

For Discussion  
on 29 October 2001

## **Legislative Council Panel on Economic Services**

### **Hong Kong International Airport Master Plan 2020**

#### **Introduction**

\_\_\_\_\_ This paper sets out the gist of the Master Plan 2020 of Hong Kong International Airport (HKIA) which the Airport Authority (AA) will present at the meeting. A brochure outlining Master Plan 2020 is attached for Members' reference.

#### **Background**

2. HKIA was developed based on a master plan completed in 1992. In order to ensure that HKIA has the potential to handle its ultimate annual capacity of 87 million passengers and 9 million tonnes of cargo, AA undertook a series of studies to determine the range of facilities and services required to handle this level of traffic. These studies also recommended strategies to take the airport forward in its next phase of development as an international and regional centre of aviation and gateway to the Mainland.

3. The first step to planning new facilities is forecasting demand. After comprehensive research, data gathering and market assessment, the studies recommended the following forecasts for the next 20 years-

- (a) an average annual passenger growth rate of 5%;
- (b) an average annual cargo growth rate of 6%; and
- (c) express cargo will grow at double the rate of general cargo.

#### **Master Plan 2020**

4. Based on the results of the demand forecasts and other recommendations in the studies, AA has formulated Master Plan 2020 to guide

HKIA's development in the next 20 years. The Plan includes various developments to meet forecast demand to reach HKIA's ultimate capacity of 87 million passengers and 9 million tonnes of cargo and measures to enhance Hong Kong's status as an aviation hub. A summary of these facilities and measures is given in the following sections.

### *Passenger Terminal Building*

5. The existing Passenger Terminal Building (PTB) need to be enhanced to enable it to handle up to 61 million passengers a year. One option to expand the PTB is to add new bays to the North and South sides to accommodate the ultimate annual capacity of 87 million passengers. On the basis of the studies' passenger demand forecasts, expansion of the PTB is likely to be required in ten years' time.

### *Airfield*

6. The studies concluded that additional aircraft stands will be required some time in the second part of this decade. The studies also recommended that a Midfield Concourse configuration be an elongated "X" shape which should provide a total of 59 stands.

### *Cargo Facilities*

7. The growth rate of express cargo is expected to be higher than that of general cargo. Express cargo hub operation is expected to enhance Hong Kong's competitiveness. Hence, the studies recommended that in addition to developing additional facilities for general cargo, a dedicated express cargo terminal be developed within the next 3-4 years.

### *SkyCity*

8. With a view to generating more air traffic to strengthen Hong Kong's position as a regional aviation hub and gateway to the Mainland, the development of a mixed land-use commercial area of some 57 hectares ('SkyCity') has been recommended. The main constituents of SkyCity will include an international exhibition centre, office and retail development to meet the needs of airport-related businesses, and a cross-boundary passenger ferry terminal.

### *Connectivity*

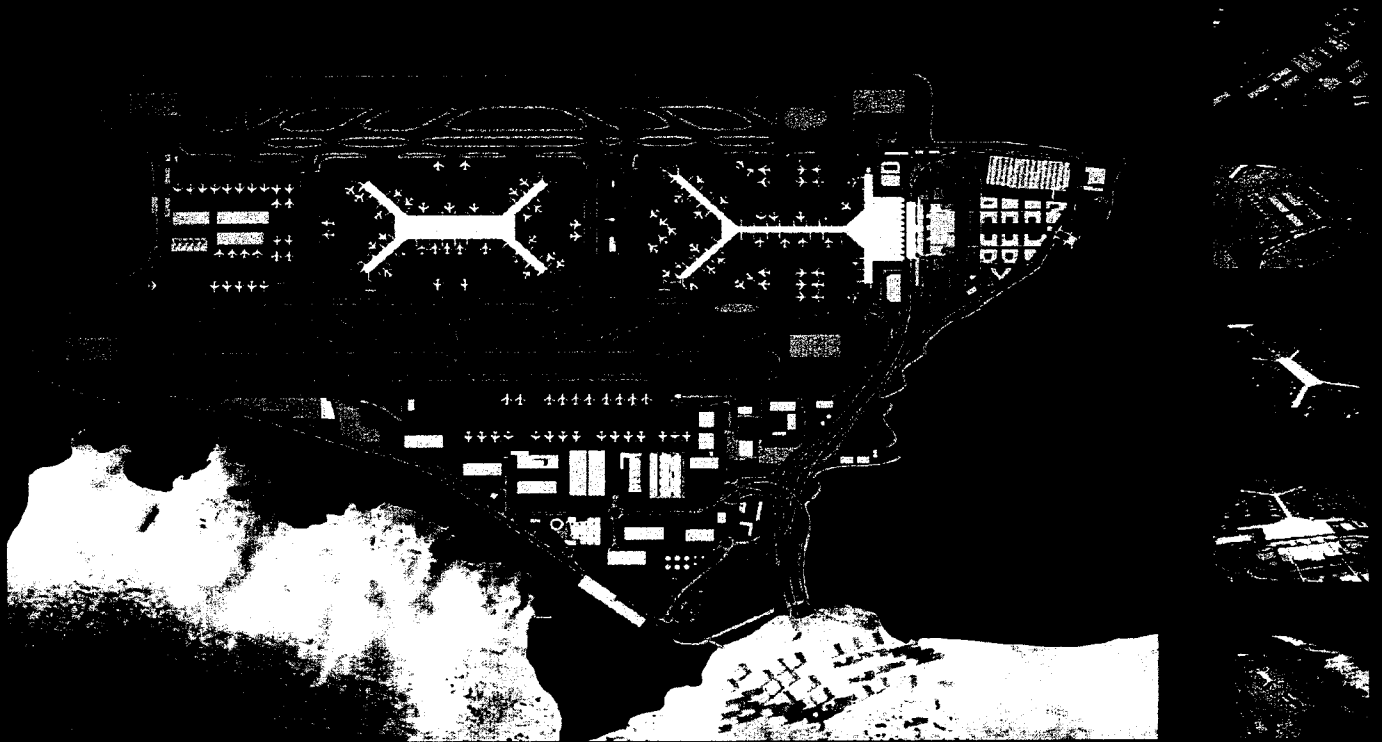
9. Recognising the importance of the Pearl River Delta as HKIA's hinterland – accounting for 70% of its export cargo – measures have been identified to extend the airport's connectivity to this region and beyond. These may include developing inter-modal transport links at HKIA and cooperating with other airports in the region.

