arrangement without some equity participation, and we cannot ask for equity participation without some share of control. Similarly, cabotage appears to be more an emotional issue than a real one, I believe. Surely, a single flight a day in a market, and one usually not aimed right for the bulk of the traffic, cannot be considered a threat to domestic airlines.

Political Issues

Finally, I think there is a political challenge that has to be met. I do not think the industry has done a good enough job explaining the need for adequate profits. The original thrust of the deregulation effort was less ideological. I think, than low fare oriented. In some ways, the growth of People Express unfortunately furthered this thinking. For a while, we though we could have it all - low fares, frequent service even to smaller cities, and an array of airlines catering to different market segments. It turned out to be a mirage, because People Express' fares were in fact subsidized by its investors. Indeed, I do not think it was accidental that the deregulation movement started in earnest during the first oil crisis in 1973 when airlines were able to raise their fares significantly at the same time that they reduced service - and made more money. That particular combination of circumstances could well lead to reregulation efforts this time around, and some punitive measures could be written into law if airline service standards deteriorate. Some were already been proposed during the service quality problems a couple of years ago. While they did not pass, their impetus could be regenerated by another service quality problem such as we had in 1987.

The Future

We have come a long way in the past ten years. In 1984, I participated in a television talk show panel on the airline industry's rapid changes. When we were finished, the moderator thanked us and indicated his desire to host a similar panel a couple of years in the future. I responded by saying that I would like to return in about ten years and then talk about the continuing turbulence in the industry. I am not sure the current environment is a turbulent one, but it certainly continues to be characterized by change, not all of which could have been foreseen a couple of years ago. I hope to be able to continue observing this exciting and evolving industry for many years.

AIRPORT CAPACITY OVERVIEW

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Industry Task Force on Airport Capacity
Improvement and Delay Reduction

It is my great pleasure to be here today to focus our thoughts on some of the main challenges and opportunities faced by civil airports in the United States and abroad into the 21st century.

During the development of civil aviation over sixty years, airports -- relatively speaking – have been the "no-problem", "always-there", anecdotal, or, even, footnote aspect of the industry's growth and development.

The 1990s will find this comfortable euphemistic notion radically altered. Today, airports are the Achilles heel of aviation that – without immediate planning for massive surgery – will lead to spreading industry trauma. The 1990s will become the "decade of the airports."

Through aviation's first fifty years the most significant changes involved aircraft technology and heavy government regulation. For the last ten years the most significant changes have been institutional as government regulation was dismantled by the Airline Deregulation Act of 1978 and global airline "liberalization."

U.S. airline deregulation initially led to expansion in the number of airlines and then, more recently, to consolidation through mergers and acquisitions. A strong group of bigger airlines have emerged, trading traditional linear route systems for some 35 connecting airport centers, or "hubs." Fares have decreased in most markets, and traffic has expanded rapidly in response to increased service and fare reductions. To meet the growing demand, fleet size and the number of aircraft operations have dramatically expanded in the U.S.

We are all familiar with the resulting traffic increases, both here and abroad. The air transportation system has become the world's major provider of public

intercity transportation. It has become the preferred form of travel for business and leisure. It has become a true form of mass transportation.

The Airport Capacity Problem

A lack of adequate airport capacity has surely become one of, if not the most potentially crippling problem facing aviation.

The airport capacity crisis directly or indirectly affects all countries and has reached epidemic proportions in some. Today, some 22 major airports in the United States are capacity constrained, exceeding 20,000 hours annually of airline flight delays. By 1997 that number of airports will double. By 1997 the number of U.S. airports exceeding 50,000 hours of delay will more than triple compared to 1987, and the number of airports forecast to have 50,000 to 100,000 hours of airline aircraft delay will grow to 14, as compared to just four today. The cost of delays to the airlines is estimated now at $3 billion a year. Since 1984, airborne delay has been declining while delay on the ground has been increasing.

The same situation is evidenced in Europe. A recent IATA study identified 35 European airports with capacity constraints, seven of which require immediate priority action.

