

**INDEPENDENT REVIEW
OF
FLORIDA'S HIGH SPEED RAIL
RIDERSHIP FORECASTS**

Prepared for the
FLORIDA TRANSPORTATION COMMISSION

Prepared by
WILBUR SMITH ASSOCIATES

August 4, 1998

Foreword

The Transportation Commission was created by the Florida Legislature in 1987 as an independent policy and accountability oversight body for the Florida Department of Transportation. In this capacity, the Commission provides leadership in meeting Florida's transportation needs through policy guidance on issues of statewide importance and maintains public accountability for the Department through comprehensive performance reviews. The Commission also serves as a nominating commission for the position of Florida Secretary of Transportation and in the event of a vacancy, submits three nominees from whom the Governor must select the Secretary.

The nine Commission members must have private sector business management experience and must equitably represent all areas of Florida. Members are appointed by the Governor for four year terms and must be confirmed by the Florida Senate. The Commission strives to be independent, non-parochial and non-partisan in the conduct of its statutory responsibilities.

The Commission has monitored development of the high speed rail project since it became a Department responsibility in 1992 by legislative mandate. In early 1997, the Commission adopted a position in support of continued budget to conduct the ridership estimate and further route and environmental studies. The Commission felt that these steps would yield more and better data on which to base a decision as to the fiscal prudence of implementing high speed rail. Moreover, it was not yet known whether the U.S. Congress would approve proposals creating mechanisms for federal funding assistance with project capital costs.

In light of the potential impact the high speed rail project could have on Florida's transportation budget, on Florida's economy, on mobility in the Tampa-Orlando-Miami travel corridors, and on the future of high speed rail in the nation, the Commission felt that it had an obligation to conduct an independent review of the Department's ridership estimate. The Commission felt that the review should be for the limited purpose of evaluating the soundness, validity and reasonableness of the processes, assumptions and methodologies used in arriving at the ridership estimate.

In selecting a firm to perform the review, the Commission considered those firms that had global expertise and experience in demand forecasting and that also had no existing involvement in the current high speed rail process in Florida. From the initial list of six qualified firms, the Commission short listed to three firms that were interviewed by a subcommittee of the Commission.

All three firms had impressive credentials, but Wilbur Smith Associates had the broadest experience with the investment community overall and with bond rating agencies and underwriters in particular, and would bring that perspective to the review. Based on this and Wilbur Smith's impressive experience in high speed rail ridership forecasts worldwide, the Commission selected them to perform the review. The Commission is satisfied that Wilbur Smith Associates has no conflict of interest and no relationships with parties involved in the current high speed rail process that would prevent them from rendering an impartial and objective review.

The Commission wishes to thank KPMG Peat Marwick, SYSTRA, the Peer Review Team, FOX and the Department for kindly providing relevant documents and information and for cooperating fully in all aspects of the review.

Florida Transportation Commission
Lee Vause, Chairman

WILBUR SMITH ASSOCIATES

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August 4, 1998

Mr. Lee Vause, Chairman
Florida Transportation Commission
605 Suwannee Street
Tallahassee, FL 32399

Dear Mr. Vause:

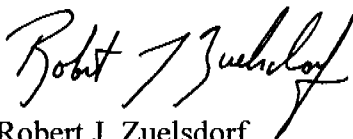
Wilbur Smith Associates is pleased to submit its report which summarizes our independent review of the ridership estimates that were prepared for the Florida Overland eXpress (FOX) proposed High Speed Rail System.

We have done our best to understand and to present what we believe was done during the ridership forecasting process. We examined the methodologies that were employed and the assumptions that were used. In this report we identify where we agree with what has been done; we also identify those areas where we have concerns.

We trust that this review will prove useful to Florida's residents as they make plans for their future transportation systems.

Respectfully submitted,

WILBUR SMITH ASSOCIATES



Robert J. Zuelsdorf
Senior Vice President

RJZ/tca

Executive Summary
INDEPENDENT REVIEW OF FLORIDA'S HIGH SPEED RAIL
RIDERSHIP FORECASTS

FLORIDA HIGH SPEED RAIL RIDERSHIP STUDIES

In 1998 two ridership estimation studies were completed relative to Florida's proposed High Speed Rail (HSR) Project. Those studies estimated that approximately 8.25 million fare paying passengers would ride the HSR (baseline route -- Tampa-Lakeland-Orlando-Palm Beach-Fort Lauderdale-Miami) during the year 2010, as follows:

<u>Sources of FOX Riders</u>	<u>Estimated Annual High Speed Rail Riders</u>		
	<u>KPMG¹</u>	<u>SYSTRA²</u>	<u>Consensus³</u>
Transfer from Autos	4,509,300	3,996,000	4,253,000
Transfer from Air Market:			
From Air Connect	1,476,000	1,476,000	1,476,000
From Local Air	1,157,700	1,244,000	1,201,000
Induced (new) Trips	864,600	1,787,000	1,326,000
Total Annual Riders	8,008,600	8,504,000	8,256,000

Sources:

1. KPMG Final Ridership and Revenue Report, April 1998.
2. SYSTRA Ridership and Revenue Study, Final Report, March 1998.
3. Average of the two estimates, as recommended by the Peer Review Committee.

WILBUR SMITH ASSOCIATES' REVIEW OF THESE RIDERSHIP STUDIES

As commissioned by the Florida Transportation Commission, Wilbur Smith Associates (WSA) conducted a four-month independent review of those two High Speed Rail ridership studies.

Scope of Wilbur Smith Associates' Independent Review – The WSA review focused only on the ridership estimates developed by KPMG and SYSTRA. The independent review did not produce a third ridership estimate; instead, the review was conducted for the limited purpose of evaluating the soundness, validity and reasonableness of the processes, approaches, assumptions, and variables used in the two HSR ridership studies.

Results of the Wilbur Smith Associates' Review – The review conducted by Wilbur Smith Associates suggests the following regarding the two ridership studies:

1. **Overall Approaches Used** – WSA concurs with and endorses the overall approach employed by the FOX/FDOT team. The FOX ridership studies included two different independent forecasting teams, included the conduct of extensive travel demand and traveller expected response surveys, focus groups were used, two state-of-the-art mathematical models were developed, travel markets were segmented, sensitivity tests were conducted, and a

Executive Summary

qualified peer review team provided oversight. In other words, the ridership studies were thorough.