### **Conclusion**

10. Master Plan 2020 provides a broad framework for HKIA to reach its ultimate capacity while upholding a safe, secure, smooth and efficient operation. It also recommends measures for maintaining and enhancing the aviation hub status of HKIA. Detailed studies will have to be conducted for the specific development projects. Members' views on the development plan are welcome.

Airport Authority  
October 2001

# Hong Kong International Airport Master Plan 2020



## Background

Commissioning of Hong Kong International Airport ("HKIA") in July 1998 marked the completion of the Airport Core Programme - an integrated series of infrastructure projects which included land reclamation, expressways, bridges, a dedicated airport railway system and development of a new town at nearby Tung Chung.

HKIA was developed based on the New Airport Master Plan ("the NAMP") which was completed in 1990-1992. Although the airport is only three years old, it has experienced substantial growth in passenger and cargo throughput. Adopting a pro-active approach in long-term airport planning to ensure that facilities are provided in-time to meet the needs of the aviation industry, the Airport Authority ("the AA") undertook new studies to assess future requirements. In particular, these studies were required to:

- review the existing demand forecasts developed by the AA;
- ascertain whether HKIA has the potential to handle an ultimate

- capacity of 87 million passengers and 9 million tonnes of cargo a year, as stipulated in the NAMP;
- determine requirements for passenger processing, concourse and airfield facilities to achieve the ultimate capacity; and
- recommend best options for meeting demand.

Collectively, these are referred to as the Master Plan Study, the results of which provide an update to HKIA's Master Plan by accommodating forecast demand in a cost-efficient manner and effectively catering for future growth.

## Growth Pattern

HKIA opened for business with one (south) runway and a projected annual capacity of 35 million passengers and 3 million tonnes of cargo. During the years between promulgation of the NAMP and airport opening, Hong Kong experienced robust and sustained growth in both passenger and cargo traffic. In the period 1989-2000, passenger traffic grew at an annual

average rate of 6.1% while cargo averaged 10.5%. New comprehensive traffic forecasts completed in 1994, indicated faster growth than envisaged in the NAMP. As a result, construction of the second (north) runway and completion of the Northwest Concourse of the Passenger Terminal Building ("the PTB") were advanced and brought into operation in May 1999 and January 2000 respectively, increasing HKIA's passenger handling capacity to 45 million a year.

The Asian economic downturn led to a decline in passenger traffic in the years following airport opening. Although not as severely impacted as passenger traffic, cargo throughput also fell initially. With the easing of economic and financial problems in the surrounding region both passenger and cargo traffic have seen a rebound in 1999. Cargo volumes, in particular, exhibited dramatic rates of growth of 21% and 13% in 1999 and 2000 respectively. The significant boost in runway and terminal capacity and the airport's 24-hour operations, in comparison to the airport at Kai Tak, have facilitated a more rapid



Existing Airport

development of the following trends:

- An increase in the number of transfer passengers as airlines in general and the home carriers in particular take advantage of the new airport's greater capacity and scheduling flexibility to promote fast and convenient interconnections;
- A consequent increase in the relative proportion of transfer passengers (30% at HKIA compared with 23% at Kai Tak) versus origin/destination (O/D) passengers; and
- An increase in the number of aircraft movements, reflecting airlines' ability to increase frequency and develop hubbing operations at HKIA.

