

REMARKS BY JAMES B. BUSEY
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ANNUAL ASSEMBLY AND TECHNICAL SYMPOSIUM
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Thank you very much. It's a pleasure to address this assembly today.

It is appropriate and timely that RTCA chose to address the 21st century air traffic management system at this assembly because the world is looking to the RTCA community to provide the vision, the technical knowledge, and the leadership in this area.

The list of distinguished moderators, speakers, and panelists assembled for this meeting is ample testimony to the prestige of RTCA and its capability to act as an effective agent for constructive changes within our community.

And, of course, over the years, RTCA has played a key role in making the U.S. air transportation system the best in the world. We've established a standard for superb air traffic management technology and practices that is unmatched anywhere around the world. And we are all proud of these accomplishments.

Now, the challenge shifts in this last decade of the 20th century. Our job now is to keep the U.S. air transportation system preeminent, but within a broader context as the aviation industry becomes increasingly global in nature.

And the challenge is already on top of us. The continued growth of aviation is placing a heavy burden on the air transportation system. Not just in the United States. Everywhere we look we see growth and expansion. In Europe, Asia, and the Pacific Rim--demand for air transportation services has never been greater.

Air traffic in the international market has risen almost 17 percent this year. Today, the U.S. air transportation system serves over 450 million passengers annually -- that's twice our national population. And not too long after the turn of the century, we expect to see this number double. If you travelled by plane or picked up someone at an airport the day before Thanksgiving, you have a pretty good idea of what air travel will be like every day in the year 2000. That is, unless we do something about it.

What makes this challenge all the more daunting is that no new major airports have been built in this country since 1974. And only one more--the new Denver Airport--is now under construction.

More new airports and development of existing airports are the key to providing the increased capacity we will need to meet the growth challenge. There is no getting around that.

However, the good news is that a large number of technology opportunities present themselves for improving air traffic management services and thus help increase system capacity.

The principal opportunities are satellite-based communications and navigation services, air traffic management automation, flight management computer systems, data link for error-free interchange of information air-to-ground, and new capabilities for sensing and forecasting weather.

The Microwave Landing System will provide essential improvements in the flexibility and efficiency of approach and landing operations. And TCAS technology will facilitate cockpit displays of traffic information and new roles for flightcrews in the air traffic management process.

We've recently completed a description of a future system based on these technologies. As you would expect, our system description is derived largely from the work of the ICAO Future Air Navigation Systems Committee and RTCA Special Committee 155.

We have added new material in a number of areas, particularly in the area of integrating the operations of ground-based air traffic management automation systems and flight management computers using data link. We believe that integrated operation of ground-based and airborne automation systems will be the cornerstone of the future air traffic management process.

Our objective is to focus community attention on the need to define the future air traffic management system and to facilitate deliberations on this important subject.

Marty Pozesky will discuss our views on the future system in more detail later this morning.

Now, I would like to share with you my perspective on some of the challenges we face as an aviation community in defining and developing the system for the 21st century.

It is clear that the future system in the United States will build on the strong foundation being implemented under the National Airspace System Plan and its successor, the Capital Investment Plan.

I assure you, there will be no wholesale abandonment of existing systems and practices. Rather, I foresee a rapid evolution that puts in place new services, many of which will be based on the facilities we now plan to install.

The goals for the future system are also clear. It must maintain and improve the safety of air traffic management operations, provide increased capacity, and fully utilize capacity resources to meet traffic demand.

User-preferred flight trajectories must be accommodated along with the full range of aircraft types. Aviation information provided to users, in particular weather forecasts, must be reliable, timely, and easily accessible.

Are these goals achievable? Yes. Some far sooner than you might expect.

Satellite-based data and digitized voice communications services for civil aviation are scheduled to be in operation in 1991. And the U.S. Global Positioning System is expected to be operational in 1993.

These early elements of the future system will immediately and dramatically improve communication, navigation, and surveillance capabilities in oceanic airspace.

The FAA recently issued a request for proposals for prototype development leading to the award of a production contract for MLS Category II and III systems.

MLS will provide the essential capability to fly curved approaches and departures in all weather conditions. At a time when airport capacity gains are difficult to achieve, MLS offers one of the few promising answers to the severe airport capacity constraints facing us.

So, our goals are clear and the enabling technologies are available, or soon will be. So, where's the challenge, you might ask?

The major challenge, as I see it, is in the application of these new technologies, in understanding how to apply them to improve air traffic management services.