2. **Forecasts Validity** – It is Wilbur Smith Associates' view that the ridership studies, their mathematical models and forecasting procedures, are consistent with generally accepted forecasting practices. However, it should be recognized that the preparation of the forecasts was not a strictly statistical exercise. The opinions and judgement of the forecasting consultants and the peer review panel also played a role in forecast preparation.
3. **Ridership Uncertainty** – The way the ridership estimates are presented in the FOX Executive Summary Report implies a level of certainty which, in the view of WSA, is unrealistic. No one can be certain that the estimated ridership will actually occur, since the estimates depend on forecasts of Florida's economy and traffic growth, estimates of trip makers' behavior, forecasts of how people will react to a new transportation mode, and assumptions about future fuel prices and how the airlines might adapt to a new transportation mode. The existence of so many variables, by their very nature, imply uncertainty.
4. **Reasonableness of the Forecasts** – While WSA found no "fatal flaws" in the analyses, WSA has three concerns which, if founded, individually and in composite would reduce the estimated ridership below the 8.25 million:
 - **Diversion from Automobiles** – The ability of a new High Speed Rail system to cause auto users to instead use High Speed Rail is not yet proven in the U.S. While the forecast level of diversion could occur, lesser rates of diversion from private autos are also plausible. WSA is concerned with the magnitude of this HSR market.
 - **Air Connect Passengers** – The studies assume that one or more of the major airlines will cooperate with FOX, and willingly give their air connect passengers to the HSR. This is uncertain at this time and needs to be verified with the airlines. WSA is concerned with this entire HSR market.
 - **Induced Travelers** – The two ridership studies estimate that HSR will create additional travel in the corridor. While WSA agrees that some HSR "induced" travel is likely, the amount of induced travel that will actually occur is uncertain. WSA is concerned with the magnitude of this HSR market.

In the view of WSA, the HSR forecasts should not be viewed as conservative, and may prove to be optimistic.

CONCLUSIONS

Although Wilbur Smith Associates has concerns about the reasonableness of the estimates, these concerns involve differences of opinion and judgement rather than differences of fact. It is Wilbur Smith Associates' opinion that the High Speed Rail financial calculations should be tested not only using the ridership estimates contained in the FOX reports, but also at a lower to-be-determined ridership level (as two equal financial tests, not as a sensitivity test).

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REVIEW OF FLORIDA'S HIGH SPEED RAIL RIDERSHIP FORECASTS

INTRODUCTION

This report documents the findings of an independent review of ridership forecasts for the Florida Overland eXpress (FOX) High Speed Rail (HSR) system. The review was commissioned by the Florida Transportation Commission and undertaken by Wilbur Smith Associates (the review consultant).

The review was focused on evaluating the soundness, validity and reasonableness of the overall process employed by the FOX ridership consultants, the approaches used in various tasks and the assumptions and variables incorporated into the forecasts. The intent was **not** to prepare a new ridership forecast (and new ridership estimates were not prepared by Wilbur Smith Associates).

History and Current Status of FOX and FOX Travel Demand Forecasts

As stated in the **Executive Summary Report, Florida High Speed Rail Project, Ridership Study, Florida Department of Transportation and Florida Overland eXpress, April, 1998** :

The Florida Legislature, through The High Speed Rail Act of 1992, directed the Florida Department of Transportation (FDOT) to develop a statewide high speed rail system. FDOT, the state agency mandated to implement the legislative policy on high speed rail, and Florida Overland eXpress (FOX), the state's franchisee selected by competitive procurement, are working together in a public/private partnership to develop a high speed rail system in Florida, thereby fulfilling the legislative mandate.

FDOT and FOX engaged two independent forecasting firms, KPMG Peat Marwick and SYSTRA (the consulting arm of the French National Railways, SNCF). They conducted parallel studies for the ridership that could be expected to use the Florida high speed rail system.

These two ridership studies were completed in March (SYSTRA) and April (KPMG) of 1998 and their findings documented in individually prepared ridership and revenue reports and a jointly prepared Executive Summary Report. A peer review team of industry professionals was assembled by FDOT to provide ongoing oversight of forecast procedures and to review forecast results. The peer review team also prepared its own report.

Three routes were considered in the preparation of forecasts. This Florida Transportation Commission independent review concentrated its efforts on examining the procedures and forecasts associated with Route 1 - identified in the consultant reports as the baseline alternative.

Each of the forecast consulting teams produced an independent estimate of FOX ridership based on common data and using some common assumptions. At the completion of their individual forecasting efforts the teams and the Peer Review Committee considered both forecasts and reached a consensus view that a 'highest level of confidence' forecast would consist of an average of the two. The major components of the individual and consensus forecasts are shown in Exhibit 1.

Review of Florida's High Speed Rail Ridership Forecasts

**Exhibit 1
YEAR 2010 FOX RIDERSHIP FORECASTS
Annual Person Trips**

MARKET SEGMENT	KPMG	SYSTRA	Consensus
Long Distance Trips (> 100 Miles)			
Tampa Bay – Palm Beach	373,300	435,000	404,000
Tampa Bay – Southeast Florida	957,500	850,000	904,000
Polk – Palm Beach	102,600	120,000	112,000
Polk – Southeast Florida	166,700	133,000	150,000
Central Florida - Palm Beach	944,800	1,057,000	1,001,000
Central Florida – Southeast Florida	3,703,800	3,804,000	3,753,000
Other	357,700	308,000	333,000
Total Long Distance	6,606,400	6,707,000	6,657,000
Short Distance Trips (< 100 Miles)			
Tampa Bay – Central Florida	817,500	1,245,000	1,031,000
Polk – Central Florida	18,400	174,000	96,000
Palm Beach – Southeast Florida	566,400	378,000	472,000
Total Short Distance	1,402,300	1,797,000	1,599,000
TOTAL FOX TRIPS – 2010	8,008,700	8,504,000	8,256,000
SOURCE OF FOX RIDERS			
Transfer From Air Connect Market ^(a)	1,476,000	1,476,000	1,476,000
Transfer From Local Air Market ^(b)	1,157,700	1,244,000	1,201,000
Transfer From Auto User Market ^(c)	4,509,300	3,996,000	4,253,000
Induced Trips ^(d)	864,600	1,787,000	1,326,000
TOTAL FOX TRIPS – 2010	8,008,600	8,504,000	8,256,000

- (a) Air Connect Market – air trips with an origin or destination outside of Florida, with a “connecting” airport in Florida. Both KPMG and SYSTRA used the SYSTRA estimate of this market.
- (b) Local Air Market – air trips between two places in the Tampa-Orlando-Miami corridor that, with FOX, would instead choose to ride the HSR.
- (c) Auto User Market – a trip made by auto that, with FOX, would instead choose to ride the HSR.
- (d) Induced Trips – a trip in the corridor that is made because of FOX that, without FOX, would not be made.