The industry's prospects for continued growth hinge on its ability to maintain a viable airport system. But, if airports cannot handle today's volume of passengers, how will they ever handle the doubling of passenger traffic expected by 2000? And the doubling again by 2018? If airports cannot solve the aircraft noise problem, how will they secure the local public approvals needed to construct new facilities to meet the capacity demands of 2000 and beyond? If airports do not develop new sources of capital, where will the funds for major new airport development come from?

The list of challenges is long and intricate. While I would be safer and -- at this point -- much prefer to call on Solomon, let me address some of these major airport issues and possible solutions.

The principal issues and solutions involve both short-term and long-term elements. The short-term elements will include at least three programs (1) extracting maximum capacity increases from the current system through improvements in airport technology and aircraft operating procedures, (2) resolving the aircraft noise problem and re-establishing capacity growth, and (3) establishing new financial mechanisms to fund the enormous airport facility improvements needed. This last need will differ country by country.

For the long term in the United States we must begin, now, a comprehensive study of new airport needs and measures to insure their development in a timely fashion.

Short-Term Actions

Expanding Capacity at Existing Airports. We are all too familiar with the excruciating length of time required for the approval and construction process leading to the opening of new runways and new airports. New runways take from four to eight years. New airports, anywhere from 10 to 15 years. Obviously, too long a period to help meet today's capacity needs and our expanding capacity needs during the next five years.

For near-term purposes, our best solution is to use technology and enhanced operating procedures to make existing airports and runways as efficient as possible. This can be done. Recent studies indicate that for instrument conditions (IFR), capacity increases of 40 percent to 100 percent can result from the addition of new independent arrival streams (e.g., to independent closely spaced or converging runways) by means of appropriate changes to ATC procedures. In addition, reduction of separation standards, both longitudinal and lateral, can result in 15 percent to 20 percent increases in IFR capacity arrival. Reduction of ATC system variables, primarily through automation, can result in a 10 percent to 15 percent increase in IFR arrival capacity.

For visual conditions (VFR), capacity gains of up to 20 percent can be achieved through reduction of arrival time variability and decreased runway arrival occupancy time.

A decrease of 10 seconds in departure separations would produce an 18-percent increase in VFR departure capacity.

These achievable gains are very much worth pursuing considering the multiplier which promises a five-percent reduction in delay costs for every percentage point of capacity gain.

Major Initiatives. A broadly represented Industry Capacity Task Force has been working closely with FAA to complete simulation and flight demonstration of these types of initiatives to permit their implementation as early as possible. These major initiatives include:

1. Reducing lateral IFR in-trail separation between aircraft on approach. Separation on final approach between large aircraft has now been reduced to 2.5 nm. Investigations of additional spacing improvements continue for various types and mixes of aircraft. All airports can benefit from reduction of required longitudinal separation.

2. Reducing separation between parallel runways for simultaneous IFR independent operations. Simulations and new demonstrations indicate that separation can be reduced from the current 4,300 feet down to 3,000 feet, and perhaps even to 2,500 feet. Among the top 100 U.S. airports, 26 have or plan to have parallel runways with separations of 3,000 to 4,300 feet.

3. Developing new airport surveillance sensors with high data renewal rates and advanced displays to aid runway separation reductions. Reductions in the current radar sensor update rate of 4.8 seconds are being demonstrated with new sensors installed at Raleigh-Durham Airport (0.5 second) and at Memphis (2.4 seconds). These sensors, if successful, will provide the basis for independent IFR operations on parallel runways with separation of 3,000 feet or less as well as for lower minimum separation on converging runways.

4. Simultaneous IFR approaches to converging runways (dependent or independent). Approaches to converging runways are now being allowed during IFR conditions, and demonstration will continue to develop procedures for reduced separation on converging approaches. There are about 60 converging runway layouts at the top 100 U.S. airports. If dependent IFR converging approaches are approved, capacity increases of about eight arrivals per hour could be achieved at these candidate airports.