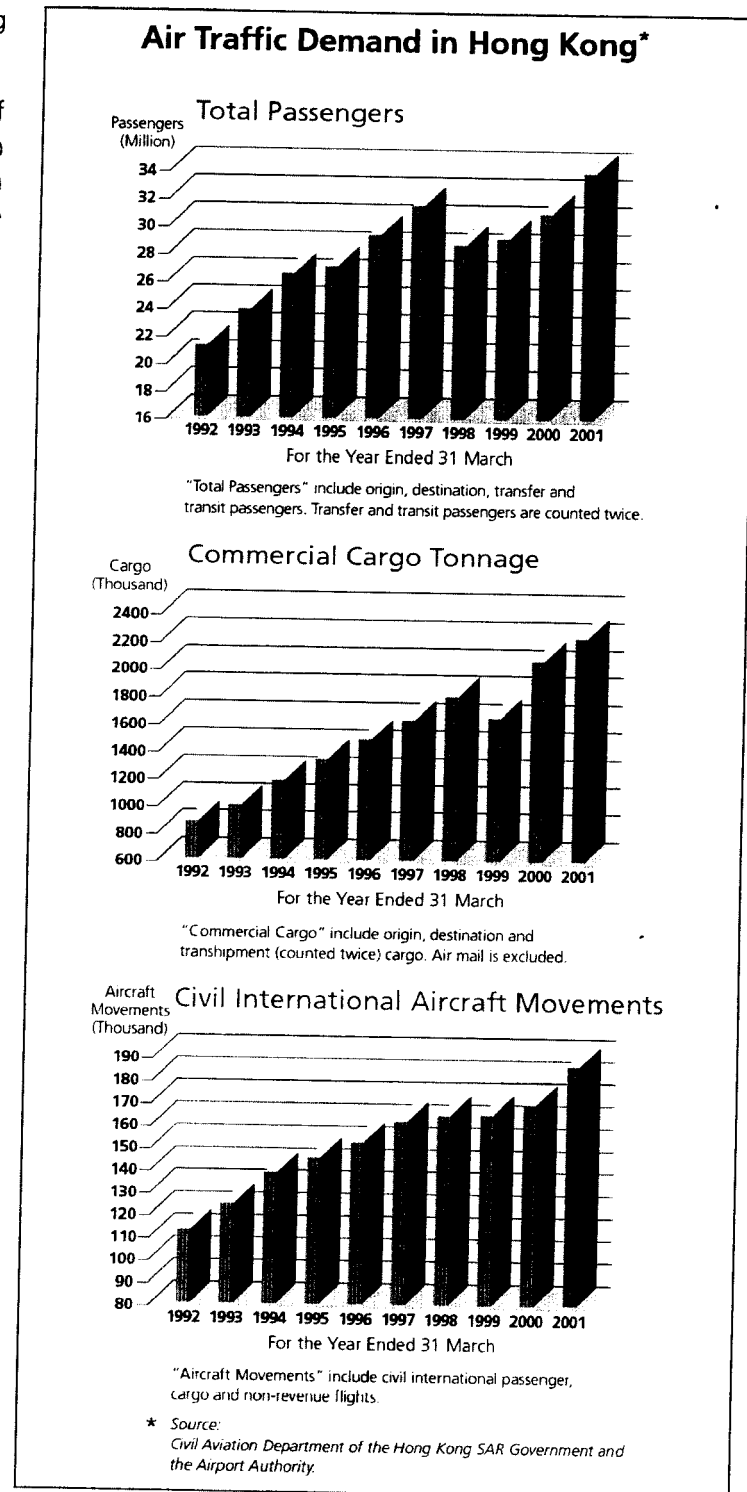
### Challenges

The airport is crucial to the continuing growth of the Hong Kong economy, its role as the region's centre of trade and tourism, and the primary gateway to Southern China. The new airport inherited a solid business base from which to grow into the future. Since its opening the airport has weathered the challenge of commissioning a large and technically advanced infrastructure, as well as the effects of the Asian economic downturn.

Under the terms of the Airport Authority Ordinance, the AA is required to:

- Maintain Hong Kong as a centre of regional and international aviation;
- Meet the highest standards of safety, security and efficiency; and
- Operate in accordance with prudent commercial principles.

The AA must achieve these requirements within the framework of an aviation industry which has seen many changes in the 10 years since the NAMP was finalised. The way



### Current Statistics at HKIA

airlines do business has been altered radically with increased competition (which drove down air fares and forced reductions in airline operating costs), electronic ticketing, on-line booking, and new structural dynamics such as hubbing and the emergence of global airline alliances. The growth of cargo traffic has been facilitated by the rapid development

of new forms of supply chain management, which rely crucially on express delivery and the provision of integrated logistics solutions.

Meeting the challenges of this dynamic and increasingly complex commercial environment requires sound understanding of industry trends, responsiveness to the needs

of customers and business partners, and a readiness to develop and implement planning solutions which are pragmatic, cost effective, robust and, above all, flexible enough to cope with unexpected changes in demand or operational requirements.

## Demand Forecast

Forecasts of growth in air traffic activity are a fundamental input to airfield and facilities planning. These forecasts, developed by the AA in 2001, were compared with forecasts prepared by major international organisations, such as International Air Transport Association and International Civil Aviation Organisation, and with industry projections by Airbus and Boeing. They were also evaluated qualitatively against many of the assumptions and risk factors analysed in the 1994 Comprehensive Traffic Forecast Study commissioned by the AA, as well as more recent trends in the world and regional economy and in the aviation industry.