Sources: Executive Summary Report, Florida High Speed Rail Project, April 1998; SYSTRA Ridership and Revenue Study, Final Report, March 1998 and KPMG Final Ridership and Revenue Report, April 1998. (Totals may not match due to rounding)

Ridership Review Initiation and Objectives

The primary objective of this review was to evaluate the overall forecasting process, individual procedures and assumptions used by the two consultant teams for technical validity and to assess the resulting forecasts for reasonableness - given the assumptions used in their preparation. The intent was to obtain an independent review of the overall forecasts (and the individual market components making up the total ridership estimates).

It was not intended that a revised ridership estimate be prepared (and no forecasts were developed as part of the review). Rather, the independent review consultant was directed to examine each major procedure and assumption used in building the overall forecasts and to provide its comments (both favorable and constructively critical) regarding the techniques employed.

The independent review was limited to an examination of forecast FOX ridership. No examination of high speed rail capital costs, operating costs, or high speed rail revenues was conducted.

Wilbur Smith Associates

Wilbur Smith Associates (WSA) was selected by the Commission to undertake the ridership review. WSA is an engineering consultant specializing in transportation planning and finance. The company maintains offices in Orlando, Tallahassee and Tampa, Florida as well as 26 other United States cities and locations overseas. The firm employs over 600 people and has been providing transportation consulting services for 46 years. WSA has developed a reputation for conservative, reliable travel demand forecasts and enjoys the confidence of bond rating agencies and underwriters - over 45 billion dollars of transportation infrastructure improvements have been financed using forecasts prepared by the firm. In other cases WSA forecasts have suggested that projects were not financially feasible.

The firm has conducted a number of ridership forecasting projects similar to the FOX work. These include high speed rail systems linking Chicago with St. Louis, Milwaukee and Detroit; the Ohio high speed rail system (Cleveland, Columbus and Cincinnati); a proposed Orlando MAGLEV between the airport and International Drive; the Texas Triangle high speed rail system (Dallas/Ft. Worth, Houston and San Antonio); a Canadian high speed rail system connecting Windsor, Toronto, Ottawa, Montreal and Quebec City; and a high speed train for Thailand. WSA was also one of a number of consultants which participated in the preparation of demand forecasts for Eurotunnel (linking England and France under the English Channel). WSA also provided technical oversight/peer review services to the Federal Railway Administration study of the commercial feasibility of eleven high speed rail corridors and to the Tri-State (Chicago-Milwaukee-Minneapolis) rail project. In addition, WSA has analyzed the economic impact of the California High Speed Ground Transportation System, and the economic impact of 11 US high speed rail corridors for the Federal Railroad Administration.

WSA has had no prior involvement with the preparation of the FOX ridership forecasts or the design and implementation of the FOX system. As an active, internationally recognized consulting firm,

Review of Florida's High Speed Rail Ridership Forecasts

WSA competes against and, sometimes, works with firms that are under contract to FOX. WSA also conducts projects for FDOT. As part of an FDOT work order contract WSA participated, in a minor role, in the review of Florida high speed rail franchise proposals. In addition, WSA has conducted a number of railroad studies for FDOT including several statewide rail freight studies, several urban rail passenger studies, several south Florida rail studies, and one statewide study of possible rail passenger routes (physical feasibility only). These prior activities are mentioned in the spirit of full disclosure of WSA's past experience with the project and its principal participants.

The firm has conducted feasibility studies for highway, air, waterway and rail projects. It maintains a position of being mode neutral and is neither a high speed rail advocate nor a critic. The firm's reputation for objectivity is essential to maintaining its transportation planning practice.

THE REVIEW PROCESS

Project Management

The Florida Transportation Commission's objective in undertaking this project was to obtain an impartial, unbiased and completely objective analysis of the ridership forecasts sponsored by FDOT and FOX and to identify any concerns within these forecasts or forecasting processes. To support this objective, the review consultant worked directly and exclusively for the Commission and reported only to the Commission.

To expedite the contracting process the review consultant was hired as a subcontractor to FDOT's public transportation general consultant - ICF Kaiser Engineers, Inc. During the hiring process, FDOT and the general consultant carried out the administrative steps required for the issuance of a task order for the independent review. The Commission prepared the estimate of services and work scope and determined the final contract amount. The role of FDOT and its general consultant was limited to the purely administrative aspects of hiring the review consultant. After the task order was issued, that administrative involvement ceased and there was no further oversight by FDOT or its general consultant.

The review consultant was given notice to proceed on March 19, 1998. The review was conducted over a four-month period and included approximately 12 person weeks of professional staff effort.

Coordination and Communication with FDOT and the FOX Ridership Consultants

Formal meetings between the review consultant, FDOT, the FOX ridership consultants, a representative of the peer review team and representatives of the Commission were held on the following dates for the indicated purposes:

DATE	MEETING PURPOSE
March 25, 1998	To present the objectives of the independent review and request information from the FOX ridership consultants. (This meeting was attended by KPMG Peat Marwick, SYSTRA, FOX, FDOT, and the High Speed Rail Sub-Committee of the Commission.)
May 27, 1998	To present review preliminary findings to the High Speed Rail Sub-Committee of the Commission. (This meeting was attended by representatives of the Commission's High Speed Rail Sub-Committee).
June 4, 1998	To present preliminary findings to the FOX ridership consultants. (This meeting was attended by all parties--FOX, KPMG Peat Marwick, SYSTRA, peer review committee chairman, FDOT, Commission High Speed Rail Sub-Committee.)
June 19, 1998	To receive responses from the FOX ridership consultants regarding the review preliminary findings. (This meeting was attended by all parties.)

