

**PREPARED REMARKS
ADMINISTRATOR CHARLES F. BOLDEN JR.
NASA GREEN AVIATION SUMMIT
Sept. 8, 2010**

Thank you, Jaiwon, and thank you all for inviting me to speak today. It's great to be at Ames again. The long history of aviation comes alive here, and as a trained pilot myself, I love soaking up that atmosphere.

I have to say, on the plane ride here from the Midwest, where I spoke last night, I was daydreaming a bit about what some of the aircraft of the future will be like. There are a lot of amazing concepts on NASA's Aero website and I know there are a lot of great ideas and vibrant imaginations in this room. I hope this summit is productive for NASA and for all of you -- as individuals and as a field.

My plane ride -- really my whole airport experience today -- wasn't too bad, but in the future, I think it will probably be a lot better. Quieter and more efficient flights will mean none of us will have to worry that our travel is polluting the air or the sonic environment of our neighbors. I'm hoping you're all dedicated to helping bring about these important improvements in aviation.

Your work here and in the future will have a huge impact. I often find myself having to explain to people the benefits of space exploration to life here on Earth. But in aeronautics, the positive gains from what we do should be a little easier for anyone who has ever walked through an airport and struggled with our air transportation system to see these benefits. Our critical responsibility is those who feel anxious because of the long distance they have to travel to reach an airport; the crowding they experience upon arrival at the terminal; the departure, enroute, or arrival weather; or concerns that the technology on the planes may not be up to dealing with problems that may be encountered in the sky.

That's why we're so excited at NASA about the opportunities we are being given in the coming years to help develop solutions to some of our most pressing aviation problems and create the next generation of air transportation systems that will last for generations and make us all safer and make the planet a better place. That's a huge challenge, but we at NASA enthusiastically accept it.

Just as I like to tell the scientists and engineers who send our human and robotic missions out into the cosmos, you are contributing to national goals and helping people in the work you do every day. We are going to make measured progress leading to ever expanding accomplishments to meet the myriad increasing challenges. This is our challenge - to shape the future in aeronautics.

Over the past 70 years or so air travel has become one of the world's safest modes of transportation and a vital part of the world economy. But even with this tremendous progress, new challenges continue to surface.

It's no secret that our airports and our airplanes are getting more and more crowded. In the United States, 60 certified domestic carriers operate more than

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28,000 flights a day. Last year alone, they moved more than 700 million passengers, a number that is forecast to exceed 1.2 billion by 2030.

Here's what the sky over our heads looks like now. That looks like a traffic jam to me. Just imagine what it will look like 20 years from now with almost double the demand. And imagine the demands on air traffic controllers. Our aging air traffic control system needs new capabilities, new technologies, and new ways of looking at the big picture.

As we are doing in space flight, we're looking at where we want to be not just a few years down the road, but decades from now, and we're making decisions about what we need to do today to get there.

Today, commercial aviation provides jobs for nearly one million Americans. The aerospace manufacturing industry provides the nation with a \$60 billion trade surplus.

But the capacity of our system to operate the way we do now, and the increased traffic's toll on the environment and our system's own infrastructure are factors we need to address. We need to make some changes – both in the design of aircraft and in the way they transit through our skies to not only maintain, but improve safety and efficiency. Yes, I am going to use a word that has become integral to my vocabulary - we are going to innovate!

NASA Aeronautics is finding answers to the challenges we face.

For decades, NASA has worked to improve the performance, efficiency, and safety of our aviation system. Nearly every airplane that exists today uses technology made possible in part by NASA research. We're present in the innovative aircraft themselves and the air traffic management systems that help make them safe and efficient.

When it comes to NASA's contributions to environmentally friendly aviation, the list of technologies we have developed that are in use today is long and comprehensive.

The most recent example is this chevron nozzle. It's similar to ones that will be flying on Boeing's new 787 and 747-8 airplanes.

See the saw-tooth shapes at the back of the engines on this aircraft? They reduce engine noise significantly without penalizing engine performance, and they are a NASA innovation.

In the not-too-distant future, thanks to NASA, you may be able to live near an airport and not suffer the whine of jet engines revving for takeoff when you are

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trying to sleep. Nuisance noise near major metropolitan airports is seen as one of the greatest hindrances to future growth of the aviation system, so the advent of chevrons is especially timely.

Another NASA innovation -- the little upturned ends of the wings you see here -- came about when the environmental awareness and the energy shortages of the 1970s prompted demands to save fuel and stop polluting. Winglets reduce drag and fuel consumption, and most of the airliners in service today have them.