Take the oceanic environment as an example. GPS will improve navigation capability substantially, especially if the combination of the GPS and GLONASS constellations will provide a sole means of navigation over the ocean.

Automatic Dependent Surveillance, using satellite-based data link communications, will provide real-time position reports to oceanic centers. This data link could be used also to connect ground-based automation functions with flight management computer operations.

The payoff is that we'll be better able to accommodate safely the user's preferred flight path. Cockpit display of traffic information and air-to-air VHF voice communications will allow flightcrews to resolve simple separation problems.

These are exciting possibilities. But the detailed design and full understanding of this new oceanic air traffic management system is a major undertaking.

We need to develop the engineering design, the functional and technical relationships among the various system elements on the ground, in space, and on the aircraft.

We need to develop the new procedures that will be required in oceanic centers and on flight decks. And we must understand the implications for airspace organization and separation standards.

The design must be validated from the human factors standpoint and coordinated internationally to assure its acceptance.

Finally, when all this is done, we need to fully understand how and to what extent system operations will be improved. The benefits measured in terms of improved safety and efficiency of flight operations must offset the capital investments required.

In some respects, the new technologies present us with the problem of too many choices. But that's where you come in. This community is challenged to sort through the alternatives and rationally determine a path to the future. That's a big job. But, that's okay. This community thrives on challenges.

FAA clearly has a major role to play in defining the future system. Much of our energy as an agency is consumed by the day-to-day operation of the air traffic control system. Nonetheless, we must and will maintain a vision of the future as a basis for our R&D and capital investment planning.

The system description I mentioned earlier is one small step in this process. We need your participation and support in defining the development directions.

And I know we will get that support because we are all united by a common and lofty goal--the advancement of civil aviation for the benefit of mankind. And the only way we will reach that goal is by working together.

Thank you.

REMARKS BY ADMIRAL JAMES B. BUSEY
FAA ADMINISTRATOR
BEFORE THE GRADUATE SEMINAR
ON AIR TRANSPORTATION
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DECEMBER 6, 1990

Thank you. It's a pleasure to have this opportunity to share some of my thoughts about the problems of managing the FAA in these final years of the Twentieth Century.

During the first part of this seminar I'll discuss some topics that I hope will stimulate your thinking and generate questions that we can cover during the discussion period later on.

First of all, then, let me give you my perspective on the FAA and its place in the world today.

As we all know, the Age of Aviation was born just three years after the turn of the Century. When the Wright brothers made that first flight at Kitty Hawk, no one could have foreseen how air transportation would change life on this planet.

In the 87 years since that first flight, aviation has become the mainstay of our national defense and one of the foundations of our national economic strength.

In fact, it would be difficult to exaggerate the importance of aviation to our national economy. We have the largest air commerce system in the world -- with more planes and more flights, flying more passengers and freight than any other country.

According to a recent study for the Partnership for Improved Air Travel, American aviation generated 594 billion dollars worth of economic activity in 1989. That total -- more than a half-trillion dollars -- comes from what the economists call the direct, indirect, and induced economic impacts of aviation.

The largest segment, commercial aviation, accounted for 552 billion dollars worth and provided eight million jobs -- while general aviation contributed 42 billion dollars and provided 537,000 jobs.

On the manufacturing side, the aerospace industry had gross income of more than 105 billion dollars and employed 1.3 million people last year. It is the leading positive contributor to our balance of trade, with nearly 33 billion dollars in exports last year.

So aviation has a tremendous impact. But its influence extends far beyond just the world of aviation. It affects our standard of living and our ability to compete in world markets.

Make no mistake about this: Every market today is a world market. The day of the purely domestic national market, confined by national borders, is gone.

Wherever we sell our products and services, here at home or abroad, we face tough competition from other countries -- and we can beat this competition only if we can price our services and products competitively.

Transportation is a major cost component affecting the price of our products and services. The more efficient our transportation, the better we can meet the competition in the global market.

Now I said a moment ago that we've got the biggest air transport system in the world. By any measure, it is indeed impressive. Let me give you a few numbers. We have 5,600 aircraft in our airline fleet and 210,000 in our general aviation fleet. These aircraft are maintained by 326,000 licensed mechanics and are flown by 700,000 pilots, who use the nation's 17,000 public and private airports.

Our air route traffic control centers will handle more than 36 million operations and our airport control towers will handle more than 61 million operations this year. And our airlines will transport more than a half-billion passengers this year.