Additionally, informal telephone, e-mail and fax communications were used during the review process to obtain additional data and information from the FOX ridership consultants. Following the June 4 meeting the FOX ridership consultants were provided with written and computer based material describing the review preliminary findings. Following the June 19 meeting the independent review consultant was provided with written material addressing questions raised regarding forecasting assumptions and procedures. A draft statement of review findings was transmitted to the ridership consultants and the Chairman of the peer review committee (on June 30, 1998) for their review and comment. All three responded with useful written comments.

The FOX ridership consultants cooperated with the independent review process. Information requested (describing model validation results, FOX ridership characteristics and sensitivity testing) was provided in a timely manner.

There was no attempt by FOX, the FOX ridership consultants (or anyone else) to influence the review consultant, the review results, or the conduct of the review.

Information Available for Review

The following reports were provided to the review consultant:

- 1 - Florida High Speed and Intercity Rail Market and Ridership Study, KPMG Peat Marwick for the Florida Department of Transportation, July 1993.
- 2 - Florida Overland eXpress Intercity Travel Survey - 1997, Transportation Consulting Group with KPMG Peat Marwick and SYSTRA for Florida Overland eXpress, January 1998.
- 3 - Draft Final Report, FOX Ridership and Revenue Study, SYSTRA for FOX and FDOT, January 1998.
- 4 - Draft Ridership and Revenue Report, FOX High Speed Rail Study, KPMG Peat Marwick LLP for FOX and FDOT, January 1998.
- 5 - Draft Preliminary Peer Review Report of Ridership and Revenue Forecasts for the Florida Overland eXpress, the High Speed Peer Review Panel for FDOT, February 3, 1998.
- 6 - Final Report, FOX Ridership and Revenue Study, SYSTRA for FOX and FDOT, March 1998.
- 7 - Final Ridership and Revenue Report, Florida Overland eXpress High Speed Rail Study, KPMG Peat Marwick LLP for FOX and FDOT, April 1998.
- 8 - Peer Review Panel Report, Ridership and Revenue Forecasts, Florida Overland eXpress, the High Speed Peer Review Panel for FDOT, April 1998.
- 9 - Executive Summary Report, Florida High Speed Rail Project, SYSTRA and KPMG Peat Marwick for FDOT, April 1998.

In addition to the written reports, the two ridership consultants also provided the review consultant with additional information which facilitated the review consultant's work. For example, information providing forecast model calibration/validation results and more detailed breakdowns (by cross classifications of city pair, resident versus visitor, business versus nonbusiness) of demand forecasts were requested from and provided by the FOX consultants. The consultants also provided information describing air fare and seat availability trends in the central-southeast Florida travel market, a breakdown of air traveler origins-destinations by county within southeast Florida (from the 1992 and 1997 travel surveys), a comparison of FOX estimated auto diversion rates with a prior FRA study of high speed rail in Florida, comments regarding assumed value of time relationships, induced traffic comments and comparisons to other systems and comments related to air connect travel.

Review of Florida's High Speed Rail Ridership Forecasts

The review consultant also obtained additional independent information describing the characteristics of 1997 air travel between Tampa/Orlando and Palm Beach/Ft. Lauderdale/Miami airports. The sources of these data were the Federal Aviation Administration (FAA) U.S. Department of Transportation airline airport to airport passenger counts (required by the FAA from all commercial carriers) and the 10 percent sample airline ticket data (also required by the FAA).

This information was obtained from Data Base Products, Inc., a firm specializing in processing and refining the FAA data to obtain estimates of connecting and local traffic between airports. (Local air traffic comprises passenger trips whose entire air journey is between two airports in the corridor; connecting air traffic comprises air passengers using one or both of the Florida airports to transfer from or to another airline flight).

The review consultant also made use of data collected in the 1990 census, available traffic count data and information available from the American Travel Survey (The American Travel Survey was conducted in 1995 by the Bureau of Transportation Statistics, U.S. Department of Transportation. It collected information from a sample of approximately 80,000 households about their long distance - over 100 miles - travel. The information, which describes how, why, where, when and who travels in America, is available on an individual state basis. Data were obtained describing travel to and within Florida for comparison with the FOX survey results).

The reports provided to the review consultant documenting the KPMG Peat Marwick assumptions and procedures (supplemented by conversations with KPMG staff) were found to provide a sufficient description of the KPMG approach to allow an informed review.

SYSTRA also provided its reports, supplemented by conversations and communications with the review consultant. Despite efforts by both the review consultant and SYSTRA staff, some questions remained regarding some components of the SYSTRA forecasting procedures. These questions were primarily in areas related to the use of survey data to segment travel by purpose, time of day, day of week, traveler group size; the assumptions made regarding the service characteristics of FOX and the competing travel modes and how these assumptions varied by travel segment; and assumptions made and procedures used to account for difficult to quantify, but potentially favorable, service attributes of FOX - increased reliability, comfort and convenience. Some of these questions remained unanswered and limited the ability of the independent review consultant to fully evaluate the reasonableness of the SYSTRA approach.

Major Review Areas of Investigation

The review process performed by Wilbur Smith Associates was organized to address five (A-E) major areas of investigation, including:

- A. Survey Data** - Traveler survey data was collected by the FOX consultants to support the forecasting process. Two types of data were collected. The first (observed travel data) was conducted to define the characteristics of existing (1997) travel within the FOX corridor. The second (stated preference data) was conducted to investigate how travelers would react to the availability of FOX as a traveling alternative. The procedures used in

both data collection exercises were reviewed relative to their potential for introducing bias or error into survey findings. The observed travel data were also compared with other available sources of information describing corridor travel, and assessed for consistency with this information.