There are some 33 airport candidates for independent converging IFR approaches, which could approximately double the capacity for single IFR runway arrivals.

5. Dependent runway approaches in IFR. Analysis indicates that the diagonal separation for IFR operations could be reduced from 2 nm to 1.5 nm for runways with separations closer than the currently required 2,500 feet. Of the top 100 U.S. airports, 27 have parallel runways with separations of 1,000 to 2,500 feet. About 14 additional arrivals per hour would be possible if diagonal aircraft separation can be reduced to 1.5 nm.

6. Procedures for integration of independent short runways into present airport configurations. Of the top 100 U.S. airports, about 60 can benefit from the independent use of separate short IFR runways.

7. Confirmation of procedures for eventual introduction of closely spaced triple and quadruple runways for independent IFR operations. Ten airports are candidates for independent triple runway operations, which could achieve increases in IFR arrival capacity of up to 100 percent.

8. Develop optimum methods for terminal and airport automation.

9. Updating and procurement of computer models that will assist with decisions on detailed airport capacity operations (ADSIM), analyzing terminal area air space capacity options (SIMMOD), and evaluating and providing "fast looks" at various integrated airport capacity options (JOLENE).

10. Exploitation of almost parallel, splayed and curved or segmented approach path operations.

11. Application of cockpit traffic displays to provide better situation information to pilots.

12. Reduction of wake turbulence.

13. Better real time information on winds and wind gradients.

14. Development of airport surface surveillance, guidance, control, and automation.

15. Acceleration of specific individual airport capacity improvement studies.

The capacity increases available from these concepts vary by airport, by weather, and by aircraft mix. As a rule of thumb, new runways or changes in ATC procedures that permit independent arrival streams can yield capacity increases of 40 to 100 percent at particular airports. Reduced separation standards can yield increases of 15 to 20 percent in arrival capacity increases. Reducing the variability in the ATC system through automation could yield 10 to 15 percent more capacity increases.

There is solid evidence that our current airports, depending on local circumstances, can achieve significant capacity increases in the short term through these types of initiatives. These gains will depend on the willingness of Congress to provide adequate R&D funding and FAA's determination to keep their efforts in these areas, with adequate staffing, on the front burner.

Aircraft Noise Program. Another immediate challenge to airport management is the unsolved problem of aircraft noise. Noise remains a major problem because it dramatically affects the process for environmental and local political approvals for airport expansion and construction of new runways and new airports. Further, locally required aircraft noise abatement procedures may tend to reduce existing airport capacity through restrictions that prevent full use of airport approach and departure paths, limit the number of aircraft operations or the hours of operation, or require preferential runway use or periodic rotation of alternate runways.

To maintain current airport capacity and to remove roadblocks to new airport capacity construction a comprehensive national noise program must be fashioned at the federal level. Such a program should have three principal elements. To control the extent of noise exposure around airports, the Federal Government must encourage the States to accept responsibility for creating environmental protection areas at each commercial airport, overseen by a local public board responsible for implementing and enforcing compatible land use and noise mitigation measures for non-airport property within the 65 Ldn noise contour. The Federal Government should provide guidelines for operation within such areas and tie the flow of some portion of the State's transportation funding to the timely implementation of operational requirements for protected areas.

Second, the Federal Government should establish a final cut-off date for operation of all FAR Part 36, Stage 2 low-bypass-ratio aircraft (ICAO Annex 16, Chapter 2) no later than December 31, 1999, subject to assurance of the ability of manufacturers to produce Stage 3 aircraft, hush kits, or re-engine assemblies at rates sufficient to meet the established cut-off date.

Third, the Federal Government should prohibit airports from imposing any new local airport noise restrictions as to the type of aircraft, number of aircraft, or time of day of airline aircraft operations.

After a year and a half of deliberation, this program concept has been advanced by a joint airline/airport Noise-Capacity working group. While no noise program can satisfy every group's individual needs, this program offers a new initiative to resolve a stumbling block to achieving airport capacity gains.