Those are just a few of the numbers I could cite to show the size of our civil air system. It is big. It is complex. And it takes a big organization, with a wide range of responsibilities, to ensure that it's safe and efficient.

To give you an overview, I'll quickly list a few of our major activities. The FAA:

- * establishes and enforces regulations governing all flight activities.
- * It oversees the training and licensing of pilots, technicians, and mechanics.

- * It certifies the design of new aircraft.
- * It monitors aircraft manufacturing.
- * It sets and enforces standards for aircraft maintenance.
- * It promotes civil aviation and a national system of airports.
- * It maintains working relationships with aviation authorities in other countries.
- * It helps develop new technology.
- * And it operates a vast air traffic control, surveillance, communication, and navigation system that includes 455 control towers, 21 air route traffic control centers, 194 flight service stations, and thousands of computers, radars, radios, and navigation devices.

I could go on, but that's more than enough to give you an idea of the range and extent of our responsibilities.

There is no part of the aviation world that is unaffected by the FAA. If it has to do with aviation, we are there. And I want you to keep that in mind as we consider the problems of managing this agency.

Now there are two major developments that affect just about everything the FAA does. First, there is the continued advance of aviation technology, a phenomenon that has been with us since Kitty Hawk. Secondly, there is the ever rising volume of air traffic.

As far as we can look into the future, we see continuing improvements in aviation technology and continuing increases in air travel. Technological change and ever-increasing air traffic, then, are the hallmarks of the environment in which the FAA operates.

The FAA has no choice but to keep pace with both of these developments.

In one sense, they are inter-related. To handle ever increasing air traffic efficiently and safely, we must equip our air control system with the best and most advanced technology available. By keeping up with technological change, we will be able to increase system capacity.

So we're investing billions of dollars in the new computer systems, the new radars, the new automation techniques, and all the rest, that will give us the highest possible level of safety and that will ensure that the system does not bog down in congestion and delay.

In addition, we're doing everything we can to help our states and localities improve existing airports and build the new ones we need to meet rising demand.

In investing these billions of dollars, I am determined that we spend the money wisely and well. We are making sure that what we buy is what we need. And we are making sure we bring these new systems on line, on time and on budget. These are investments which for the most part are financed by users of the system. In effect, I am managing a modernization they have paid for and I take that responsibility seriously.

Now let me turn to the question of what it's like to manage an organization with such a wide range of activities and responsibilities in the environment I've just described.

First of all, as you can imagine, the job of managing the FAA is considerably different from managing a corporation in the private sector.

The FAA is unique, unlike any other organization in the world. One aspect of this uniqueness can be seen in the fact that the FAA's success in fulfilling its mission can be strongly affected by the way in which it manages four very special relationships.

Those four relationships are with the Congress, with the Department of Transportation, with the aviation user groups that represent the people we regulate, and with the major aviation nations around the world.

I spend a lot of time and energy making sure those relationships are being handled in the right way.

Let's first consider our relations with Congress. You've probably heard about the problems of congressional oversight and what is called the "micro-management" of Federal agencies by the Congress and its committees.

The point I want to make is not that there's too much oversight -- although there may be some FAA people who would agree with that -- but rather that it's a fact and we have to deal with it.

I'm sure you realize that congressional oversight sometimes reduces our freedom of action. Sometimes it means that we can't make decisions with the degree of flexibility that managers in private industry enjoy.

Members of Congress are interested in everything we do -- not just the large programs, but often the minute details of our daily activities. And they're not hesitant in letting us know what they would like us to do -- or not do.

For example, for several years now we've been consolidating our flight service stations in order to provide a more efficient and less expensive service. The program has been well received by pilots all over the country. But in several instances, congressional opposition has made it difficult to close or consolidate a flight service station.

Another example. Every FAA appropriations bill contains a number of special requirements that direct us to take specific actions -- such as installing a certain kind of equipment in a particular geographical location.

This year we testified at 31 congressional hearings on such subjects as our appropriations and reauthorization bills, the Pan Am 103 bombing, airport noise, aging aircraft, runway incursions, the new Passenger Facility Charge, security, and controller training.

I personally testified at seven of those hearings. And we monitored 11 other hearings that dealt with subjects of direct interest to us.

In addition to our testimony at hearings, in legislation passed this year, Congress is asking us for 34 new reports on various subjects. A number of these will deal with subjects related to our appropriations and reauthorization bills. But some are not quite so far-reaching.

