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Good morning. I'd like to thank Philippe Rochat, executive director of ATAG, for that nice welcome and Giovanni Bisignani, director general and CEO of IATA, for getting us started today. I'm not sure who planned today's agenda, but having Giovanni kick things off is a sure way to make sure everyone is awake and alert. He is always interesting, and I appreciate his dedication to helping our industry perform to the best of our ability.

It is a pleasure to be here on behalf of all the members of ICCAIA, and to join the discourse on one of the most important issues we face in aviation today. We have in this room some of the most influential figures in the aviation industry. The time and attention all of us collectively are devoting to this issue today reflects our common commitment to making our industry the gold standard for environmental responsibility and stewardship.

And, let me say, in my view, this consensus says a great deal about things to come. Because I believe that when all the disparate segments of the aviation community come together in common cause, there is little we cannot achieve. It reminds me of one of my favorite quotes from aviation icon Eddie Rickenbacker. He said, "Aviation is proof that, given the will, we have the capacity to achieve the impossible." I believe those words apply to the challenges we are addressing today – given the will, we have the capacity to achieve ...

Let's start with a simple statement of fact. Aviation has a very good track record on the environment. That record is especially good when it comes to technological advances that have made flying more fuel efficient, and decreased aviation's environmental footprint.

But we are here today because together our industry is determined to do more. As it states in the summit declaration, we are committed to a pathway to carbon-neutral growth. Even though this goal is not easy.

My theme today is that openness to experimentation in all nations will be key to success on environmental matters. Meeting the current challenge will be much like the development of successful manned flight itself. The trial-and-error endeavors of aviation's Pioneer Era occurred all over the globe – the United States, France, Germany, England, Scotland, Austria, New Zealand and many other countries. In 1906, notable Brazilians and Romanians separately flew in originally designed aircraft in the aviation hotbed of Paris, pushing technology forward. Ultimately successful concepts were the products of parallel efforts from individuals with the initiative and courage to follow their ideas into the sky.

Like those early flight innovators, we will need a global policy atmosphere that opens the door to a new age of experimentation to meet aviation's environmental challenges. I am saying that success in this New Pioneer Age – an environmental Pioneer Age – will not come from one magical invention. It will combine innovations in equipment, operating procedures and processes across all the sectors: manufacturers, airlines, air traffic management, airports and all the others. In other words, success in the New Pioneer Age will require a combination of what I will call today technology, tactics and teamwork.

Today air travel demand has grown beyond traditional high-traffic areas like Europe and North America to the biggest leaps in places like China, India, the Asia Pacific, and the Middle East.

As a result, manufacturing activity has grown not only in scope global reach, but in geography as well. For example, we have seen regional jet construction ramp up in the traditional centers of Brazil and Canada. Russia is re-inventing its aviation sector, and China recently began efforts to enter this growing industry. In addition, after a four-decade hiatus, Japan is poised to become an airframe manufacturing nation once again.

But let's state a fact – this growth in aviation around the world is putting stresses on the environment. We need to find ways to lessen that impact while accommodating the increases in global demand for air travel. As the declaration states, we agree on the need to “accelerate action to mitigate our environmental impact ... while preserving our driving role in the sustainable development of our global society.” Using technology, tactics and teamwork, we can rise to this challenge.

Let's start with the role of technology.

Aviation manufacturers have a tremendous track record of developing products and technologies that provide significant leaps forward regarding environmental advances. Fuel burned per seat mile in today's aircraft is down more than 70 percent from

early jets, and new planes are more fuel efficient than most automobiles on a per-passenger-mile basis.

Consider the technological leaps that have gotten us to this point. Jet engines have evolved from noisy, smoky units to today's fuel-sipping whisper jets. They are so powerful and reliable we can cross oceans in aircraft with just two engines, and emissions are a fraction of what the early units put out.

And it's not just engines. Winglets, for example, have provided significant gains in efficiency. Airlines have installed them on existing aircraft in their fleets to increase aerodynamic performance and decrease fuel consumption.

More is coming. Fuel savings on composite-construction aircraft may be as much as 20 percent. Meanwhile, engine manufacturers have developed a new generation of advanced power plants that will compound the efficiencies gained by the new airframes. Some of these engine advances represent technological leaps of two generations or more, incorporating entirely new technology like the geared turbofan.

There is also ongoing work on wings that shows promise for all classes of aircraft. New designs are under development to improve aerodynamic efficiency, and new leading-edge technologies will reduce noise.

Alternative fuels are also part of the effort. Manufacturers are aggressively exploring biofuels and other options to reduce emissions. Following the Airbus demonstration of gas-to-liquid fuels, just a couple of months ago, we all followed the successful demonstration flight by Boeing, Virgin Atlantic and GE Aviation testing a sustainable biomass-to-liquid fuel. And, this fuel didn't affect our food supplies. We can now say with confidence that biofuels made from non-food sources may well power aircraft to come, reducing carbon emissions and airlines' reliance on petroleum.

More recently we saw a remarkable first flight of a hydrogen fuel cell-powered small aircraft in Spain. The project involved Boeing Research and Technology – Europe as well as industry sponsors from Austria, France, Germany, Spain and the UK. While the technology is not expected to power large passenger aircraft, there are many potential uses for the technology that can lower aviation's environmental impact. And, like any new technology, alternative fuels and fuel cells need to prove their promise in flight.

So there are a number of ways that technology is answering the environmental challenge. And, there are many experts here today who can provide first-hand details. So, let me move along. I mentioned that tactics and teamwork are additional aspects of the answer.