In addition to the technical feasibility of producing sufficient Stage 3 aircraft, replacement of the Stage 2 fleet (some 4,000 aircraft worldwide and 2,100 in North America alone) presents a financial conundrum. At an approximate cost of $175,000 per seat, a total replacement of the current Stage 2 fleet would run about $1.5 billion based on a 25-year life, and as much as $3.2 billion based on a 30-year life. It appears that total replacement is technically possible. It is estimated that free-world manufacturers are currently capable of producing some 650 new Stage 3 aircraft per year which, over a ten-year period, would provide 6,500 new aircraft.

The replacement cost of $1.5 to $3.2 billion could be reduced if some portion of the Stage 2 fleet were retrofitted with hush kits or re-engined to meet Stage 3 noise levels. According to a recent AVMARK study, the average age of the entire U.S. airline passenger aircraft fleet (including newer Stage 3 aircraft) is 12.5 years. For cargo aircraft (about 800) the average age is 16.6 years. It is interesting to note that major airlines use 15 years to 20 years to calculate total depreciation.

New Funding Mechanisms. In Fiscal Year 1989, request for U.S. Airport and Airways Trust Fund monies from the top 100 airports for projects to increase capacity amounted to about $1 billion. This compares the total available Trust Fund monies of $1.4 billion for all U.S. airport development requests. FAA currently has more than $7 billion in unfunded airport project requests. Total U.S. airport development needs (Trust Fund eligible and ineligible) exceeded $5.6 billion per year, not including funding for future new airports.

Today, airports face a funding shortfall of as much as $2 billion per year for capacity and other airport development needs. This funding shortage will surely increase in the 1990s as total airport development projects expand. It is incumbent upon Congress to recognize this airport financial need. Without available funding, airport capacity facilities will not be put in place during the 1990s.

In light of the continuing Federal budget deficit, it is unrealistic to imagine that Congress, no matter how sympathetic to need, will increase the level of funding in the Airport and Airways Trust Fund to meet future airport development needs. It may not even be appropriate in this maturing industry to conceptualize an expanded Trust Fund as the best vehicle to meet diverse airport funding needs. In fact, the time is right to position airports to be able to fund greater portions of their own expansion needs in the 1990s and beyond.

Two new funding mechanisms offer great potential in this respect: congressionally authorized passenger

facility charges and a federally instituted revolving loan fund. Both concepts offer differing but complementary advantages to airports, while unlinking the high airport funding needs from the complications of the Federal budget and its vacillating processes.

Passenger Facility Charge. The most direct means for an airport to establish new reliable funding, with greater control over the pace and level of development, is through a passenger facility charge (PFC). The PFC could increase an airport's revenues in direct proportion to its traffic growth and could be adjusted to accommodate increased or decreased funding needs, unencumbered by Federal budget constraints or airline unwillingness to provide financial support for new capacity improvements that increase opportunities for competitors.

It is important, though, and in the interest of all concerned that PFC revenues be controlled through dedication to support only specific AIP-eligible airport needs, such as capacity and noise abatement programs and federally mandated safety and security projects. Further, to permit airports to assess different categories of passengers who would be the major beneficiaries of particular projects, airports should have flexibility to charge different PFCs for domestic origin-destination, connecting, and international passengers.

Revolving Loan Fund. A second means to create new airport capital funding is to take advantage of some of the $6 billion uncommitted surplus in the federally controlled Airport and Airways Trust Fund. Congress could create a revolving loan fund (RLF) for airports by a single lump-sum deposit from the Airport and Airways Trust Fund surplus or by a series of annual appropriations from the Trust Fund.

A minimum of $1 billion in loans annually, over a thirty-year period, would provide financing for up $68 billion in airport construction projects. Loans would be amortized over periods up to 20 years and would be made at market rates. A grace period of interest should be considered to permit the project to come on line and begin producing revenue. The loans would be secured by the pledge of net revenues from the project or from airport operations subordinated to prior bonded indebtedness.