For example, we've got to do a study on the Caribbean airspace, a study on housing for our people down there, and a study on the feasibility of a tower for a certain airport. As you can see, the subjects range far and wide.

Now these new reports to Congress are in addition to the ones we're already doing -- which include nine annual reports a year, five quarterly reports a year, and three monthly reports every month.

We also have to respond to thousands of letters and telephone calls from members of Congress. So far this year, we've received more than 4,200 letters and close to 2,600 calls. Like congressional hearings, these letters and calls cover the waterfront:

- * A member wants an ILS in his district,
- * or he wants to ask about a constituent who failed his airman's medical exam,
- * or there's too much noise at the local airport,
- * or she doesn't want the flight service station closed,
- * or he wants us to reconsider the age 60 retirement rule for airline pilots,
- * or she's worried about exit-row seating, or child safety restraints,
- * or he wants us to rehire a striking controller (yes, it's still an issue),
- * or she's asking about an Airport Improvement Program grant -- the list of congressional concerns is really endless.

We can't ignore those concerns, no matter how trivial they may appear. We need Congressional support and understanding. The only way to get that support and understanding is to work with them, respond to their questions, and try to help them understand our problems and our needs.

So I've got to know the people on the Hill. I've got to know what's on their minds.

In addition to direct congressional oversight, we also have to deal with a number of studies and investigations by the Government Accounting Office, which, as you know, is an arm of Congress.

In fiscal '90, for example, there were 20 GAO investigations directed solely at FAA programs and activities. There were 22 others that were government-wide in scope but that also included the FAA.

I think I've said enough to show the extent of the congressional oversight -- a fact of life the FAA has to deal with.

No matter what we do, we always have the Congress looking over our shoulder. But that's really not a complaint. One could say, I suppose, that this is one of the prices we pay for a representative democracy.

I'm not alone with this problem. Other federal administrators must live with it too. And I think it can be done successfully. You have to deal honestly with the members of Congress and, as I said, you have to be responsive.

But that does not mean that you have to do things that you know are not in the nation's best interest. If you have the facts on your side, and you can communicate them effectively, then the chances are that you will not be pressured into doing something undesirable.

Now let me turn to our relationship with the Department of Transportation. This too is vital to our success.

In essence, the FAA-DOT relationship starts at the top, with how well the FAA Administrator and the Secretary of Transportation work with each other.

I'm happy to say I have an excellent relationship with Secretary Skinner. There's a personal friendship and respect and sensitivity that goes all the way back to when we first met one another.

We knew that it was important -- for the FAA and the Department -- that we work well together. We mutually agreed to work hard to demonstrate the right kind of working relationship. And we did that.

For one thing, during the first year, we appeared together before aviation groups around the country. Now that's no longer necessary. The message has been communicated effectively.

We also established, right at the start, the ground rules that would give me the freedom of action I need at the FAA.

For example, he has given me the authority to make major procurements -- those running above 150 million dollars. He's also given me the authority to establish new executive positions that I need. And he's granted me the authority to give my senior executives incentive bonuses, when they are warranted by outstanding performance.

The fact is that the FAA has the Secretary's support -- and this has been invaluable to me and the FAA. He works with me, and he supports my decisions. I couldn't ask for more.

This good working relationship has paid off in a number of ways. You may remember that 18 months ago, at the time I came into this job, there was a lot of interest on the Hill in making the FAA independent. People said the agency would work better if it were taken out of DOT.

But that issue is no longer on the front burner. And I believe a major reason for that is the relationship that the Secretary and I have established between the FAA and the Department. We have shown that these two organizations can work together effectively.

This also shows, I think, how you can effectively manage your relationship with Congress. The Secretary and I have worked hard to demonstrate what a good working relationship can do for aviation. In doing that, we turned around those antagonists -- not only in Congress but also in some of our major aviation groups -- who were ready to push for an independent FAA.

We established credibility. We did what we said we were going to do. And that took the ammunition away from those who wanted to move the FAA.

So I strongly believe that, by personal example and credibility, a manager in the government can change the direction and the intent of the Congress and perhaps keep it from too much micro-managing and over-management.

Such a manager may also win victories in other areas too.

For example, we were able to get a two-year reauthorization for the FAA. We got the new Passenger Facility Charge. We got the call for a national noise policy. And we got higher budget levels which, although they are not up to what we asked for in the President's budget, were up significantly over the previous year.

Now these are all legislative victories that show a greater tolerance in the Congress to let us keep going because they like what they see, they like the way the FAA and DOT are working together.

