

Aviation's NextGen – A Plan to a Global System

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**Royal Aeronautical Society – Montreal Branch
Montreal, Quebec**

**Fourth Annual Assad Kotaite Lecture
Dec. 4, 2007**

Remarks as prepared for delivery

Thank you so much, Dr. Kotaite, for that wonderful introduction. I feel fortunate to have made it for this event given the weather over the past few days. It reminds me of the description of the climate here I heard years ago – there are two seasons in Montreal, winter and next winter. Hopefully you'll have some glimpse of summer in between.

It is an absolute honor to be here today speaking at a lecture that carries your name, and I'm humbled to be introduced by a figure that looms so large in international aviation. Your remarkable 30-year tenure as ICAO Council president speaks for itself, and you have presided over some of the most challenging and rewarding times in aviation history. As everyone here knows, Dr. Kotaite's first posting with ICAO came as Lebanon's representative in 1956. Anyone who can come away from a half-century in the international aviation arena and emerge unscathed is nothing short of heroic in my book.

Obviously, Dr. Kotaite has left a huge imprint on worldwide aviation and deserves a large debt of gratitude for where we are today. He presided over the greatest period of global aviation safety gains in history. I had the pleasure of serving as FAA administrator during the last few years of his tenure and was privileged to work together with him to tackle some of international aviation's biggest challenges.

I'd also like to thank the Royal Aeronautical Society and the Montreal Chapter for hosting me today. I recently was inducted as a fellow of the RAS, and I am very proud to be a part of such a distinguished organization.

Tonight I'm going to talk about the global air transportation system. Now, think about that statement for a moment. I didn't say I'm going to talk about all the different air transportation systems around the world. I didn't say I was going to compare and contrast the various levels of aviation safety or approaches to airport management or air traffic control. And that was very deliberate on my part. I am here today to talk about the

shortest route to a truly global air transportation system – with some of the challenges along the way.

We are at a pivot point in international aviation. The looming question is “How do we expedite the next generation of air transportation in a way that is internationally integrated?” In the U.S. we are working on NextGen, our innovative advanced air transportation system. In Europe, they are developing SESAR, a similar concept with substantial financial backing from the EU. I think we all recognize that despite the differing names and details, the only way to cope with the challenges of booming international aviation is by moving rapidly to a seamless, interoperable, satellite-based system.

To do so, the U.S. and Europe need to work together – along with our partners – to foster this international interoperability. I was pleased to learn today that ICAO will be hosting two Symposia on this subject in 2008. First, an Aeronautical Information Management/Systems Wide Information Management Symposium in June and second, a NextGen/SESAR Symposia in September. Both events are intended to advance international interoperability and to identify what the community needs from ICAO in order to expedite the development and implementation of the future generation of air transportation. This is a once-in-a-generation change, and we absolutely must get this right.

I was recently in Italy on vacation, and, of course, I had to change my U.S. dollars into Euros. And for the first time I noticed that the coins all had famous Italian landmarks or works of art depicted on the back. I learned that each nation in the Eurozone uses common bills, but customizes the design of the coins to reflect its culture. So my Italian € Euro coin depicts da Vinci’s Vitruvian Man, while the same coin in Spain shows King Juan Carlos I. But even with this cosmetic difference, I can use either coin whether I am in Spain or Italy. There may be lessons here as we move forward toward an integrated global aviation system.

Our collective goal is a system that is seamless, instituting compatible advanced technology around the world. Current infrastructure varies greatly depending on where you are on the globe, creating inefficiencies and challenges for aircraft traversing different authorities. The global NextGen is a satellite-based system that allows precise, point-to-point flight for a lot more aircraft operating with a better margin of safety and much less environmental impact.

Now, we all know there are very real roadblocks to achieving this goal, including structural, political and financial barriers. But a truly interoperable global system would pay out benefits that far outweigh any costs. In fact, I believe we can’t afford anything less. Eddie Rickenbacker once said “Aviation is proof that given the will, we have the capacity to achieve the impossible.” That’s a good outlook when considering a global air transportation system -- we cannot let “what is” become the enemy of “what could be.” Big parts of our globe have a huge investment in the status quo – sure, with on-going upgrades – but, nevertheless, “what is” is the wrong architecture for our times?

Frequently, particularly in computers and telecommunications, we talk of technology “leapfrogging.” It occurs when less-developed countries, regions or economies make huge gains by skipping over entire phases of advancement and adopting state-of-the-art technologies. Think of widespread use of mobile phones in many developing nations with no land-line infrastructure to speak of. I believe there is great potential for this phenomenon now in aviation as well.

Today, air traffic management is a patchwork, with varying degrees of development and sophistication around the world.

All of these systems are based on radar, a technology that emerged six decades ago. While it is obvious the architecture of most of today’s air traffic management is a little long in the tooth, that does not mean there has not been progress. RNAV, RNP and Ground Based Augmentation Systems like WAAS and LAAS, are providing significant improvements while proving the worth of satellite-based technology. But there is no escaping the fact they are still based upon an aging and limited platform.