The review noted that the AA's projected average annual passenger growth of some 6% up to 2011 was at the middle range of industry forecasts. In the next 20-year horizon, an average annual growth rate in the order of 5% is expected. This was considered reasonable for the purposes of airfield and facilities planning. By the time HKIA reaches its design capacity of 87 million passengers a year, it is projected to serve approximately 245,000 passengers daily.

For many years HKIA has led the world in terms of international air cargo throughput. Initially the airport served Hong Kong's domestic manufacturing industries including electronics, watches, toys and luxury garments. With the relocation of the majority of Hong Kong's

manufacturing activities to the Pearl River Delta ("the PRD") since the early 1980's, the airport has emerged as a vital economic gateway to the Mainland of China ("the Mainland"), in particular Southern China.

The most important markets for HKIA are the United States, Europe, Japan and Taiwan. In 2000, air cargo volumes exceeded 2.2 million tonnes, over 50% of which was carried on passenger aircraft. It has been possible for HKIA to handle this growth because of private sector investment in high density and technologically sophisticated cargo handling facilities, and the extensive air route structure to over 130 cities throughout the world.

Development of the new demand forecast was preceded by a process of comprehensive research, data gathering and market assessment including:

- Global and regional economic trends;
- Air cargo industry trends;
- Views of manufacturers, shippers, freight forwarders, airlines and cargo terminal operators;
- Potential impact of specific economic, political and trade factors, e.g. China's entry to the World Trade Organisation ("the WTO");
- Competition from other airports; and
- Trends in air services regulation.

The AA is also mindful of the negative impact caused by the September events in U.S.A., the downturn in the U.S. economy and challenges from neighbouring airports in the region. During the 12-month period from October 2000 to September 2001, cargo throughput fell by 5% while passenger numbers grew marginally by 2.5% and flight movements increased by 10%. However, passenger and cargo traffic for the month of September fell sharply by 7% and 10% respectively year-on-

year, with flight movements maintaining close to 7% growth. As the slowdown in the global economy is expected to continue for a while, the cargo business could remain weak next year before picking up again.

The key findings of the research and market assessment were:

- Over the next 20 years, cargo growth is expected to average in the order of 6% per year while express cargo will likely grow at double that rate;
- Growth in express cargo will be fuelled by an increasing reliance by manufacturers and suppliers on the services of specialist "integrators" and logistics providers who offer door to door and time-definite modes of delivery;
- HKIA is likely to retain its competitive edge in handling air cargo in the PRD region – even in the face of increasing competition from neighbouring airports – because of its extensive route network, secure and efficient handling facilities, and reliable regulatory procedures;
- China's entry to the WTO will provide new opportunities to HKIA; and
- Possible direct trading relations between the Mainland and Taiwan (San Tong) will stimulate growth in trade overall, thereby compensating for relative reductions in the proportion of goods being transhipped through Hong Kong.

In order to arrive at a realistic projection of the ultimate cargo capacity of HKIA, the next step was to assess the impact of the entire range of capacity drivers and constraints. These include aircraft mix, number of aircraft movements, airfield and terminal capacity, land availability and transport access. The main conclusion of the various streams of analyses is that the ultimate capacity would be 9 - 10 million tonnes per year.

## MASTER PLAN 2020

Based on the results of the demand forecast and the recommendations of the Master Plan Study, the AA has formulated a revised Master Plan to take HKIA forward in the next twenty years. Key facilities and services which will be required to meet forecast demand over the years and HKIA's ultimate annual capacity of 87 million passengers and 9 million tonnes of cargo have been identified in the Master Plan.

### Passenger Terminal Building

In planning for passenger growth the study took as its starting point a comprehensive assessment of the capacity of all key facilities and functions associated with the processing of passengers and the handling of aircraft.

The analysis demonstrated that the capacity of the PTB is sufficient to accommodate up to 61 million passengers per year provided that necessary enhancements are phased-in to meet demand. These include

improvements to facilities for departing passengers (e.g. check-in desks), arriving passengers (e.g. escalators) and public and private transport (e.g. parking and staging areas for buses, cross boundary coaches and tourism industry vehicles).

Drawing on the capacity of the PTB, the Master Plan Study considered the location and requirement, if any, of a second terminal. The possibility of combining the enhancement and expansion of the PTB to provide sufficient additional processing capacity to fully cope with the ultimate annual capacity of 87 million passengers was also analysed.

The result of comparison and evaluation of various options, which covered capital and operating costs, passenger service, operations, commercial benefits and flexibility for future development, was that enhancement and expansion of the PTB emerged as the recommended approach to meet future increases in demand.

An important consideration in this recommendation was the fact that the original plan of the PTB had safeguarded expansion of the building by up to two bays each to the north and south of the building envelope. While the Master Plan

Study concludes that expansion by one additional bay each to the north and south will provide sufficient capacity for 87 million passengers a year, the full four-bay expansion has been safeguarded to meet possible changes in demand and operating requirements which cannot be foreseen at this time.

