

## **Cincinnati/Northern Kentucky International Airport (CVG) Master Plan Update Forecast Methodology Summary**

The CVG Master Plan Update (MPU) forecast was prepared in 2004 with a planning horizon of 2025. The aviation activity forecast for CVG was developed using industry standard methodologies and represents unconstrained demand at the airport. It reflects input received from each of the airlines operating at CVG, as well as expected aviation system trends identified by the FAA and industry experts. The forecast was reviewed and accepted by the FAA for master planning and environmental impact purposes. As such, it provides a viable basis for examining future aviation needs and preserving flexibility necessary to continue serving the region's air transportation needs within a very dynamic global marketplace.

Air transportation demand at CVG depends on a combination of trends in the airline industry and the socioeconomic conditions within the southwest Ohio, southeast Indiana, and northern Kentucky area. Local demand represented only about 35 percent of the airport's passengers in 2003; the remainder is connecting passengers. However, it is the airport's role as a major connecting hub that enables such a rich menu of non-stop markets and high frequencies, which contribute significantly to the region's economy. The MPU forecast assumes the airport will continue to be a major connecting hub for both Delta and Comair, as well as a major spoke market for each of the other airlines.

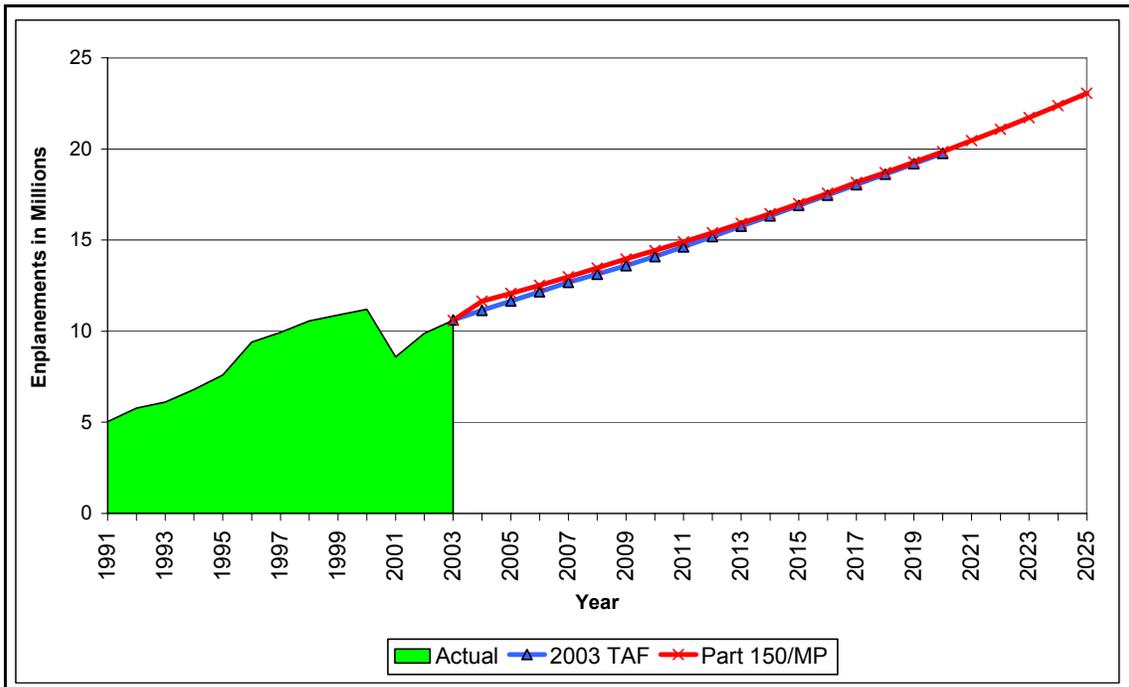
### **1. Passenger Enplanements**

Any effort to project future airline passengers begins with a forecast of originating enplanements. The level of originating enplanements reflects the attractiveness of the Cincinnati/Northern Kentucky region as a place to live, a place to visit, and as a place to work and conduct business. A multi-linear regression analysis approach was chosen to forecast originating passengers. This methodology, which compares a logical and proven relationship between socioeconomic variables in a specific area around CVG to historical O&D (origin and destination, local) passenger activity at CVG, has been successfully utilized for many other major airport forecasts throughout the U.S. Various combinations of independent variables were tested, and the variables used to develop the forecast for originating enplanements were population, employment, per capita personal income, and local yield (ticket price).

The volume of connecting passengers reflects the quality and quantity of air service offered at an airport by a hub airline and its alliance partners, and is typically gauged by the frequency of departures and the number of destinations served. The percentage of connecting passengers increased from 59 percent in 1992 to 68 percent in 1998, as Delta expanded its hub. Since 1998, the connecting percentage has fluctuated between 65 and 67.5 percent. In 2003, the

connecting ratio was 65 percent. It is assumed that this ratio will increase to 69.2 percent by 2025.

The following graph presents the enplanement forecast and the FAA’s 2003 Terminal Area Forecast (TAF). Domestic enplanements are projected to grow from 10.2 million in 2003 to 21.9 million in 2025, an average annual growth rate of 3.6 percent. International enplanements are projected to grow from 393,591 in 2003 to 1.1 million in 2025, an average annual growth rate of 4.7 percent. Total enplanements (domestic, international and charter) are projected to grow from 10.6 million in 2003 to 23.1 million in 2025, an average annual growth rate of 3.6 percent.