- B. Forecasting Assumptions** - Travel demand forecasting requires that assumptions be made regarding many of the variables that are input into the process. Variables in this category include economic growth, tourism growth and the service attributes (travel times and costs) associated with competing travel modes. The assumptions used in producing the FOX forecasts were reviewed for reasonableness and consistency with one another (particularly comparative mode travel times and costs).
- C. Forecasting Model Structure and Validation** - Travel demand forecasting uses computer based mathematical models to simulate the choice behavior that travelers exhibit as they make decisions regarding where, when and how to travel. Different submodels are used to estimate growth in overall travel demand and the choice between available modes of travel (automobile, air or FOX). The model development process includes a comparison of model estimates with observed travel data for a base year (in this study the base year is 1997) to 'validate' the model's ability to accurately estimate travel demand. The model structures and related mathematical relationships were reviewed for reasonableness and consistency with generally accepted forecasting techniques. The validation results were examined to determine the ability of the models to reasonably estimate actual demand for, at least, one point in time.
- D. Forecasting Procedures and Reasonableness Tests** - Two sets of forecasts were prepared - one by each of the FOX ridership consultants. The two forecasts were compared to determine where significant differences exist and, where possible, to determine the reasons for these differences. The forecasts were also evaluated for reasonableness - given the assumptions made regarding competing mode service attributes. Forecast model sensitivity to key input assumptions (travel times, costs and access requirements) was examined to determine if the models react to changes in these variables in a manner consistent with observed travel behavior.
- E. The Air Connect Passenger Market** - This component of potential FOX users is different from other markets in that mathematical models were not used in its derivation. Rather, an approach based on judgement and expectations of airline cooperation was used to estimate the number of FOX passengers derived from this source. The review examined the assumptions made regarding overall air connect passenger growth, relative costs of air and FOX transport of these passengers, and airline cooperation.

INDEPENDENT REVIEW FINDINGS

Uncertainties Associated With Travel Demand Forecasting

There is no single, universally accepted procedure for forecasting future travel demand. A variety of techniques have been used in prior intercity travel studies (and on this project). Each of these have proponents and critics and it is difficult to definitively rate one as 'better' or 'worse' than another. Therefore, the findings expressed in this report should be recognized as the opinions of the independent review consultant. These opinions reflect the consultant's experience with intercity demand forecasting and a generally conservative approach to the preparation of such forecasts.

Future event forecasting, by its very nature, includes a level of uncertainty. Assumptions made regarding factors affecting overall travel demand and/or FOX utilization may or may not actually come to pass. Demand forecasters attempt to make reasonable assumptions in these areas using the 'best' information available at the time the forecasts are prepared. However, it should be recognized that uncertainties do exist in the process.

In recognition of these uncertainties the FOX team adopted an approach of using two demand forecasting teams each charged with producing an independent estimate of FOX ridership. The forecasting teams were supplemented by a peer review panel to provide oversight of and comment on the different procedures employed. The FOX team and FDOT should be applauded for this approach and for dedicating the resources needed for its implementation.

The Florida Transportation Commission initiated this additional review in an effort to provide decision-makers with another, completely independent opinion of the level of uncertainty that may exist within the FOX forecasts. It is suggested that this review brings benefits to the overall process of evaluating the feasibility of the FOX system and assessing the uncertainties associated with its implementation.

Assessment of Overall Approach to Ridership Estimation

The review consultant concurs with and endorses the overall approach employed by the FOX/FDOT team. Components of this approach that merit individual recognition include:

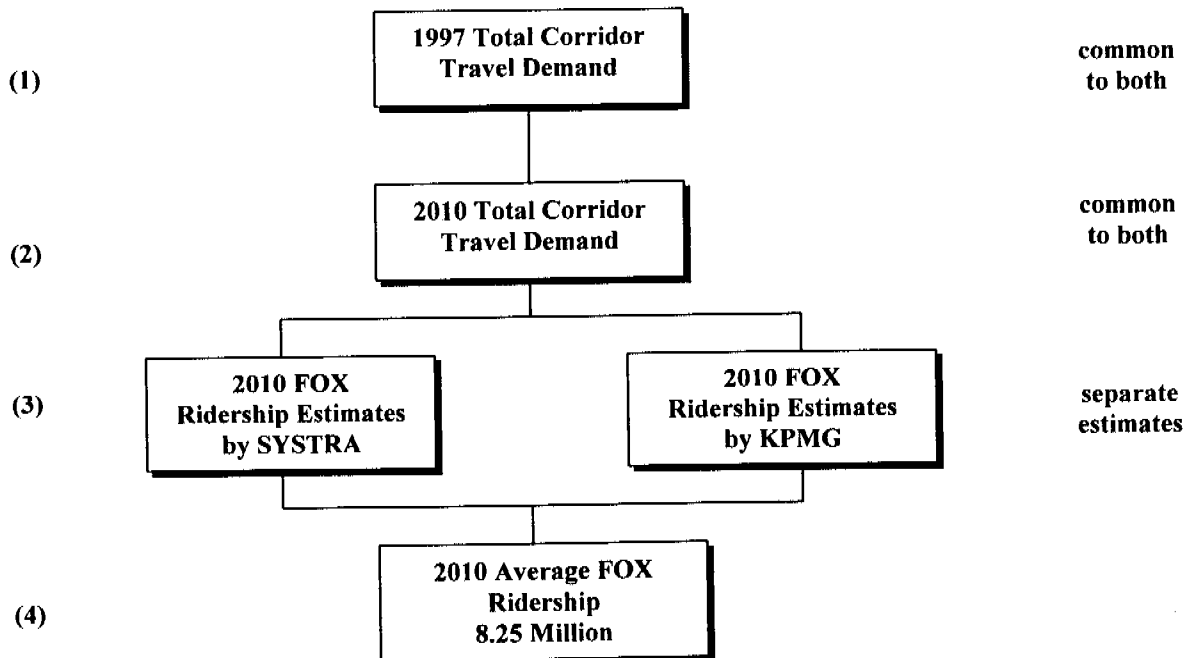
- 1 - The use of two independent forecasting teams and techniques (for the mode split analysis);
- 2 - The use of peer review and oversight at all stages of the process;
- 3 - The design and implementation of an extensive program of data collection intended to gather corridor specific information describing existing travel demand and traveler expected response to the availability of a new travel mode - FOX;

- 4 - The development and use of two different, but consistent with current forecasting technology state of the art, mathematical models for travel behavior;
- 5 - The division of the overall travel market into individual geographical and trip maker market segments having different reasons for traveling and objectives in meeting their travel needs. The development and use of models that recognize the differences that exist within these individual market segments; and
- 6 - The conduct of tests examining the sensitivity of forecast results to different assumptions regarding key model input variables.

The Overall Approach to Ridership Estimation

The ridership estimation process used a series of steps. Some steps were common to both the SYSTRA and the KPMG ridership analyses, some steps were distinct to the two estimates. Several of these steps are shown on Exhibit 2.