Key advantages of the recommended option are that it:

- Builds on the strengths of the PTB design in respect of its passenger wayfinding simplicity and operational efficiency;
- Optimises the use of an existing sizeable asset while, at the same time, minimising near-term capital expenditure on additional terminal processing capacity; and
- Enhances commercial revenues by focusing a greater than anticipated population both at landside and airside concessions and catering outlets.

In summary, the recommended strategy is that the PTB be enhanced, to enable it to handle up to 61 million passengers a year and thereafter expanded to the north and south to accommodate the ultimate annual capacity of 87 million passengers. On the basis of the AA's current passenger demand forecasts, expansion of the PTB is likely to be required in 10 years' time.



Terminal Expansion Plan

### Airfield

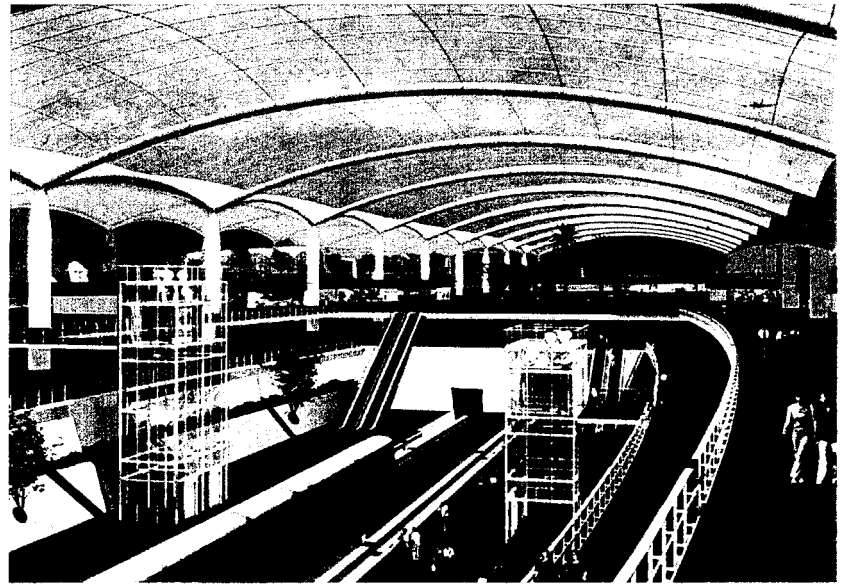
In formulating overall future demand, the study took account of projected peak hour passenger flows, runway capacity and assumptions with regard to scheduling, aircraft dwell times and patterns of stand usage. The study found that additional aircraft stands will be required some time in the second part of this decade if planning and level of service targets are to be met.



The Master Plan Study considered options for the development of the midfield area including the optimal size, layout and phased implementation programme for the Midfield Concourse and associated apron and taxiway facilities.

The recommended Midfield Concourse configuration is an elongated "X" shaped concourse which includes a total of 59 stands (49 frontal and 10 remote), with the following key features:

- Economy of land use, enabling land to be safeguarded for alternative development in the midfield;
- Efficient placement of parking stands and ground service equipment areas, minimising potential conflicts between manoeuvring aircraft and ground handling vehicles;
- Simple passenger wayfinding from a single airport people mover (APM) station in the Central Concourse of the PTB;
- Baggage sortation hall located at apron level to reduce cost;
- Ample circulation and good concessions potential in the Central Concourse of the PTB;
- Staged development in line with demand growth; and



Midfield Concourse

- Greater flexibility for developing centralised departures level retail facilities.

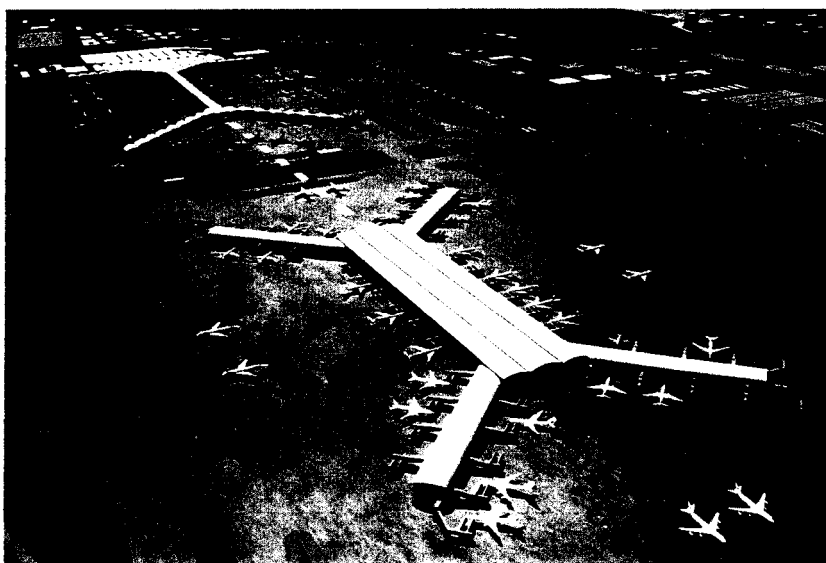
## Cargo

Recognising the importance of air cargo services to the economy of Hong Kong, in particular the growing logistics and supply chain management industry, the AA is constructing eight additional air cargo stands which will be ready by end-2001. In addition, the AA has awarded a contract for the

