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PDX Airport Futures Project

Forecast Peer Review

EXECUTIVE SUMMARY

May 12, 2008

This executive summary documents the findings and conclusions of a review of the aviation forecast methodology and resulting traffic forecasts developed for the Portland International Airport (PDX) *Airport Futures* project by the Port of Portland's aviation consultant team. The Forecast Peer Review was undertaken for the City of Portland by Dr. Geoffrey Gosling, Principal of Aviation System Consulting, LLC, with the objective of providing the City of Portland, the Port of Portland, and the PDX Airport Futures Planning Advisory Group (PAG) and its Forecast Subcommittee with an independent assessment of the forecast methodology, forecast scenarios, and associated assumptions, including the treatment of uncertainty in the forecast process.

At the start of the forecast development process it was recognized that it would be more productive to have the Peer Review Consultant interact closely with the Port's Consultant (Jacobs Consultancy) during the preparation of the forecasts rather than commenting after the fact. This would allow any concerns to be raised at an early stage in the process while there was time to address them and provide an opportunity for the Peer Review Consultant to make suggestions as the work is proceeding. As a result, the Peer Review Consultant has been closely involved in the forecast development throughout the process, has been included in the distribution of draft products and working materials, including technical memoranda on the model estimation and drafts of presentations to the Forecast Subcommittee and PAG, and provided the opportunity to comment prior to their presentation. More substantively, a number of concerns raised by the Peer Review Consultant during the forecast model development have been addressed in the final models. Overall, this has been a very productive relationship.

A central feature of the process adopted for the current forecast is the decision to develop a probabilistic approach to generating the forecasts, also termed a risk analysis. This represents a significant technical improvement over the typical approach adopted in most airport master plan forecasts, including the previous master plan forecast for PDX. The principal advantages of this approach is that it provides a much better representation of the uncertainties inherent in forecasting future traffic at an airport and provides a basis for assessing the robustness of alternative facility plans considered in the master plan to different future traffic levels. In particular, it allows a more quantified approach to understanding the risks involved if traffic grows faster or slower than expected and provides the ability to address questions such as "how soon might we need the capability to handle 30 million annual passengers at PDX?" or "what is the likelihood that we will need to build another terminal concourse by 2015?"

However, an important consequence of adopting this approach is that the analysis is significantly more complex than is usual for an airport master planning study. This was further complicated by the recognition of the need to give detailed attention to assumptions regarding the future price of oil and the impact of policies to address climate change, aspects that have generally been ignored in past forecasts. As in other areas of transportation planning, the Portland region is well ahead of the state of the art elsewhere and is setting new standards of practice for aviation forecasting, something that the PDX Aviation Futures project and the Port's aviation consultant team can be justifiably proud of.

Although adopting a probabilistic approach incorporating the effect of future oil prices and climate change policies improved the usefulness of the forecast, the steps required proved technically challenging, time-consuming and costly. As a result there were a number of issues that arose during the forecast development process that it was decided there was neither the time nor the resources to pursue any further at the present time. Recognizing these limitations, the PAG voted to accept the forecasts at its meeting on April 15, 2008 with the condition that that the forecasts should be revisited before the end of the master plan update process to determine whether the assumptions underlying the forecasts still appear to be reasonable.

The Forecast Peer Review identified a number of aspects of the forecast methodology and assumptions that could have a significant impact on the forecasts and that appear deserving of further analysis in order to better understand how these could impact future traffic levels at PDX. The following aspects are likely to have the greatest influence on the forecast traffic:

- ❖ The enplaned passenger demand model assumes that the historical relationship between total passenger traffic at the airport and regional population, per capita disposable income, and average cost per passenger-mile of airfares from PDX (termed airline yield) will continue unchanged in the future and that the recent reduction in traffic from the levels predicted by the historical relationship will also continue unchanged.
- ❖ The air cargo model assumes that the past growth in air cargo is largely explained by an increasing weight of air cargo per thousand dollars of regional income and that this ratio will continue to increase in the future to a level about 40 percent above the 2006 level, while the effect of the recent reduction in air cargo traffic from the levels predicted by the historical relationship will continue unchanged.
- ❖ The forecast assumptions use current U.S. Department of Energy (DOE) projections of the future price of oil. In recent years the DOE has significantly under-predicted the increase in the real price of oil. In addition, the assumed future price of carbon offsets for aircraft emissions are reduced below the price levels identified in a recent study by the Massachusetts Institute of Technology by assuming that only a proportion will be passed on the airlines. The assumptions also do not include a factor to increase carbon offset costs to account for the radiative forcing effects of aircraft emissions. As a result, the assumed future range of airline fuel and carbon offset costs may be too low.

Since without further analysis it is unclear how these factors might interact to affect the forecast traffic, it is recommended that the Port and City continue to pursue these issues in parallel with the remaining steps in the master plan process, so that they are better understood when the time comes to revisit the forecasts at the end of the master plan process or closer to the time when important facility development decisions need to be made.