The third important relationship I want to mention concerns the aerospace industry, the airlines, general aviation -- all the people who are directly affected by FAA rules and regulations.

I've worked hard to create a better relationship with these people. When I first took this job, it was obvious that we needed to make some changes. I wanted to find out what the problems were and what we might do about them, and I spent a lot of time talking to people throughout the world of aviation.

I didn't much like what I heard. The atmosphere was negative. There was a lot of discontent over the way the FAA was running its enforcement and compliance programs.

There was not enough flexibility. There was too much reliance on mandatory punishments for infractions. People told me they were being treated unfairly and inconsistently.

All too often, there were wide variances in the enforcement actions taken by our various field offices and even between individual inspectors in the same offices. Some actions appeared to be unnecessarily severe.

The result was that a lot of people were losing confidence in the FAA. In my view, that threatened to undermine the voluntary compliance that has always been the bedrock of aviation safety in our country.

The willingness to cooperate, to follow the rules, is essential to safety. But that willingness can be quickly undermined by enforcement actions that are unnecessarily harsh and inconsistent.

So in mid-1989 I ordered a review of our enforcement and compliance programs. That review clearly indicated that we needed major changes in our enforcement and compliance programs. We had to make them more fair, more humane, more consistent, and more effective. And that's what we've done.

Rather than putting so much emphasis on enforcement of the rules, we're aiming for greater voluntary compliance by everyone concerned.

For general aviation, we've shifted the emphasis away from inflexible, mandatory, punitive actions, to a greater reliance on education and remedial training. We've made it easier to comply with the regulations and easier to correct shortcomings when they occur.

We've also made the same kind of change in emphasis for air carriers. Here, again, we're shooting for greater voluntary compliance. We're saying "if you find an inadvertent violation, and if you correct it on a permanent basis and report it promptly to the FAA, you will not be penalized. Period."

We've also made similar changes in our compliance policies for manufacturers of commercial aircraft and parts.

Enforce the rules and regulations? Yes, of course. The safety regulations are not at issue. What is at issue is the question of getting better safety through voluntary compliance. And I believe the changes we've made will move us closer to that goal.

Our experience shows that cooperation is better than coercion. To put it simply, we get better results by relying on the expertise, the good judgment, and the freedom of action of everybody in aviation -- far better results than we could ever get by 100 percent over-the-shoulder monitoring.

Most importantly, the changes we've made are creating a more positive atmosphere between the FAA and the people we regulate -- an atmosphere that is more conducive to communication and cooperation.

In my view, that's a step forward toward the goal of the highest possible level of safety for everyone who flies.

The fourth relationship I want to cover relates to the world beyond our borders.

Aviation today is increasingly a global system. National borders really don't mean much any more. We all know about the growth in international travel. People cross borders and oceans as if they didn't exist.

We're witnessing a rapid increase in global travel. Total U.S. international passengers more than doubled between 1977 and 1988, rising from 28.5 million to nearly 61 million during those years. We predict that international flights will increase 50 percent faster than domestic travel in the 1990s.

The number of U.S. air carriers serving international destinations has grown from a dozen prior to deregulation to more than 40 today.

You can see the same trend in aircraft manufacturing. Large aircraft today are made with components from all over the world. In 1980, there was an estimated 7 to 9 percent of foreign content in large U.S. transports. Today, with the increase in licensing, co-production, and joint venture agreements, the foreign content of large transports has risen to an estimated 20 to 30 percent.

And they are being operated increasingly on an international basis too, often with owners in one country leasing equipment to operators in another country and flown by crews from a third country on a worldwide basis. Some estimates show that by the turn of the century half of the world's commercial fleet may be controlled by large international leasing companies.

A leased plane operating out-of-state for long periods creates a regulatory nightmare for the state of registry. The only way to get out of that nightmare is to go through a cumbersome and costly transfer of registry to the other state.

There's no question that we face the potential of a severe dilution of safety responsibility as a result of the increasing multi-national nature of aircraft manufacture and operation.

How can we be sure of the safety and maintenance of aircraft that are owned by a company in one country, operated on lease by another company in another country, maintained by someone else, and possibly flown by crews from a fourth country?

The best answer to that question will be to create greater uniformity in our airworthiness standards and in our operating and maintenance and certification regulations around the world.

The fact is that we no longer have a bunch of domestic air transport systems. We have one international system, which means that no single government has the sovereign authority to control the whole thing.