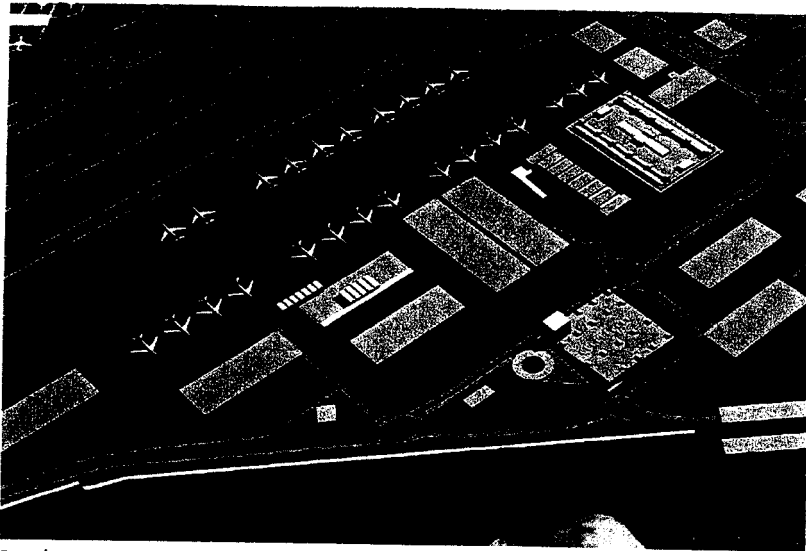
development of an on-airport logistics centre which will commence operation in 2003 to process time-critical air cargo and to position HKIA as a logistics management hub.

Furthermore, the AA has proposed development of a logistics park at North Lantau in close proximity to the airport to target high-value and time-sensitive products such as computer parts and components and pharmaceuticals. This would create a hub for such products which can be handled or processed in Hong Kong before their onward transfer to the PRD by air, sea or land. Similarly, goods from the PRD can be handled in the same manner in the logistics park before re-export by air to regional and international destinations.

The marine cargo terminal which opened in March 2001 now provides one-stop service, including round-the-clock on-site customs clearance and truck delivery service between the terminal and the air cargo handling facilities at the airport. Strategically, the marine cargo terminal is of great importance to Hong Kong in reinforcing its position as the premier gateway of China and the logistics service management



Midfield Concourse Plan



South Cargo Development

centre of the region. The terminal now links HKIA with 20 ports in the PRD and significantly enhances the airport's accessibility to its cargo hinterland which contributes 70% of the cargo exported from HKIA.

In formulating a cargo development strategy, two scenarios were considered:

- HKIA continues to focus on serving general cargo demand (including O/D and transshipment cargo); and
- HKIA as an express cargo hub, in addition to meeting general cargo demand.

With the rapid expansion of high-tech, high-value and logistics industries in Southern China, particularly in the PRD, efficient and resourceful air cargo services are required at HKIA. Moreover, Guangdong Province is fast becoming one of the world's premier manufacturing and logistics centres. In order to maintain our position as the pre-eminent air cargo and logistics hub in the region, HKIA must provide air cargo service providers with sufficient flexibility for expansion and innovative solutions for improvement. This is in support and in line with Government's policy to develop Hong Kong as an international and regional logistics hub.

The growth rate of express cargo throughput at HKIA is double that of general cargo. The Master Plan Study has recommended that a dedicated express cargo terminal be developed within the next 3 - 4 years to cater for this strong growth to improve handling efficiency, increase the scope of services, extend the air network, increase flight frequencies and provide more competitive pricing to shippers. This hub operation is also expected to stimulate general cargo growth and enhance Hong Kong's competitiveness.

Having concluded that the express hub strategy was the preferred option, the ultimate cargo land use plan and phased development of the various sites were formulated by:

- Ensuring that additional cargo handling capacity is brought on-line in a timely and commercially efficient manner;
- Capitalising, in the short term, on spare land for revenue generation; and
- Safeguarding, for the long term, the land required to enable achievement of the ultimate capacity objective.

In line with the results of the demand/capacity assessment, the next phases of cargo development include:

- Construction of additional facilities for express cargo; and
- Construction of additional facilities for general cargo.

In the longer term as demand grows, it may be necessary to make provision for additional land in the western midfield to accommodate express cargo operations.

## SkyCity

The overall objective for the commercial development at HKIA is to establish a 24-hour "SkyCity" and to create a community environment that embraces the new airport. The AA's strategic planning goal for SkyCity is to define a flexible development concept which meets the market's expectation while at the same time maintaining an urban design concept which will expand HKIA's value-added business focus. Specific objectives for the development of SkyCity are to:

- Generate more air traffic to strengthen Hong Kong's position as a regional aviation hub and gateway to the Mainland;
- Promote economic growth, trade and tourism;
- Provide better facilities for passengers and the airport community; and
- Increase non-aeronautical revenues.

