

AVIATION INFRASTRUCTURE

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Overview

The panel on aviation infrastructure addressed the question of whether the availability and/or costs of infrastructure would be a limiting factor in achieving aviation activity forecasts over the next twelve years. The scope of the panel included both airport and air traffic control (ATC) infrastructure issues.

On the whole, the panel concluded that the availability of infrastructure will not likely constrain aviation activity or aviation system growth. Improvements in infrastructure both for airports and air traffic control are

necessary, but it is most probable that they can be made as and when needed. Since costs are passed on to users, it is important that investment strategies be prudent and realistic because of the poor financial condition of the airline industry. (Airlines pay the largest share of user costs for airport and ATC infrastructure.)

This is not to say that in some locations all demand will be accommodated at the facility or time of first choice. In locations such as London, Los Angeles, New York, Tokyo, and elsewhere, there will be site-specific ATC and airport capacity problems. Some facilities cannot be expanded for either physical or environmental

reasons. In addition, at some times of the day, the demand for some facilities well exceeds the available capacity even in good weather conditions. Therefore, there will be a need to allocate scarce capacity by either administrative or economic means.

The panel also noted that aviation was becoming more like other industries. Projects which provide a return on investment can be financed on a commercial basis through user fees or other means. Airports have shown the capability to access financial markets to raise funds for sound projects. It is likely they will be able to do so in the future. Airports are becoming less reliant on airline guarantees of long-term debt. (in fact, airports are likely to be more creditworthy than their principal customers the airlines.) The panel believed that using market principles to develop and operate aviation infrastructure and to allocate scarce infrastructure resources would reduce the likelihood that infrastructure will become a critical constraint. Market disciplines should do much to prevent the development of speculative projects, i.e., projects where there may not be sufficient demand to warrant the level of investment.

Dr. John Strong, in a presentation in the aviation system in the Russian Republic and Independent States, noted that there was significant upheaval in the air transportation markets in this region. (Appendix A contains Dr. Strong's presentation.) The introduction of market prices for aviation fuel has resulted in large price increases for air travel. As such, demand for domestic air travel has been reduced by about 70 percent over the last two years. It may take up to 10 years for traffic to return to 1990 levels. The ability to invest in airport and ATC infrastructure in Russia and the Independent States requires stability in the airline market as well as a separation of the large regional aviation companies which control airlines, airports and ATC within the a single organization.

While projected growth rates in aviation activity vary among regions of the world, there is still absolute growth projected for all regions of the world. Dr. Oster's presentation on growth projections looked at this in detail. (See Appendix B.) Those regions with lower rates of growth tend to be those with the highest bases of traffic and will have the largest absolute growth in numbers of passengers or cargo shipments. Hence there will be a continuing need for infrastructure development in nearly all regions of the world. The planning and permitting cycles for major projects such as a new airport or a new runway can run from 10 to 20 years. Planning must begin even if it is not possible to determine exactly when a new facility will be needed. (Once planning and permitting are done, there is some

ability to vary the date on which the new facility becomes operational.

Ground access may be a particular problem in infrastructure development, and it could limit the growth of specific facilities. The aviation industry cannot ignore the necessary intermodal connections which take a traveler or cargo from door-to-door. It does no good to have a modern efficient airport and ATC system if the highways leading to the facility are oversaturated.

Changing Institutions

Organizational and institutional change in the airline industry may spur airports and air traffic control to operate on a more commercial basis. Airlines are reducing costs, increasing productivity, and redeploying capacity in order to improve financial performance. It is likely they will demand the same from those firms that provide support or supply inputs to the airlines. Over the forecast horizon, we are likely to see a more corporate orientation in the provision of infrastructure, with cost, service quality, productivity, and customer satisfaction becoming more important considerations. Not all aspects of this trend will be necessarily welcomed by the airlines as communities seek greater consideration in bilateral negotiations and greater freedom in decision making on infrastructure investment.

Corporatization may be a means for improving infrastructure, but there are little comparative data on airport and ATC cost and productivity trends on which to base intelligent decisions about new organizational forms for providing infrastructure. Many observers think operating infrastructure on a more businesslike basis will make things better for both infrastructure providers and users. (In fact, a number of independent airport authorities are introducing market pricing for retail concessions.) However, there are concerns about a leveraged buyout or asset-sale mentality in the privatization of infrastructure. The panel expressed concerns about the potential exploitation of infrastructure monopolies as sources of cash to support other governmental activities. There is a clear need for improved measurement tools on airport and ATC cost and productivity to support institutional reform. The lack of cost, performance, service quality and other comparative data for aviation infrastructure may be a worthwhile area of research for the Transportation Research Board.

There are other types of institutional reform which can take place in the context of existing organizations. For example, demand management through pricing

mechanisms provides efficiency benefits in that it tells what users value and what they are willing to pay for access. In addition, it provides signals on when and where to invest in additional capacity. The presentation by Dr. David Gillen provides a useful discussion of these benefits (See Appendix C.) The panel generally recognized the potential for improvements in pricing infrastructure. They noted that there are many new tools that will promote the "smart" pricing of infrastructure. These include advanced communication and positioning technologies in particular.

Activity Measures

The panel concluded that there are requirements for better information on the future composition OF air travel demand. In particular, the following distinctions were believed to be important:

- Business vs. pleasure travel,
- Short-haul vs. long-haul travel, and
- Domestic vs. international travel.

Especially in the case of airports, different facilities may be needed to serve different types of passenger movements.