Let me turn to the next of them: tactics.

By tactics I mean the combination of infrastructure improvements and subsequent enhancements in operations in the global air transportation system that hold the potential to increase efficiency dramatically.

As you can imagine, the tactic most front-and-center to me is NextGen, which I worked on extensively in my previous position at the FAA. NextGen technology will allow direct point-to-point flying and eliminate backups of aircraft landing and taking off, meaning less fuel burn and fewer emissions. Estimates show NextGen can cut greenhouse gas emissions by approximately 15 percent.

An excellent example of this potential is a project in Louisville, Ky., by UPS. Using ADS-B technology to guide continuous descent approach, the company saw an impressive 34 percent reduction in emissions during approach.

In the past I have spoken, especially to international audiences, about the importance of a truly global interoperable air transportation system. Here in Europe SESAR is in development, and its similar technology should reap environmental rewards on par with NextGen. Around the world we see projects advancing that, while maybe not on the scale of NextGen or SESAR, are improving air traffic management significantly. ADS-B and other satellite-based technologies are either in place or planned in Australia, East Africa, Indonesia, China, Japan and India.

But tactics don't have to be on even that scale to make a difference. Manufacturers are working with airlines to ensure that every possible step is taken to improve the efficiency of aircraft. This includes steps like making sure the engines are clean and operating at peak performance, and keeping airframe surfaces free from even small imperfections. Even these small steps can make a real difference in fuel efficiency.

I've mentioned a few statistics in my remarks today relating to emission reductions we see in the pipeline. Now, I think many of us are aware that there are different ways to look at the concept of "carbon neutral" aviation. This has led to varying conclusions of whether that goal is achievable by everybody's definition. And some say there is a gap in what we are currently on pace to accomplish and what would be true carbon neutrality. But any way you look at it, I believe we can – and should – do even better than the advances in limiting emissions I have mentioned here today.

This means the need for experimentation is even more crucial to our industry as we juggle the twin demands of growth and environmental impact. It demonstrates the crucial role research and development investment around the world plays in making sure we can fully address the problem. I have no doubt that we can get there with the hard work of many of you in the audience today; and, no doubt with the ideas and hard work of some in unexpected places we haven't thought of.

In this New Pioneer Age, the key to success in the areas of both technology and tactics will be experimentation. In a sense, this is nothing new. The aviation industry has long achieved progress by encouraging and rewarding entrepreneurial testing, and the

environmental issue should not and must not be the exception to the rule. Because experimentation often reaches conclusions you might not expect.

It reminds me, once again, of the first Pioneer Era, when the challenge was flight itself. If you looked at the Wright brothers and one of their main rivals, Samuel Langley, the smart money would not have been on the siblings from Ohio. In 1896, Langley engineered two powered, heavier-than-air flights of an unpiloted model – one about a mile in length. The Wrights' big achievement that year was manufacturing their own brand of bicycle for the first time. Langley's success brought in a huge infusion of government investment – \$70,000 – to develop a piloted plane. In contrast, the Wright brothers wrote to the Smithsonian Institution in 1899 for data on aeronautics, so they could start their work on powered flight. The secretary of the institution at the time? Samuel Langley. Makes you wonder if he ever found out what employee sent the Wrights that information!

The point is the brothers chose to experiment in spite of long odds against them. And they worked in a cultural and policy environment that allowed them to proceed unfettered, leaving open rewards for success. The result was the first controlled, manned, heavier-than-air flight in 1903, and the first practical airplane.

This is the spirit we need and the action we need. It is the policy atmosphere and further experimentation necessary in all our nations in this New Pioneer Age if we are to produce major reductions in aviation's environmental impact.

Experimentation will also be key to success in the last of the three arenas I want to mention – teamwork.

Recently my friend Clay Jones of Rockwell Collins made a comment about the U.S. aerospace industry that really struck me. He said he could not think of one single issue or initiative on which the industry was united that was not successful. We can adapt the same principle to international challenges like the environment – I can't think of anything we could not achieve if we present a single unified front around the globe.

If manufacturers join with airlines and airports and pilots and regulators and controllers and MRO companies and air navigation services providers and travel and tourism organizations and chambers of commerce, there is no stopping us. By coincidence, that group sounds a little like ATAG, doesn't it?

What does this mean to the current discussion about how to improve aviation's environmental performance? First, it means the spirit of entrepreneurial experimentation should permeate worldwide, even for governments. True innovation sputters when held back artificially.

Secondly, teamwork means a truly global approach to aviation's environmental problem solving. Our industry is very fortunate to have an organization like ICAO as our international forum to deal with every issue affecting the worldwide aviation endeavor.

ICAO can provide a seamless structure to house all our various efforts to make improvements and avoid needless confusion and fragmentation. Conveniently, ICAO already has a framework for this task – the Group on International Aviation and Climate Change.

Now, I'm not going to stand here and pretend there are not differences of opinion in the approach to environmental regulation. That's a normal outcome of the type of experimentation I've been talking about. But I would submit that we sit here today in a session of a remarkable group designed to promote international cooperation – ATAG. We have representatives from every corner of the industry, and from all over the globe. And we have a common goal of improving environmental performance.

So much is at stake – for all of us. The challenges are immense and yet I am confident. After all, as we launch this New Pioneer Age for aviation and the environment, we know one thing: we have the will, and we have the capacity to achieve.

Thank you

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