No one nation can do it all. It must be done together, cooperatively, through rules and regulations that are coordinated and harmonized.

Thus, the growing internationalization of aviation presents a tremendous challenge to agencies like the FAA.

If we're to have a truly international air transport system and if that system is to be both safe and efficient, then the major aviation nations of the world must get together and harmonize their aviation rules and regulations. We can no longer look at this business from a narrow, purely domestic viewpoint.

That's why I've stepped up the FAA's leadership in the international area. We are the world's leading aviation nation. As I see it, we have a responsibility to press forward with other nations to develop a high degree of commonality in our rules and regulations.

We have been getting together with the European nations on these questions since the early 80s. Now we're speeding up the timetable, we're putting a lot more of our resources into the effort, and we're inviting other nations to join the effort.

Time is not on our side. Aviation growth too fast. The technology won't wait until we are ready. Growth and technology are coming-with or without us. So we've got to work fast, not only to harmonize our regulations but to ensure that we're ready for the satellite-based global navigation, surveillance, and communications system that will be in place before the end of this decade.

Well I think I've said enough to give you a feeling for the kind of things that an FAA Administrator must deal with in this time of rapid change in the world of aviation.

As you can see, it's not a cut-and-dried kind of executive situation. Decisions can't be made without affecting the relationships I have described. The way in which the FAA Administrator deals with those relationships can directly affect the way in which the FAA carries out its mission.

I believe we have only just begun to reap the benefits of powered flight. I think the changes that you will witness in your lifetimes will be as profound and as far-reaching as those that have occurred so far in this first century of the Air Age.

My goal at the FAA is to make sure that we are truly prepared to handle the challenges of the future.

Thank you very much.

Now I'll be glad to hear any questions you may have, on the subjects I've covered or any others that you'd like to discuss.

Remarks by James B. Busey, Administrator
Federal Aviation Administration
The First Flight Society
Kitty Hawk, N.C.
December 17, 1990

It's a genuine pleasure to be here today. It's easy to understand why the Wright brothers had a life-long affection for Kitty Hawk. Not only were the wind and terrain conducive to their purpose but the place and its people also seemed to capture their hearts.

I don't think it's any exaggeration to say that the Wrights were never happier than when camping on the Outer Banks. They wrote home often about the stark beauty of the North Carolina seascape, the abundance of fish and wildlife and the generosity and kindness of the local inhabitants.

Katharine Wright was convinced that Kitty Hawk actually had therapeutic powers for her two brothers. Prior to their 1902 trip here, she wrote that "Will is thin and nervous and so is Orv." But, she added: "They will be all right when they get down in the sand where the salt breezes blow..." And, in truth, they always returned from their working vacations tanned and fit and rejuvenated in body and spirit.

Not surprisingly, then, they thought of Kitty Hawk often in the years that followed, especially during the long protracted legal battles over patent rights that sapped their creative energies and heightened their sense of alienation. Even in times of triumph, the Outer Banks were never far from their thoughts. In November 1908, after Wilbur became the toast of Europe with a series of sensational flights on the Continent, he wrote to Octave Chanute of his yearnings for simpler times and places. "How I long for Kitty Hawk," he said.

Of course, the happy times at Kitty Hawk could never be recaptured although Orville came back here in 1911 to test an automatic stabilizer that he had been working for several years. The tests were scrubbed when the press showed up to cover them. But Orville spent three weeks among the familiar dunes of the Outer Banks and managed to set a gliding record of nine minutes and 45 seconds that stood for a decade.

As a footnote, I might mention that Orville completed his work on the automatic stabilizer in 1913 -- a year after Wilbur's death -- and was awarded the Collier Trophy for his work. It was, in effect, his "last hurrah" in aviation. In 1915, he sold his interest in the Wright Company and went into semi-retirement, running a small aeronautical laboratory.

We like to think of the Wright brothers today as uniquely American geniuses who -- to use Wilbur's description -- were "afflicted with the belief that flight was possible to man." And there is certainly no doubt that the term genius applies because they were capable of startling and profound original insights. They even amazed themselves at times. In June 1903, six months before they achieved powered flight, Orville wrote to a friend, "Isn't it astonishing that all these secrets have been preserved for so many years so that we could discover them."

One aviation historian has noted that, "The Wrights were unique among aeronautical investigators in that they could take an idea from its theoretical stage, verify it in the laboratory, and then apply it by building and testing an end product. They were in short, theoreticians, experimental scientists, engineers, mechanics and test pilots. Everything on their flying machine, from its engine to the last thread on the craft's cloth skin, passed through their hands."