The panel noted that there was a particular need for better data on air cargo in addition to the typical metrics such as ton-miles or ton-kilometers produced. There has been a revolution in the air cargo industry including the emergence of package express carriers, and the development of just-in-time inventory systems. Air cargo is becoming increasingly more integrated into a multimodal, multiservice product offering total distribution services. Measures that embody the total value of the cargo moved or the total revenue generated from the complete distribution activity (not just the air segment alone) may be better indicators of growth in this sector than the more traditional measures of available and revenue ton-miles or ton-kilometers. The new integrated form of air cargo transportation also has different facility requirements than the more traditional belly cargo on passenger flights.

Global alliances among carriers also can have an effect on terminal facilities. Carriers in an alliance need to collocate to hand traffic off to their partners. As airline markets change, airport roles are also likely to change and may become more specialized. Infrastructure must be built for user needs, but also it must be built with the flexibility to respond to changing markets and the changes occasioned by airline alliances.

The panel noted that, if security needs for domestic flights become equivalent to those for international flights, there will be large cost and facility implications as well as potential downward effects on air travel

demand. This is an issue that is not treated in existing forecasts.

Air Traffic Control

In air traffic control, the institutional side is starting to fall behind the capabilities of ATC technology. Modern ATC technology requires networks that cover large geographic areas to allow users to fully exploit the economies available in user-preferred flight profiles. When ATC is operated as a government entity, these types of networks are difficult to achieve because of sovereignty issues. While sovereignty issues cannot be disregarded, they can be accommodated in a modern ATC system. Technology can be used to control access to specific airspace without relying on national borders or other artificial boundaries.

Satellite technology will make the efficient supply of communication, navigation, and surveillance services feasible everywhere in the world if institutional barriers can be overcome. Such barriers are becoming a particular problem in Asia because there is little cooperation among the states in the region regarding ATC development and operation. There are few multilateral institutions in this area to promote cooperation in the development and operation of a regional ATC system. Asian states would be well-advised to look at the European experience where uneven development and a wide variety of systems and standards led to very inefficient ATC systems that reached crisis proportions and sparked the present effort to harmonize European ATC systems.

There is also a need to look at the benefits and costs of the future air navigation system (FANS) and how such systems must be organized to achieve their potential. There may be a need to operate air traffic on a more business-like basis to produce the necessary savings for users. In turn, it may also be necessary to make fundamental organizational changes so that large integrated ATC can evolve. In particular, the satellite-based ATC systems operated by Fiji and the Seychelles point to the large potential benefits of new technology for oceanic ATC services.

Constraints to Growth

Environmental problems could be the largest constraint on the growth and development of aviation infrastructure. Aircraft noise will continue to be an important issue, but it will be joined by other concerns such as air and water pollution. These matters will have an increasing effect on aviation and other industries as well. The pressure for environmental reform may move to the national and international arena instead of

remaining a local matter as has been case with aircraft noise. All segments of the aviation industry need to take a proactive approach to environmental problems. The industry must promote sensible solutions including continued vigorous efforts to reduce noise levels at the source in order to avoid having inefficient solutions imposed upon them. The industry must determine how aviation can be a good environmental neighbor because it is the right thing to do. In turn, the industry must demand that environmental regulations be reasonable, and that sufficient time be allowed for compliance.

New Technology

Some airports may find it difficult to accommodate the new large aircraft, which *may* have from 600 to 800 passenger seats. Because of the long life of aviation infrastructure, facilities must be designed today to accommodate these new aircraft that may enter service over the next decade or two. If provisions are not made in the planning and design stages, aviation infrastructure may have to undergo expensive modification before its useful life is complete. The panel thought that it would be worthwhile to take a comprehensive look at the costs of the new large aircraft including research and development, the changes in infrastructure necessary to accommodate them, and basic costs to produce and operate such vehicles.

Some infrastructure providers are already beginning to plan for accommodating intelligent vehicle highway system (IVHS) technology in their access road networks. Major improvements made today to airport road systems are likely to last well beyond the introduction of IVHS. It is necessary to provide for new surface transportation technology in current airport investment programs.

Summary

Significant changes are taking place in the airline industry. It is becoming more dynamic and market driven, and carriers are not tied to specific locations. They will redeploy assets as demand dictates. Alliances,

mergers, and consolidations among carriers will require a more flexible supply of infrastructure.

While it is believed that infrastructure will be adequate generally, there will remain some critical capacity constraints, often in the most important air transportation markets. The use of pricing as a way of allocating resources and producing the funds necessary to develop infrastructure will therefore grow in importance, particularly in these major markets. There are already new types of pricing being employed with good results in the area of landside access to airports. In some cases, there may be a need for new organizational forms for infrastructure provision to stimulate such changes, but much can be done in the context of existing organizations through improved management practices.

The panel noted that the financial state of airlines will drive cost and productivity improvements in aviation infrastructure. There is a need for data on the cost and productivity trends in providing air traffic control and airport services in order to demonstrate the potential benefits of change. The panel supported institutional reform if it results in real improvements in productivity, cost, and customer satisfaction. The panel was concerned about privatization or other forms of leveraged buyouts of infrastructure facilities if the principal purpose is to raise funds for nonaviation activities.

Institutional reform may, in fact, also be necessary for cooperation and coordination to increase infrastructure productivity especially in air traffic control. This is largely driven by technology. The largest constraints and uncertainties to future activity growth are likely to be in the environmental arena and include the cost to remedy existing problems and, in some locations, even the ability to operate aviation infrastructure at its current levels of capacity.

The panel ended with a sobering thought. If there are not productivity improvements in air transport, the real cost of air travel in the future could rise. As the industry comes to depend more on highly price-sensitive leisure travel, this could dampen the growth in aviation activity. TRB may want to explore the long-term trends in the cost and productivity of providing airline services and aviation infrastructure.