Strategic Airport Planning
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The aim of the book is to identify the strengths and weaknesses of past strategic planning of airport systems, and to attempt to provide guidance on how the concept of strategic system planning can be used to advantage in the future. It is an attempt to return to the ground which was so well covered some 20 years ago by Richard de Neufville in his book: “Airport System Planning”. The need to update and extend this work, as well as the challenge in doing so, arise from the subsequent changes in the structure of the air transport industry and the contexts within which it must work. The industry is increasingly becoming liberalised, privatised and globalised. However, the intended competition is sometimes seriously constrained by lack of physical and environmental capacity or by the economic forces that shape the behaviour of the operators. At the same time, the planning context is becoming more sensitive to sustainability issues and to calls for integrated transport solutions to address increasing levels of congestion.

The need for a strategic systems view has never been greater, as entrepreneurial stakeholders attempt to create and take advantage of their own comparative advantages. Those in government need to understand the system behaviour and the extent to which it may be necessary to intervene in the provision of facilities, and how air transport may best be fitted into other transport policies. Equally, the entrepreneurs need to understand what their natural roles may be and what they would need to do to move away from those roles.

The content of the book stems from studying past attempts to prepare national and regional strategic system plans in a variety of contexts, as well as from noting the lack of a systems context in many individual airport master planning studies. The ideas presented in this book have been honed by discussions with colleagues and students on postgraduate and short courses in Berkeley, Loughborough and ITA in Brazil, as well as numerous professional colleagues throughout the aviation industry, though all responsibility for these ideas rests with the authors. Among those at Loughborough who have influenced the work are Norman Ashford, David Gillingwater, Lloyd Jenkinson and David Pitfield. Colleagues at Berkeley whose work and ideas have shaped the thinking in this book include David Gillen, Mark Hansen and Adib Kanafani. Thanks go to them, to Henrique Gennari whose PhD helped to structure some of the strategic planning ideas, to Darren Rhodes for his PhD work on an integrated aircraft design model, and to all others whose work has been relevant, whether it is attributed in the text or has trickled into our consciousness in a less formal way. Thanks also to Mary Ashworth who compiled and formatted the text. Finally, thanks to those whose lives have been so disrupted by the prolonged production of the text, namely Anna Caves and Katie Korzun, without whose tolerance and good humour the task would never have been completed.
INTRODUCTION

Few things better characterise the changes in transportation and communication that have taken place during the twentieth century than the growth and changes in air transportation. In 1903 two bicycle mechanics and self-taught aeronautical engineers were able to achieve sustained powered flight for 40 yards at Kitty Hawk, North Carolina. At the time, the fastest train journey from Washington DC to San Francisco took over four days, while the transatlantic journey from New York to Hamburg took seven days. Today, aircraft have replaced both trains and ocean liners for all long distance travel, with everyone from diplomats to students routinely crossing oceans and continents in a matter of hours. Modern long haul aircraft can fly a third of the way around the globe without stopping. Nor are these changes restricted to passenger travel. A business package can be picked up in Los Angeles one afternoon and delivered in Paris two days later.

1.1 CONTEXT OF AIRPORT SYSTEM PLANNING

The advances in the technology of air transportation have been matched by a progressive reduction in its cost, as shown in Figure 1.1. Not surprisingly, these changes have led to a dramatic increase in air travel, which are projected to continue into the foreseeable future, as shown in Figure 1.2. Together with this growth in air travel has come the need for ever increasing airport capacity to handle this traffic. At first, airports were constructed in a somewhat ad hoc manner. As the technical requirements of successive generations of aircraft became clearer and the volumes of passengers and cargo being handled increased, the need for common and accepted procedures for airport planning become apparent, and a well-defined body of technical literature emerged, supported by the standardising influence of such agencies as the International Civil Aviation Organisation and United States Federal Aviation Administration.
Figure 1.1: Historic trend in real fares


Figure 1.2: Worldwide traffic growth

Sources: International Civil Aviation Organisation, ICAO Bulletin; Civil Aviation Statistics of the World, various annual issues. 
However, these procedures and guidance material largely focus on the planning of individual airports. The interaction between airports, and the planning of airports at a regional or national level, has been less well defined and given much less attention. Even so, over the past three decades the need to plan individual airports within the context of the airport system as a whole has become more widely recognised. This has been driven largely by two concerns. The first is the emergence of national or statewide funding programmes to support airport development, and the consequent need for a systematic approach to allocating that funding among the many eligible airports. The second concern is the emergence of systems of multiple airports serving large metropolitan regions. As air traffic has increased beyond the point where it can be handled by a single airport, or simply due to the geographical extent of the region, the traffic has become distributed between several airports.

Travel and tourism, much of it using air travel, now employ more than 10% of the world’s workforce and generates the same percentage of the world’s Gross Domestic Product. Similarly, a large proportion of the world’s freight value is moved by air. The air transport industry estimates that the total impact on the world economy in 1992 was US $1,000 billion and accounted for 22 million jobs (ATAG, 1993). A recent survey by the Airports Council International showed that 85 of their members operated 246 airports which handled 40% of world passengers, employed 71,000 people and generated some US $11.4 billion in 1995, half of which came from non-aeronautical sources (ACI, 1997). This activity is generated by the travel habits of a very small proportion of the world’s population. Hardly any of the two billion Chinese or Indians have flown, and even in the United States, where air transportation is widely used for domestic travel, only 15% of US citizens hold a passport (Lovett, 1995).

Increasing wealth and lower prices will cause continuing increases in demand. The International Civil Aviation Organisation (ICAO) reports that passengers carried have been increasing at 5.0% and air transport movements (atm) at 3.5% per annum worldwide for the last decade.

The world’s most mature air travel market is the US, but its traffic is still expected to increase at 4.0% annually. This will call for very large absolute increases in capacity, even at the busiest airports. While the average passenger growth of all the member airports of the Airports Council International (ACI) was 5.0% in 1997, the growth at the four airports with the greatest number of passengers, namely Chicago O’Hare, Atlanta, Dallas Fort Worth and Los Angeles was 1.8%, 7.7%, 4.2% and 3.7% respectively (ACI, 1998). Their average traffic growth of some 3 million passengers per annum (mppa) was therefore greater than the total 1997 traffic of such airports as Adelaide, Christchurch, Madras, Ankara, Faro, Larnaca, Milan Malpensa, Prague, Brasilia, Guadalajara, or Oklahoma City. Until the recent economic setbacks, the highest growth rates have been occurring in the developing world, particularly in Asia and the Pacific Rim, as these countries climb towards a level of income of US $10,000 per capita.

Traffic in China has been growing at over 20% per year for two decades. These countries are beginning to feel the environmental constraints which have been a prime concern in the western world for the last two decades, as cities expand into the area around their airports. Though only Seoul is in the world’s busiest 10 airports, and only Bangkok, Taipei, Jakarta, Beijing and Kuala Lumpur are in the top 50, many cities are considering expensive and remote sites for new replacement airports to support the further expansion of traffic, in air freight as well as passengers.