Still, it's important to understand that they did not work in a vacuum. They were able to build on the discoveries and achievements of their predecessors and contemporaries in both this country and around the world.

It was the Chinese, after all, who devised and flew the first kites four centuries before the birth of Christ. And the Montgolfier brothers of France were the first to put men aloft in hot air balloons in 1783. More specifically, Otto Lilienthal's glider experiments in Germany had a profound influence on the Wrights and his death in 1896 seems to have been the catalyst that sparked their own aeronautical research. And, of course, there was Octave Chanute in this country who served as a sort of one-man clearinghouse for aeronautical information and was a continuing source of encouragement to the Wrights.

So the history of aviation always has involved a strong element of international cooperation and competition and that continued even after the 1903 breakthrough here at Kitty Hawk. Within a decade of that event, the French had emerged as the world's premier aircraft builders. It's the reason why so many aviation terms have French origins, such as fuselage, empennage and canard, to name just a few. It's also the reason why American pilots went to war in 1917 in French-made Spads and Nieuports.

Although America regained its preeminence in the field of aviation in the 1930s, we should not forget that it was the British and Germans who pioneered jet flight. Nor can we overlook the post war achievements of the Soviet Union in space. They were the first to orbit a satellite, Sputnik I, and the first to put a man in space, Yuri Gagarin.

Let's be honest about it: None of these early Soviet space events were particularly thrilling to Americans at the time. Indeed, Sputnik induced something akin to a national trauma with demands for a drastic overhaul of our educational system. There was a lot of talk in those days about the "space race" and some rather cynical humor to the effect that "Russia's German scientists must be smarter than America's German scientists."

That all seems so long ago now. Today's cosmonauts and astronauts and Japanese reporters are looking down on a much different world. Nothing is more indicative of this fact than the homage we pay today to Yuri Gagarin for his pioneer role in the exploration of space. I know we all wish he could be present to receive the award in person.

The point I've been trying to make here in a rather around-about fashion is that aviation always has been a global activity and is becoming increasingly more so all the time. In fact, "globalism" has become the new catch word for all American business, not just for aviation.

One of the changes already apparent in the aviation industry is the proliferation of multinational aircraft development programs. Airbus Industries probably is the outstanding example but Boeing and McDonnell Douglas and other large manufacturers also have taken on foreign partners in order to share the costs and risks of product development.

A decade ago, for example, large U.S. transports had an estimated foreign content of seven to nine percent. Today with the increase in licensing, co-production and joint-venture agreements, the foreign content has risen into the neighborhood of 20 to 30 percent.

American manufacturers, on the other hand, have become increasingly involved in foreign programs. So it's not a one-way street by any means.

Not everyone is happy with these trends, of course. Aerospace is one of the few manufacturing areas where the United States still clearly and unequivocally is Number One in the world. Some fear that sharing our technology and know how could have dire economic consequences in the long run.

This argument is not without merit but it assumes that somehow we could maintain a lock on aerospace technology and continue to freeze out the foreign competitors. That's probably wishful thinking when you consider that two-thirds of the commercial aircraft market is outside the United States. Moreover, the Wright brothers could tell us all a thing or two about just how difficult it is to keep a wrap on technology.

And so far, at least, business has never been better for the large aircraft manufacturers. The order books are filled to overflowing. Nor has our balance of payments position suffered. U.S. aerospace is expected to post a record \$26 billion trade surplus in 1990, up almost 20% from 1989. Aerospace was the leading net exporter for the sixth year in a row.

Personally, I am very excited about the future prospects for aviation. There is no doubt in my mind that air transportation is going to play a leading role in opening up new economic opportunities around the globe and binding people and nations closer together than ever before.

Much of the technology to accomplish these objectives already is on the drawing board or actually in the developmental pipeline. Just over the horizon are a whole range of new aviation vehicles designed to serve both the domestic and international markets. These include tiltrotor/tiltwing aircraft, second generation supersonic transports, hypersonic aircraft and suborbital vehicles.

Moreover, these aircraft will feature a host of new cockpit systems designed to make flying even safer and more efficient. Included will be advanced digital cockpit displays and flight management systems, collision avoidance systems, windshear alert systems and heads-up, "synthetic vision" displays to enhance all weather landings capabilities.