Which brings us to ADS-B – Automatic Dependant Surveillance-Broadcast. I know most of us in this room are familiar with the concept. After all, it’s a known technology that has been researched, tested and advocated for a number of years. It is clear today that ADS-B is the backbone of NextGen, and any other advanced air transportation system. Much of the discussion about the benefits ADS-B will bring, especially when talking about the United States, has centered on dealing with delays and the need for ever-growing capacity. But I was first impressed by the technology when I was at the NTSB – the National Transportation Safety Board – for a different reason. One of the early adopters of the technology, UPS, convinced me that ADS-B had great potential for significant safety enhancements, including avoiding runway incursions.

Less talked about, too, is one of the most important benefits inherent in advanced air traffic management technologies – the reduction of the impact of aviation on our environment. Aircraft that are able to fly more efficiently, point-to-point, reduce fuel use and emissions, in most cases dramatically. There will also be fewer aircraft idling on runways and burning fuel in holding patterns. I regard the environmental issue as the single greatest barrier to the growth of our industry around the world. It is also one of the few challenges in which everyone agrees upon the goal – reducing the environmental impact of aviation as much as possible.

Now, as Dr. Kotaite mentioned earlier, I come here tonight wearing a new and different hat, and I cannot stress enough how important this issue is to the American manufacturing community. As manufacturers, we expect to be part of the solution to environmental challenges. Soon after I joined AIA, I learned that aggressive R&D to reduce emissions is front and center. For more than two decades, AIA and its manufacturing partners in the International Coordinating Council of Aerospace Industries Associations – or ICCAIA – have worked closely with ICAO on solutions to pressing

aviation environmental issues. And we have made remarkable progress. Since 1960, aviation CO2 emissions per passenger mile have been reduced by 70 percent.

We are continuing to work with ICAO to implement several outcomes of the 36th Assembly, including developing a comprehensive plan to lessen aviation's greenhouse gas emissions. Another is participating in a senior-level group that will recommend an aggressive ICAO program of action at the next assembly in 2010. The environmental resolution that resulted from the assembly summed up our position as manufacturers. We accept our responsibility for developing new airframe and engine technologies, deploying hardware and software upgrades into the existing fleet, and working with air traffic service providers and airports to increase capacity.

And long-term investments in R&D are paying off, with major breakthroughs in a number of areas. Manufacturers have committed to reduce CO2 emissions by at least 15 percent in each new generation of aircraft, starting with the current wave of advanced models. This can be seen in Boeing's 787, where a range of technologies, such as lighter composite material construction and more efficient engines will burn significantly less fuel. Not to mention how quiet the airplane will be.

And engine companies continue to make amazing strides, to the point we are seeing new classes of engines, like the geared turbofan, emerge. When you marry these industrial advancements to those inherent in ADS-B, we are going a long way toward improving aviation's environmental profile.

And the early data on environmental benefits from ADS-B and other advances continues to roll in. Using a continuous descent approach into Louisville, Kentucky, UPS has seen a 34 percent reduction in emissions and a 30 percent reduction in noise below 6,000 feet. The FAA estimates that improvements included in the NextGen program will reduce CO2 emissions by 12 percent, and IATA has reported its proactive program to improve airspace design and operational procedures saved up to 15 million tons of CO2 emissions in 2006.

The FAA is moving forward with ambitious plans to evolve the entire U.S. system to ADS-B under NextGen. Some of you know, a contract has been awarded to develop and deploy the ground infrastructure nationwide by 2013. I worked hard during my tenure at the FAA to establish implementation of ADS-B as a priority. And my new post at AIA has reinforced my conviction that we have a national imperative to move forward.

But one of the most interesting things is the way ADS-B is spreading in pockets around the world. Perhaps the best known proving ground is Alaska, where ADS-B is part of the Capstone Program that has reduced general aviation accidents by 40 percent. Other emerging success stories include a project with cargo carriers in the Ohio River Valley and the expansion into the Gulf of Mexico, where full radar coverage does not exist.

But the technology has certainly not been confined to the United States. Projects are popping up around the world, especially in developing nations, with tremendous potential for safety and environmental gains. One great example is a proposed World Bank-funded program in East Africa involving Kenya, Tanzania and Uganda, potentially enabling a geographically broad approach to air traffic management. This is in a region where relatively little infrastructures exists. Another example is Australia, a long-time booster of the technology, where early successful trials have led to implementation of a nationwide system covering upper-level airspace earlier this year. Other projects are taking place or are planned for Indonesia, China and Japan. And throughout much of this you see a common thread. You do not have to overcome a huge investment in “what is” to achieve “what could be.”

As an aside, these international experiences have provided a couple of important lessons. One is that a regional approach can be vital to the success of technology advancement. Another is that implementation of the system must be accompanied by a strong regulatory oversight system with the authority of law.