Source: KCAB, L&B, FAA TAF

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Enplanements Comparison

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## 2. Aircraft Operations

Passenger carrier operations forecasts for each year were derived directly from the passenger forecasts. The number of commercial passenger operations at an airport depends on three factors: total passengers, average aircraft size, and the average load factor. The relationship is shown in the equation below.

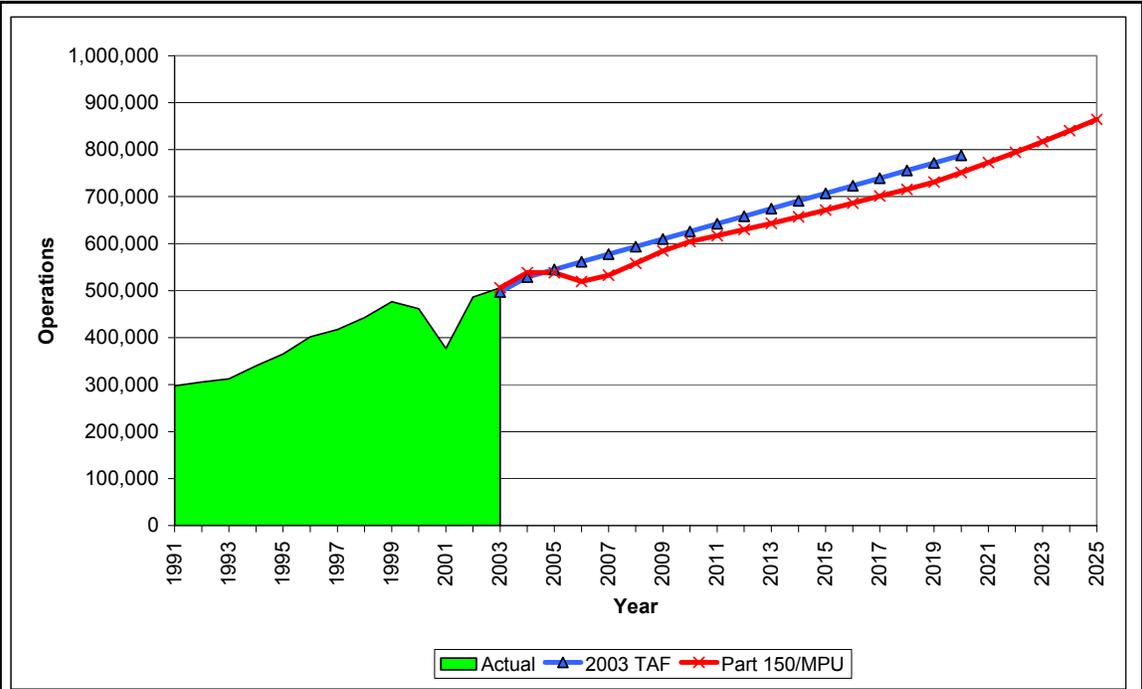
$$\text{Operations} = \frac{\text{Total Passengers}}{\text{Average Aircraft Size} * \text{Average Load Factor}}$$

As a first step in preparing the aircraft operations forecast, the fleet mix for 2003 for the commercial passenger airlines was reviewed to identify the most recent changes in aircraft types. Historical average seats per departure were calculated for the passenger carriers based on this fleet mix in conjunction with other historical data. Current aircraft orders and options placed by the major carriers were reviewed, along with expected delivery schedules. Finally, industry trends were examined, and a resulting future fleet mix was then projected. This fleet mix yielded an average seat size by sector for use in forecasting passenger operations. The dominant aircraft in the 2003 domestic air carrier fleet is the MD-80. By 2010, MD-80s will begin to be phased out and are expected to be replaced with B737-800s. The 50-seat regional jet (CRJ) represented 48 percent of the domestic CVG fleet in 2003. CR9 (80-seat) regional aircraft will gradually be introduced at CVG over the forecast horizon. CR7 (70-seat) regional aircraft are projected to increase from five percent of the 2003 domestic fleet to 24 percent of the 2025 fleet. CR9 and CR7 aircraft are forecast to make up 34 percent of the domestic fleet by 2025. Historical load factors were also evaluated and industry trends were examined in order to forecast future load factors. While regional jets are expected to continue their dominant role at CVG, their share of the market will diminish after 2010 as larger aircraft are introduced in maturing markets.

In addition to the passenger service at the airport, CVG also has cargo, military, and general aviation activity. DHL has operated a cargo hub at CVG since 1984. DHL announced in June of 2004 that it was planning to relocate its hub to Wilmington, Ohio as of September 2005. It is assumed that the other cargo carriers will continue to operate at CVG, and that other cargo carriers will increase operations at CVG as DHL pulls out. However, it is not anticipated that cargo operations will increase at a level typically associated with a major cargo hub like DHL.

General aviation and military operations increased steadily from 17,510 operations in 1992 to over 44,000 in 1999 before decreasing by 2003 to 31,431. The continued decline is expected to continue through 2010, although at a slower rate. General aviation and military operations are then expected to remain constant through 2025.

The graph below shows that total aircraft operations are projected to grow from 505,687 in 2003 to 864,440 in 2025; an average annual growth rate of 2.5 percent. Passenger aircraft operations are projected to grow at an average annual rate of 2.9 percent, compared to 3.6 percent annually for passengers, reflecting the larger average aircraft size and slightly higher average load factor. During the period 2003 to 2025, cargo, military and general aviation operations are projected to decline by more than one percent per annum with most of the decrease occurring between 2003 and 2010. The graph also presents the 2003 TAF operations forecast.



Source: KCAB, L&B, FAA TAF

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