A mixed land-use commercial area comprising some 57 hectares adjacent to the PTB, SkyCity will ultimately consist of a total of 1 million m<sup>2</sup> of mixed-use property development. The three prime commercial uses in Phase 1 are:

- An international exhibition centre on a site of 11 hectares for development of a 50,000m<sup>2</sup> single-level facility (expandable to 80,000m<sup>2</sup>) in cooperation with Government and a private sector

developer to attract special equipment/plant shows;

- A 90,000m<sup>2</sup> office and retail development to meet the needs of airlines, tourism and airport-related businesses to strengthen HKIA as a regional aviation hub with quality facilities for passengers and airlines and to increase non-aeronautical revenue; and
- A cross-boundary passenger ferry terminal to develop HKIA as a multi-modal hub with air, land and sea access and to expand the airport's catchment area to the PRD.

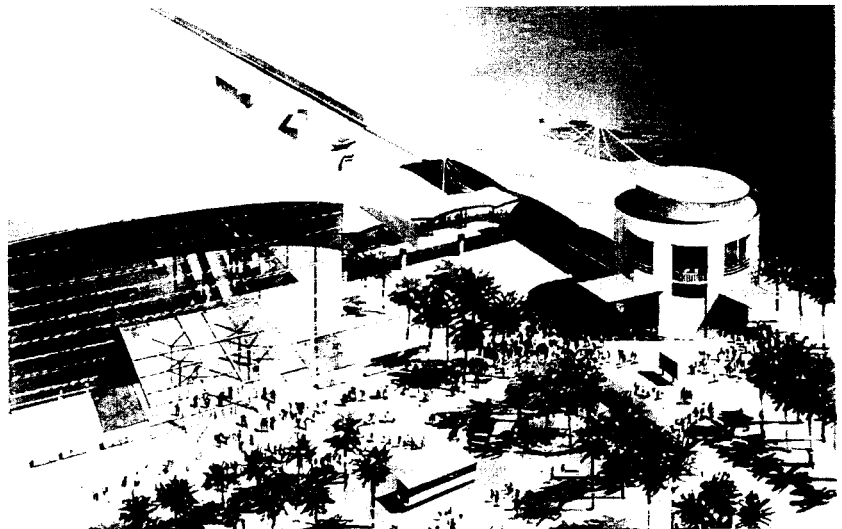


SkyCity – Office / Retail Centre

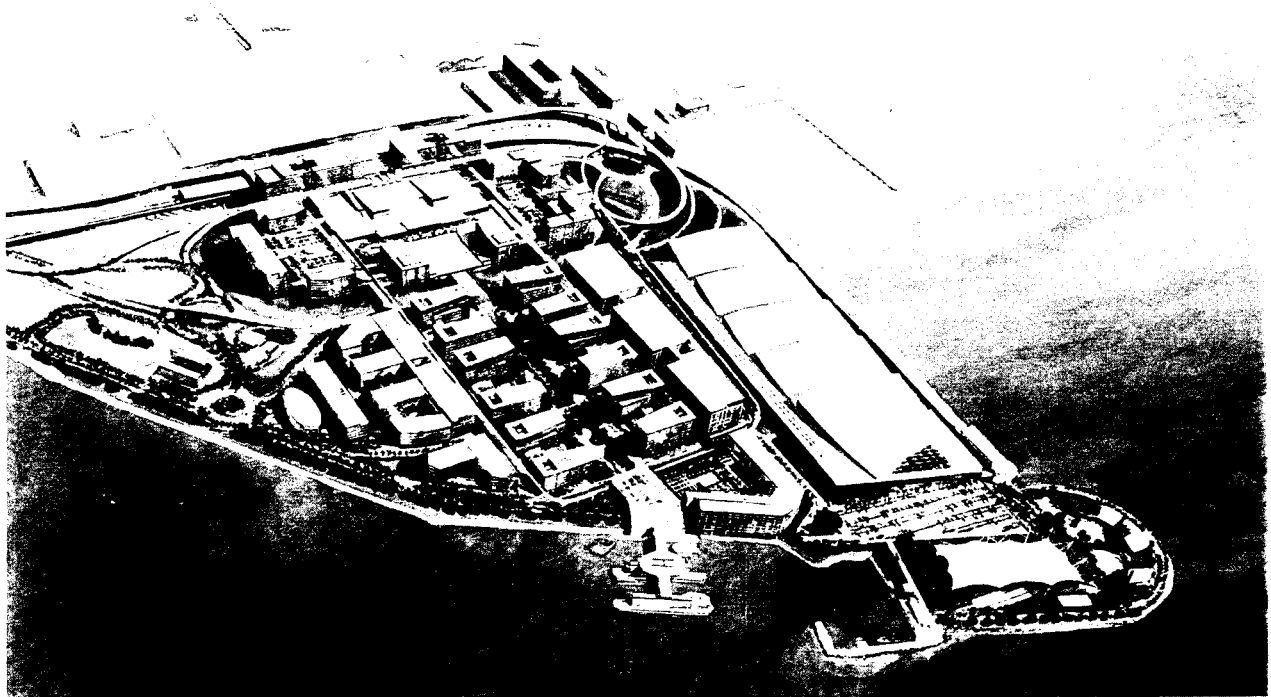
### Connectivity

With about 50% of the world's population within 5 hours' flying time, Hong Kong is uniquely located geographically as a global aviation centre. HKIA is well-placed at the mouth of the PRD to provide world-class aviation services to this region, Guangdong Province and beyond.