We want to show that it is possible to reduce aircraft fuel consumption, emissions, and noise simultaneously. Each of these is a lofty goal in itself.

We're working on demonstrating the feasibility of technologies that would enable aircraft to burn 33 percent less fuel than today's most efficient models. We hope to make a lot more progress on those technologies within the next five years.

With help from aircraft technology and air traffic management techniques developed by NASA, harmful carbon emissions from airplanes could level off and begin to dissipate in just 10 years' time.

Our goals are ambitious -- all the more so when tackled together -- but I am confident they are achievable.

Enabled by NASA research, U.S. companies will begin designing airplanes with unconventional shapes and building them with new, lightweight composite materials and structures to increase lift, reduce drag, and lessen the strain on engines.

This is an example of a new damage tolerant airplane material NASA is developing. It's called Pultruded Rod Stitched Efficient Unitized Structure, or PRSEUS for short.

Not only will these airplanes look really cool, but they will have breakthroughs like engines to handle more air, which can be placed in unusual places on the airplane to deflect their sound.

These innovations will help us capitalize on the potential of alternative fuels and advanced power technologies. We will begin equipping aircraft cockpits with automated decision tools and satellite-based air traffic information and communication systems to let airplanes climb or descend without interruption and fly more direct routes to their destinations.

I showed you the current state of affairs a few minutes ago. Here is what the future of America's airspace system could look like. The system is elastic. Distributing the air traffic control burden between the airport tower and the

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cockpit allows maximum flexibility. The system expands as necessary to accommodate demand – not only for everyday transport but also for new missions by very different kinds of aircraft, even some without pilots.

NASA did not achieve any of its past breakthroughs in aeronautics alone. Nor will we achieve any of our future breakthroughs by ourselves. Our partnerships with other government agencies, industry, and academia are crucial to our success.

In partnership with the Federal Aviation Administration and the Department of Defense, for instance, NASA is developing safe and efficient air traffic management and operational procedures using satellite-based navigation aids for the air traffic control modernization effort known as the Next Generation Air Transportation System, or NextGen.

Another example close to my heart is our work to solicit fresh ideas from industry and academia through NASA Research Announcements, student design competitions, and internships, all of which provide support for university science, technology, engineering and mathematics departments. We've also just opened the application period for this year's Aeronautics scholarships for undergraduate and graduate students, and we look forward to helping to jumpstart the studies and the careers of these future leaders.

Our close collaboration with our stakeholders helps us ensure that we are working on the right challenges -- that our research is both relevant to the aviation community and beneficial to the flying public.

NASA is fortunate. There is strong public support for aeronautics research, as evidenced by recent budget increases approved by Congress. The president has requested another increase, to almost \$580 million, for NASA Aeronautics, in 2011, and Congress appears to be supportive of this.

The president's budget strongly supports our existing portfolio of research and development and the timely development of NextGen.

With Congress' approval of this increase, NASA will help expand our system's capacity, and focus on work to enable fuel-efficient flight planning, reduce the overall environmental footprint of airplanes, reduce delays on the ground and in the sky, and improve the ability to operate in poor weather conditions while maintaining the current high safety standards of our aviation system.

Our efforts will facilitate the transition of new capabilities to manufacturers, airlines and the Federal Aviation Administration, for the ultimate benefit of the flying public.

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NASA Aeronautics has a long and prestigious history of vital contributions to America's aviation community. Green may be the new hot topic in 21st century America, but the principle of environmental responsibility has guided NASA's research goals since the earliest days of aviation.

This summit celebrates technical excellence and the power of partnerships in advancing U.S. pre-eminence in aviation. You will see not only the depth and breadth of NASA's green aviation research, but also the scope of NASA's commitment to clean, quiet, efficient and safe air transportation and a better quality of life for all.

We need your excitement, your dedication, and your innovation. With your help, NASA will continue to be a springboard for technological breakthroughs – advances that bring incredible aircraft into being and change all of our lives for the better even when we don't see the complex systems behind our travel. And we'll do it in a responsible way, a way that makes us good stewards of our environment and the world. Green is much more than a buzzword to us. It's part of every bolt we turn.

I congratulate you all on your outstanding achievements and look forward to many more in the coming years. And I'll be thinking of you every time I board that plane for my next trip.

Godspeed, as we tell the astronauts. Thank you.