**Exhibit 2
TWO INDEPENDENT MODE SPLIT ANALYSES**



- Step 1 --** Extensive surveys were taken in 1997 by the Transportation Consulting Group. These included auto users and air users, and formed a database used to characterize existing travel. This database was common to both SYSTRA and KPMG.
- Step 2 --** The "without FOX" 1997 survey results were forecast to the year 2010, to depict year 2010 travel in the corridor if FOX is not built. This year 2010 total travel demand estimate was common to both SYSTRA and KPMG.
- Step 3 --** Given the 2010 total travel estimate (without FOX), SYSTRA and KPMG then used their respective methodologies to estimate how much of the total travel demand would use FOX, and how much travel FOX might induce. SYSTRA and KPMG each developed its own estimate of mode split (how many would use FOX) and induced traffic, although some common assumptions were used.
- Step 4 --** The final step was a reconciliation of the two estimates, which was done by averaging the two estimates.

The important points are:

- The critical mode choice and induced travel analyses were performed separately by each ridership consultant, using its own techniques.
- The equally critical base year database and total demand forecasts were common to both ridership consultants.

Presentation of FOX Ridership Results

The presentation of FOX forecast results to decision makers (particularly the Executive Summary Report), in the review consultant's opinion, appears to imply a level of certainty (or at least does not fully explore the potential uncertainties) to the forecasts. The use of terms like 'highest level of confidence' and the consultant team selected descriptions of prior accuracy of forecasts could lead the reader to believe that these forecasts will almost certainly be achieved. It is suggested that the Executive Summary Report would benefit by a prominently featured discussion of the uncertainties involved and, perhaps, the identification of pessimistic and optimistic levels of ridership.

Assessment of FOX Ridership Forecasts and Procedures by Major Review Area

A. Survey Procedures and Data Reliability

Origin-Destination Surveys - The 1997 origin-destination (observed travel data) survey data collection and expansion procedures appear to be well thought out, comprehensive and consistent with (or even exceeding in terms of magnitude, attention to seasonal variation and methods used for data collection and quality control) data collection programs employed in other studies of proposed transportation system investments.

The ridership consultants compared results obtained in the 1997 survey with the results obtained in the 1992 survey (a prior study of high speed rail feasibility in Florida was conducted in 1992-93 by KPMG Peat Marwick) to establish a trend in overall travel growth (3.8% per year). This trend was then used by the ridership consultants to compare and validate the FOX overall travel growth of 3.4% per year. Exhibit 3 contains a comparison of person trips and estimated travel growth for the auto and air travel markets by major city pairs from the two surveys. While overall annual travel growth between the two surveys is 3.8 percent, it should also be noted that the surveys suggest an unexpected difference in growth rates when long and short distance trips are examined individually.

The survey data suggest that long distance travel (over 100 miles in trip length) increased at an average rate of 11.7 percent per year (with individual growth rates for individual city pairs ranging from 7.3 to 19.9 percent). Over the same period, the survey results suggest that short distance trips exhibited a slight decline. The survey comparison also suggests that the larger growth rates occurred within the long distance auto traveler market (long distance auto travel increased 12.9 percent per year while air travel increased at a 2.2 percent rate per year).

These variations suggest that either one or both surveys are not as accurate as expected, or that the forecasted travel growth in the FOX study cannot be validated based on past trends developed from these two surveys.

This concern was presented to the FOX/FDOT ridership consultants and it was suggested that the 1997 survey was more detailed and tightly focused in the Tampa-Orlando-Miami corridor than the earlier survey (the 1992 survey was statewide in scope) and, therefore, could be expected to produce more accurate results.

The review consultant concurs that the 1997 survey is likely superior to the 1992 survey when used for this purpose. However, there remains a concern about the growth rates implied by the surveys; if the cause is an overstatement of longer distance travel in the 1997 survey, then the base level of 'high potential' (longer distance) trips would be high, leading to an overstatement of FOX ridership.

Stated Preference Surveys - Stated preference surveys are used to collect information describing how respondents think they will react to a new (previously not experienced) situation. This type of survey was conducted as part of the data collection activities leading to the preparation of FOX ridership forecasts. Respondents were asked to report whether they would switch travel modes (for the trip that was intercepted in the origin-destination survey) under a range of FOX service characteristic alternatives. This data was used to structure the KPMG mode choice model and define service attribute coefficients. SYSTRA reported that this data was used to define FOX service characteristics (for input into the forecasting models) and to allocate overall FOX

**Exhibit 3 - 1992 AND 1997 TRAVEL SURVEY RESULTS
Annual Person Trips (Thousands)**

MARKET SEGMENT	AUTO TRAVEL			AIR TRAVEL			TOTAL TRAVEL		
	1992	1997	Annual Growth Rate 1992-97	1992	1997	Annual Growth Rate 1992-97	1992	1997	Annual Growth Rate 1992-97
LONG DISTANCE (100 or more miles)									
Tampa Bay - Palm Beach	468	695	8.2%	68	117	11.5%	536	812	8.7%
Tampa Bay - Southeast Florida	1,342	2,101	9.4%	500	521	0.8%	1,842	2,622	7.3%
Lakeland/Polk - Palm Beach/SEF	291	726	20.1%	10	19	14.2%	301	745	19.9%
Central Florida - Palm Beach	1,438	2,754	13.9%	44	65	8.1%	1,482	2,819	13.7%
Central Florida - Southeast Florida	3,178	6,063	13.8%	466	488	0.9%	3,644	6,551	12.4%
Total Long Distance	6,717	12,339	12.9%	1,088	1,210	2.2%	7,805	13,549	11.7%
SHORT DISTANCE (less than 100 miles)									
Tampa Bay - Central Florida	12,591	11,590	-1.6%	44	10	-25.6%	12,635	11,600	-1.7%
Lakeland/Polk - Central Florida	5,432	5,988	2.0%	1	0	-100.0%	5,433	5,988	2.0%
Total Short Distance	18,023	17,578	-0.5%	45	10	-26.0%	18,068	17,588	-0.5%
TOTAL TRIPS	24,740	29,917	3.9%	1,133	1,220	1.5%	25,873	31,137	3.8%

Note: The 1992 survey comprised 14 survey days and 14,371 surveys. The 1997 survey comprised 44 survey days and 33,249 surveys. The 1997 survey is likely more reliable and it served as the 1997 corridor travel database.