As the airport plays a pivotal role in Government's plans to promote Hong Kong as a logistics hub, it is essential to enhance HKIA's



SkyCity – Exhibition Centre



SkyCity – Ultimate Development

accessibility in the region. Recognising the need to work together to optimise opportunities, and at the initiation of the AA, the five airports in the PRD, including HKIA, have agreed to explore possibilities of multilateral and bilateral cooperation between airports e.g. enhancing the connectivity between airports by air, land and sea links.

- An elongated "X" shaped satellite concourse and aircraft parking configuration will be developed in the Midfield Area;
- A cargo development strategy will be implemented to position HKIA as an express cargo transshipment hub in addition to an O/D general air cargo centre;
- Development of off-airport logistics parks at North Lantau will enhance Hong Kong's position as a regional logistics and supply chain management centre;
- Multi-modal transport including direct and efficient air, land and sea links between HKIA and the Mainland, in particular the PRD, to enhance the airport's accessibility is essential for the further development of HKIA as a passenger and cargo hub; and
- Initiatives for cooperation with other airports in the PRD are required to expand HKIA's catchment area, including development of inter-modal links.

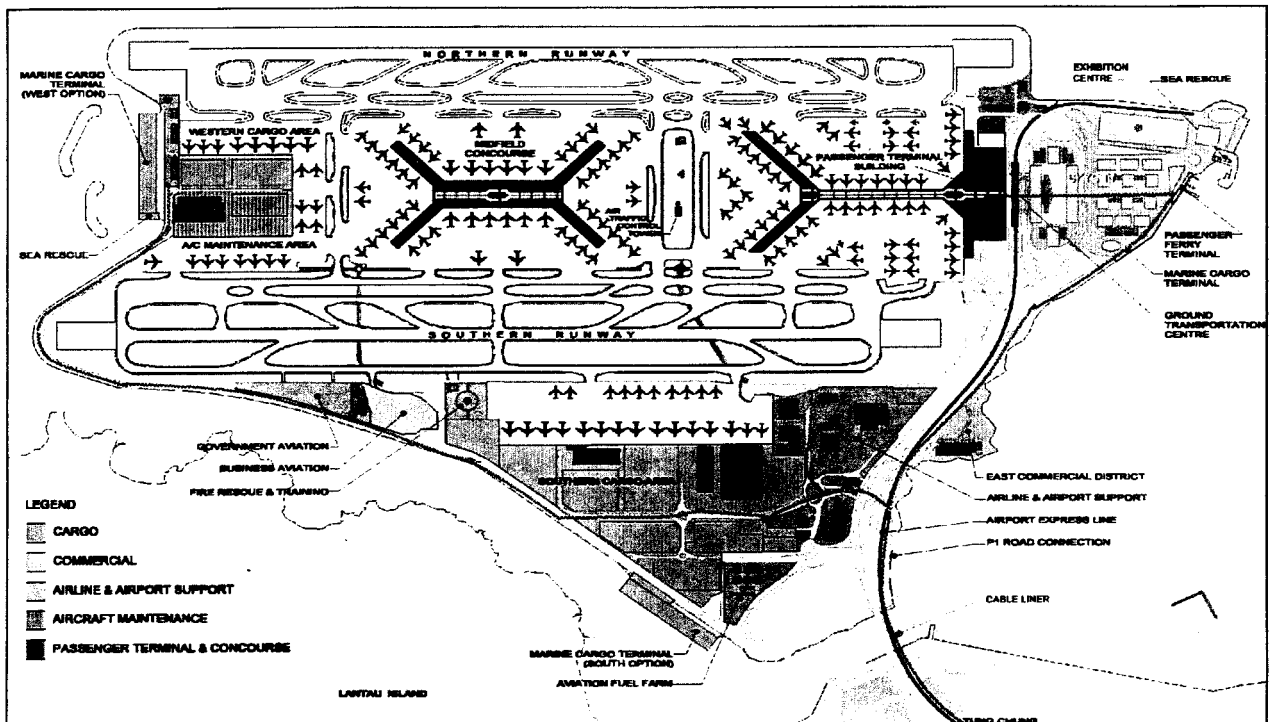
and other business partners to take HKIA forward in its next phase of development to strengthen Hong Kong as a centre of international and regional aviation, the preferred gateway of China and a world-class logistics hub.

## CONCLUSION

The development strategies recommended for supporting growth in passenger and cargo traffic at HKIA have been brought together in an integrated land use plan for the ultimate development of the airport. In the next 20-year horizon, the HKIA Master Plan has identified that:

- The PTB can be enhanced and expanded to meet ultimate demand;

With the Master Plan in place, the AA will work with Government, airlines



Hong Kong International Airport – Ultimate Land Use Plan