We also will see dramatic changes in air traffic control with increased reliance on satellites and other technological advances such as automatic data-link communications and the microwave landing system. Eventually, we may even see the evolution of air traffic control from a ground-based system to one centered primarily within the aircraft itself.

The application of new technology and procedures also will help to improve airport utilization and reduce airport congestion and delays. For example, we recently completed an extensive evaluation of a new quick scan radar system at the Raleigh-Durham Airport. We think it has a great potential for improving traffic flows to closely-spaced parallel runways in instrument weather not just at RDU but at many major airports around the country.

As the Federal agency responsible for the regulation and promotion of aviation in the United States, FAA is deeply involved in all of these activities. You might say we have a vested interest in fostering the continued safe and efficient utilization of the airspace.

FAA has been involved for the past decade with installation of the foundation for the future air traffic control system using a blueprint known as the National Airspace System Plan, or simply, the NAS Plan. It involves more than 100 projects designed to modernize and upgrade the nation's aviation infrastructure. Included are new air traffic control computers, weather and surveillance radars, secondary surveillance radars, navigation aids and communications systems to name just a few.

However, the centerpiece of the NAS Plan is the Advanced Automation System. We refer to it by initials also -- AAS. The AAS involves all new computer hardware and software, as well as new controller workstations, displays and peripheral equipment. AAS will greatly increase system capabilities and allow us to evolve to much higher levels of automation.

Enhanced software already is under development that will allow controllers to assign fuel-efficient direct routings to pilots that have been tested by the computer against the flight plans of all other aircraft and been certified as conflict free. The computer also will monitor the progress of each aircraft through the system and automatically alert controllers of potential conflicts 15-20 minutes in advance and suggest resolution strategies.

An even more advanced software package is in the planning stage that would involve a degree of autonomy for the AAS computers to detect and resolve airspace problems, make decisions and provide the necessary instructions to pilots -- all without the need for controller intervention. I suspect by the time this system comes on line sometime early in the next century, controllers will be called air traffic managers or something like that to more accurately describe their new roles.

In addition to benefiting pilots and controllers, the AAS also is going to help out the harried taxpayers by permitting the consolidation of our terminal and en route air traffic control facilities. FAA presently operates almost 200 terminal radar control facilities and another 23 regional centers to handle en route flights. Savings would run into the billions over the 20-30 year lifespan of the system.

But the Advance Automation System is not the end of the line for air traffic control. FAA already is looking beyond the AAS and recently completed a description of a long term plan for the air traffic management system of the 21st century. It starts with some basic assumptions:

The air traffic management, or ATM, system like aviation itself will be international in scope. The fundamental technologies, procedures and systems must be compatible with those in use worldwide.

ATM will evolve from the system modernization effort currently being implemented under the NAS Plan and its successor, the Capital Improvement Plan.

The transition process, itself, may require 10 to 15 years or more since the existing system must be kept running around the clock without compromising safety or sacrificing efficiency.

There is no Buck Rogers stuff in this paper, however, because we can't afford to experiment with people's lives. Air traffic control always has been -- and will continue to be -- a user of proven technology rather than a driver of new technology. Accordingly, the current thinking for future system is based on the technology opportunities that are apparent today.

Chief among them are satellite systems which will become increasingly important for communications, navigation and surveillance as we move into the 21st century. We also can look for additional advances in air traffic control automation, data link air-ground communications, enhanced weather sensing and forecasting equipment, and new technology landing systems.

In addition, flight management systems, cockpit traffic displays and other on-board system could give pilots a greater role in air traffic management. Eventually, these developments could result over time in an air traffic management system centered primarily within the aircraft itself.

So I think we are going to see a great many changes in all areas of aviation in the years ahead as technology continues to evolve. I'm excited about that, as I said, and I know it would please the Wright brothers, too. They always found their greatest satisfaction in identifying technical problems and finding appropriate solutions.

Late in his life, for example, Orville Wright remembered the happy times when he and his brother were at the peak of their creativity, shuttling between their Dayton workshop and the flight test area on the Outer Banks. Those were days, he said "when Wilbur and I could hardly wait for morning to come to get at something that interested us." And, he added, "That's happiness."

I guess that's what most of us would call happiness, too.

Thank you for inviting me here today to participate in this ceremony. The Wright brothers are indeed a national treasure and The First Flight Society, together with the National Park Service, is to be commended for their continuing efforts to perpetuate their memory. I, for one, already am looking forward to the 100th anniversary celebration.

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