Sources: 1992 - Florida High Speed and Intercity Rail Market and Ridership Study, KPMG Peat Marwick for the Florida Department of Transportation, July, 1993.
1997 - Final Ridership and Revenue Report, Florida Overland eXpress High Speed Rail Study, KPMG Peat Marwick LLP for FOX and FDOT, April, 1998.

ridership into the three service levels (premier, coach and tourist), but was not used in the SYSTRA mode choice model.

The collection of stated preference data presents unique challenges to demand forecasters. First, people are asked to describe their reaction to a mode with which they have no first hand experience. Second, to meet forecasting needs, the data to be collected often consists of a large number of questions that may try the patience of respondents (the forms used to collect FOX stated preference data run to 10 pages or more). Despite these potential shortcomings, the collection and use of stated preference data has become standard practice in the evaluation of new transportation modes. It does provide insight, where no observed information exists, into the attractiveness of the new mode.

A concern was noted related to the format of the stated preference surveys conducted within this project. A mail-back approach was used where potential respondents were provided with the survey instrument and explanatory material. They were asked to complete the survey and return it. The review consultant's concern is that response patterns might be biased in some way by characteristics of travelers choosing to return (or not return) the survey. Additionally, the survey was long and complicated, which again might bias response patterns and/or lead to a less than fully considered set of responses to the survey questions. Alternative approaches to stated preference data collection include face-to-face surveys, perhaps supplemented by computer assisted techniques designed to dynamically focus the series of questions asked and reduce the survey time.

These concerns were presented to the FDOT/FOX ridership consultants and they provided material suggesting that the stated preference survey response rates were consistent with the origin-destination survey respondent profiles. They also reported conducting analyses of the data intended to identify ill considered and/or illogical response patterns - and found none.

B. Forecasting Assumptions

The review consultants reviewed and concurred with most of the assumptions used in forecasting overall travel demand in the corridor and the share of total demand that would be attracted to the FOX system.

The assumptions regarding population, employment and tourism growth appear to be taken from the best available sources of information. These economic growth forecasts, while aggressive, are consistent with Florida development trends and should be achievable over the 13 year (1997-2010) forecasting period (unless a serious economic downturn occurs, which is not considered in the forecasts).

Assumptions used to describe the travel time and (in the cases of air and FOX travel) airport/FOX station access times appear to be reasonable. It should be noted that the

forecast reports indicate that some judgement based adjustments were made to road intercity and access travel times (from the times estimated through urban area congestion forecasting exercises and intercity road link volume capacity analyses). These adjustments could tend to both slightly increase or decrease FOX ridership from what would be estimated using the original values.

Assumptions were also made regarding new access modes to FOX (including the provision of free bus service to some stations and door to door special van service - free to premier class riders and available at an additional charge (\$12) to other class users). The FOX ridership consultants indicated that these special access modes were assumed to be used by only 5-12 percent of total FOX riders. Additionally, a light rail line was assumed to exist in Orlando linking the Orlando Attractions station with the Orlando area. This light rail line is included in the Metroplan - Orlando's Year 2020 Long Range Transportation Plan and in its Transportation Improvement Program. Should, in actuality, these bus, van and rail access services not be made available, then a reduction in FOX usage could be expected.

The KPMG models use average individual costs in comparing the costs associated with private automobile and public (air and FOX) travel modes. The automobile average values take into account vehicle occupancies observed in the travel surveys for different travel purposes. While this approach is consistent with generally accepted forecasting procedure, there is some concern that this technique could tend to under represent the cost differences (between auto and air/FOX travel) of larger groups traveling together (say, a family group consisting of 2 adults and 2 children). This could lead to an over statement of FOX ridership from this market segment. Discussions with SYSTRA representatives indicated that their forecasting procedures used different travel group sizes although average individual cost is still used in comparing costs.

There is also some concern that air fares between central and southeast Florida (particularly related to fares available through the Ft. Lauderdale airport via Southwest Airlines) might be overstated in the forecasting assumptions. The forecasts assumed that one way airfares between Tampa/Orlando and Ft. Lauderdale are in the range of \$ 50-70, depending on trip purpose. The review consultants found a \$ 35 fare to be generally available with a one week advance reservation and \$ 62 with no restrictions. This difference (between the assumed and available Ft. Lauderdale/Southwest fares) raises a concern as it appears that the low Ft. Lauderdale fares have attracted a significant number of air travelers from the Miami and Palm Beach airports - indicating, in the review consultant's opinion, that air may enjoy a more cost competitive position (throughout southeast Florida) than represented within the forecasts. Discussions with FDOT/FOX forecast consultants on this point found that the fares used for forecast preparation were those observed through the travel surveys and, therefore, in the opinion of the ridership consultants, presented an accurate statement of the level of air fare competition.

The SYSTRA forecast report presents a set of assumptions regarding FOX and air fares. Discussions with SYSTRA forecasting staff indicated that more detailed assumptions were used in the models regarding how these fares vary by service class, time of day and day of week. Some of these assumptions were transmitted to the review consultant. For example, Orlando to Miami air fares vary from \$58 at 9:00 PM to \$142 at 8:00 AM, (SYSTRA indicated that these average hourly air fares were estimated based on the air surveys). However, tourist fares are always used for FOX when estimating FOX total ridership (total FOX ridership is later distributed to the various FOX classes using the various fare levels). Such assumptions as using the average fare per time period for air and the low fare for FOX for all time periods, may introduce a bias in favor of FOX and against air travel.

C. Forecasting Model Structure and Validation

Because most details of the KPMG model structure and validation tests were contained within the forecast reports or were made available through discussions with KPMG staff, and because the review consultant is familiar with the KPMG approach, the review consultant is confident regarding its review of the KPMG procedures. However, it was found that portions of the SYSTRA forecasting procedures were not documented in the reports, and only partially revealed later in discussions. Therefore, the review consultant was not able to complete its review of the SYSTRA procedures.

Market Segmentation - The forecasting procedures used by both consultants split the overall travel market into different components (market segments) having different travel objectives and observed behavior patterns. The travel corridor was also segmented into geographic sub-areas of sufficient detail to adequately represent the travel time and cost differences between competing modes. Both of these model attributes are considered critical to the preparation of reliable forecasts and the procedures employed were consistent with standard practice.

There is some review consultant concern that visitor travel was not addressed as an individual market within the KPMG model components dealing with choice of travel mode (considering the importance of visitors to the Florida economy). Visitor travel was included as a separate market segment within the overall travel growth models, but not as a separate market in the mode choice models. The review consultant is uncertain as to how visitors were treated in the SYSTRA models.