Let’s revisit that leapfrogging concept for a moment, and to do so I’d like to talk about basketball. I’m sure we have a few fans in the audience. In 1992 the U.S. sent a basketball squad to the Olympics known as the “Dream Team,” consisting of what many regard as the greatest talent in the sport ever assembled. It was the first year professionals were allowed to take part in the sport, attracting luminaries like Magic Johnson and Michael Jordan. After the team crushed the competition and cruised to a gold medal, an unintended consequence occurred. The team was so awe-inspiring it forced other countries to revamp their national teams, installing state-of-the art recruitment and training programs for players and upgrading facilities throughout the 1990s. All these efforts were more advanced than what was in place in the U.S. Meanwhile, the American national team was slowing down as professionals took less stock in international competition. The leapfrogging occurred in 2002, when the U.S. placed sixth in the world championships. Since then, the best result for the team in the Olympics or international play has been third place. The lesson is that the American team was too invested in the status quo while the rest of the world took stock in next-generation approaches to the competition.

While this leapfrogging might be bad if you are an American basketball fan, it shows the potential to make great strides in very little time, particularly when there is not a well-entrenched investment in “what is.” In another area, many developing nations and regions that previously had little or no land-line telephone system in place passed that technology over altogether and went straight to a mobile network. Those networks are both cheaper than a land-line system would have been, but usually function better. I recently learned that large numbers of people in Africa are beginning to use cell phones to do their financial transactions, probably leapfrogging the old traditional banking industry as well. Yet another example can be found in many cities around the world that have installed Wi-Fi internet access systems in low income areas that had little hard-wire connectivity previously.

ADS-B is primed for this type of advance in many areas of the world. It's not an accident many projects have been in wide-open spaces that lacked radar, or in developing regions that couldn't afford ILSs, or in mountainous terrain where radar coverage isn't possible. Like a cellular phone network, ADS-B is both less expensive to establish and better performing than radar-based systems.

But the big players in worldwide aviation are not as nimble and cannot accept change as easily as the other locations. Political and bureaucratic ties to existing infrastructure create opposition to change. Obviously NextGen and SESAR in Europe are going to be the catalysts for large-scale, system-wide implementation of ADS-B into the busiest airspace in the world. But these are the most challenging systems to change.

Nobody expects a seamless global system to be easy to achieve. The entrenched architecture of an old system will be a problem wherever it exists. In the U.S., we have more than 500 facilities around the country – far more than will be needed for the NextGen. Yet it is very difficult to get political interests to agree to have facilities consolidated or equipment moved when they perceive change as a loss of jobs or prestige for the home team. And often redesign of the airspace causes a hue and cry from communities with new aircraft above their heads.

In Europe they are grappling with the Single Sky issue, coming up again against tough parochial concerns. Measures they hoped to achieve voluntarily may have to be mandated, and it is still questionable whether the various nations will agree to combine their air space at all. Solutions for these problems are hard to come by.

One solution may be an approach we have used in the U.S. to evaluate military bases and close those that may not be needed any longer. Since no state or locality wants to lose an active military base, an independent commission is appointed to make recommendations for base closures as a group. Then members of Congress have to agree to an up-or-down vote on all the changes rather than having the ability to protect their own.

The concept is that the pain involved is spread around simultaneously rather than individual blows over time. Perhaps this approach might work in a number of places to build a global air transportation system. I'm again reminded of my Italian Euro coins. Establishing the single currency was certainly controversial, and many nations felt a financial pinch when the change was made. But as the Euro has shown its strength, it's clear the result has been beneficial for everyone involved.

Finally, any country or region that looks to implement ADS-B must wrestle with the question of how to pay for it. Now, you might have heard in the U.S. we had a little bit of, shall we say, disagreement over exactly how much different operators should pay when the issue came up earlier this year. That's one indication of challenges that can arise, even when everyone supports the end result.

However, there are plenty of innovative payment structures out there. In the African program, the World Bank plans to provide development loans to install the ground stations and provide equipment to commercial aircraft. The bank is working with governments to recover expenses, but the private sector is also participating. The World Bank has shown great support for air transportation advancement, and it could be a key to spreading ADS-B worldwide. Alaska's Capstone is developing an aggressive public/private partnership going forward, with aircraft owners and the industry as a whole paying for the cockpit equipment and the FAA paying to install the ground stations. In Australia they have used tax credits as a funding mechanism, and tax incentives may be an excellent vehicle to pay for improvements in a number of countries.

The potential for the private sector to accelerate investment can't be over-estimated. Government-owned infrastructure will not move ahead as quickly as private equity investment will allow. It takes a substantial investment to pay for new technology – we're talking about billions and billions of dollars. But when you dig beneath the surface of the issue, it is not the insurmountable problem it seems. If you calculated the financial gains from the safety and environmental improvements alone, the system would pay for itself relatively quickly. Factoring in operational savings from fewer flight delays and cancellations, the investment in a global system would be paid back many times over.

So, in closing, I want to state this very clearly. We can achieve a seamless global air transportation system. What's more, we must. ICAO has worked hard to encourage improvements to global air traffic management, and it is a natural forum to oversee the structure and implementation of the global system. And the U.S. and Europe -- they have to avoid letting "what is" be the enemy of "what could be." And, as a world community, we need to ensure developing countries are not left by the wayside. But, in fact, with the ease of implementing technology and the leapfrog effect, those with the least in aviation may very well lead us. And that would be great.

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