One advantage of the RLF concept would be making productive use of the Trust Fund surplus. The RLF concept offers a market-based means of encouraging projects that will be self-supporting. Further, because of the lower overall borrowing costs associated with a loan fund, many projects that might otherwise be considered marginal, or be delayed until demand exceeded capacity, would become financially feasible. Revolving loans can be more cost-effective than tax-exempt debt because reserve requirements and other legal and administrative restrictions placed on tax-exempt issues can significantly diminish the amount of bond proceeds actually available for investment. Airport repayments of principal and interest would be repaid to the fund, thereby creating a continuing base for loans to other airports in future years.

Long-Term Actions

For the long term we need think in new terms: new airports, new infrastructure concepts, new technologies, and new aircraft. We need to develop new concepts to meet specific future air transportation needs.

But time -- even at this date -- is running out. We can do nothing and let events lead us surely into deeper chaos, or we can use the relatively short time we have to begin responsible long-term planning now. This planning must look at a number of options.

What number and what types of new airports do we need for 2000, for 2020? What types of new technology must we inspire to produce the smart airports of the next century?

To reach such decisions we need to understand what types of new aircraft technology we will have in the skies by 2000 or 2020. Can we develop economic VTOL, VSTOL, or tiltrotor aircraft for airports to provide short-haul service from city centers? Can we attack the long-distance, expanding markets (for example, the Pacific rim) with a Mach-2 or 2.5 aircraft that can be used at conventional airports, or will we have very-high-speed civil aircraft requiring new airport concepts?

Planning for the airport needs of 2000 and beyond will require a federally coordinated comprehensive national and international needs study. A few basic ingredients of such study will include:

1. Projected domestic and international passenger and cargo growth for individual communities and for regions and subregions in order to quantify the levels of capacity that will be needed;

2. Types and numbers of new aircraft that will be added to the fleet (e.g., VSTOL, high-speed civil

aircraft) to determine the options available for carrying passengers and cargo; and

3. New airport concepts and technology to enhance airport capacities.

Obviously, the study must be structured to produce recommended development, specific options, and best alternatives for airport needs of the 21st Century. For example: To what extent can current airports be expanded to meet local future capacity needs? When must local replacement airports be started in order to come on line to meet developing local requirements? By what date will specific communities require a second or third airport to meet projected needs? Is there a practical use for new remotely located airports to serve as regional redistributive (hub) centers for domestic traffic? Will economically viable STOL and VSTOL aircraft permit implementation of a new system of airports built to serve major population centers, e.g., in the Northeast corridor, or other similar closely knit regional areas? Will travel time saved by the introduction of Mach-2, or faster, aircraft justify construction of megaports to act as transfer airports for redistribution of international passengers?

In this respect it is quite possible that a Mach 2.5 aircraft, available in 2000, cutting air travel times to Tokyo or Sidney in half, could justify a West Coast U.S. megaport to serve as an international redistribution hub. Such a megaport could free up capacity at several major West Coast airports. The same concept can be visualized for the East Coast and for a strategic location in Europe.

A plan, begun now, is our best hope to an efficient and effective air transportation system for the next century.

Conclusion

In summary, for the short term (1989-1995), the industry must take full advantage of current airport technology and enhanced aircraft operating procedures to increase the capacity of our present airport system. This has already begun and promises to help with current needs. The Federal Government should establish a national aircraft noise program that will result in enhanced airport capacity and address local opposition to future new airport development. It will be necessary to craft new funding alternatives to allow local airport operators to undertake needed airport capacity, safety, and security programs. Airlines should be encouraged to expand their hubbing systems to less utilized airports capable of providing new operational capacity.

For the mid-term (1995-2000) we should facilitate the construction of new runways, where possible, at present airports making use of demonstrated reduced operating criteria being advanced by FAA.

For the long term (2000 and beyond), we should begin a comprehensive study now to insure an efficient 21st century airport system with full capacity that marries the best airport alternatives with new aircraft and airport technology.