A review of the 1997 survey data found that visitors are less likely to use air travel to meet their travel needs (and therefore, visitors may possibly be less likely to use FOX). As shown on the next page, the survey found that for trips over 100 miles in length (excluding shorter distance travel), visitors used air at less than half the rate of Florida residents. This may imply that visitors are less likely to use public (non-auto) modes than residents.

1997 Survey - Visitor Verses Resident Air Shares

BUSINESS TRAVEL		NON BUSINESS TRAVEL	
Resident Air Share	Visitor Air Share	Resident Air Share	Visitor Air Share
22.3 %	10.9 %	5.6 %	2.1 %

Source: 1997 Travel Survey Results as provided by the forecast consultants.

Discussions with the ridership consultant staff indicated that (1) visitor travel makes up a small proportion of the total travel market in the corridor (about 21 percent of trips over 100 miles in length - according to the 1997 survey) and (2) that their analyses did not find a significant difference between resident and visitor mode choice behavior. Therefore, the visitor and resident markets were combined for mode choice estimation. It should be noted that visitor trips make up only about 16-18 percent of total forecast FOX ridership. A possible overstatement of visitor usage of FOX (related to the forecast model consolidation described above) would likely have a relatively small impact on the overall FOX forecasts.

Total Demand Growth Model - A single estimate of overall travel growth was produced and used by both ridership forecast teams. The procedure used relates travel growth (in terms of a growth factor applied to trips observed in the 1997 survey) to growth in population, employment income and tourism. It assumes little or no transportation level of service change between base year and forecast year.

While the procedure used is consistent with accepted standard practice it should be recognized that the forecasting of intercity travel demand is an imprecise science. The mathematical models are not usually capable of accurately estimating absolute numbers of trips between individual city pairs. This is why they are used to estimate growth rates to be applied to an observed, base year trip table (rather than estimating future year trips directly). While the models may be imprecise, the forecast growth is quite reasonable.

Induced Travel Models – Induced travel comprises trips that are made because FOX exists, that would not have been made in the corridor if FOX did not exist. Each FOX ridership consultant used its own induced travel model. These models are similar in form to the total demand growth model, in that they relate total demand to population, employment, income but also include a component describing the available transportation system (as measured by travel time, costs, frequency between different city pairs). Changing the transportation system by providing a high speed rail service results in a higher total travel demand when applying these models. It is this additional total travel demand which forms the basis for the estimation of induced travel. Because the underlying model is a total demand model, KPMG considers that only part of the

additional travel will use FOX. SYSTRA, on the other hand, considers that all additional total travel demand will use the FOX, since it is the cause of the induced traffic.

Considering the lack of absolute precision in this family of models and the related potential effects of unobserved and unrepresented factors affecting intercity trip magnitudes, it is the review consultant's opinion that estimates of induced ridership derived from this source have limited reliability. This might partially explain the large difference in induced traffic estimate between the two ridership consultant estimates.

Mode Choice Models - The KPMG mode choice models consist of sets of coefficients that weight travel times, costs and service frequencies associated with competing travel modes so that they may be compared in terms of a single generalized trip maker cost. The process of model development usually consists of deriving these weighting factors from behavior observed in the origin-destination and stated preference surveys. In several cases, the KPMG forecasting team found what were, in their opinion, illogical and/or inconsistent weighting coefficients. In these cases, they replaced the original coefficients obtained from the survey with values derived from other transportation corridors (particularly the Northeast Corridor) or with values that they believed to be more reasonable. Four (4) out of 10 potential coefficients in the business mode choice model and 6 out of 10 potential coefficients in the non-business mode choice model were estimated from the surveys. It is the review consultant's opinion that this process weakens the link between the extensive set of surveys designed and conducted to measure travel characteristics/behavior specifically in the Tampa-Orlando-Miami corridor and the forecasting models used to estimate FOX ridership.

It should also be noted that the KPMG model includes a constant term designed to account for the unique service attributes of FOX compared with air and auto travel (these include onboard amenities, the ability to work effectively during the trip, increased travel reliability, comfort and convenience). This constant term was originally derived from the stated preference survey data (which recorded how people **said** they would react - not their actual behavior) and then modified based on the judgement of the forecast consultant. This technique is also consistent with generally accepted forecasting methodology. However, it should be recognized that there is uncertainty (both in the stated preference survey responses and the consultant's judgement) included in the process.

D. Forecasting Procedures and Reasonableness Tests

Forecasting Procedures - The forecasting models were reportedly applied for the year 2010 using 1997 travel times, costs and service frequencies for the auto and air modes (with some minor adjustments) and the proposed travel times, fares and service frequencies for FOX high speed rail. Auto travel times were not fully adjusted to reflect added congestion due to expected increases in traffic both due to intercity travel and also due to increased travel in the various urban areas. While increased auto congestion between cities would be favorable to FOX ridership, increased congestion in the urban areas would negatively affect access time to the FOX stations, an important component

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of both mode choice models. Air frequencies were not adjusted to reflect the fact that with so many air travelers estimated to divert to FOX, the air lines would likely reduce their frequency of service.

Discussions with the forecast consultants suggested that this was a conservative approach used to avoid an overly optimistic estimate of FOX ridership. In the review consultant's opinion, it is not obvious that this is a necessarily a conservative approach - especially considering the potential impacts of FOX access time on mode choice and revised automobile travel times and air frequencies on overall and induced travel demand estimates.

Comparison of the two Sets of Forecasts - The differences between the two sets of forecasts were examined by the review consultant. In total terms, the forecast results are quite similar (7,028,000 FOX passengers estimated by SYSTRA and 6,532,600 estimated by KPMG, not counting the air connect market). However, there are differences when individual trip maker and geographic market segments are examined.

Exhibits 4 through 6 contain comparisons of KPMG and SYSTRA estimates by city pair and trip purpose (a major market segmentation used in the forecasting process). Exhibit 4 depicts the total travel estimates, by market pairs. The two estimates vary slightly, but in general tend to be quite similar. The differences begin to appear, when compared by trip purpose, as shown on Exhibits 5 and 6. These exhibits suggest that significant differences do exist - particularly within the central to southeast Florida market (1.4 million business passengers versus 1.1 million and 1.2 million non-business passengers versus 1.7 million) and the Tampa to central Florida market (.3 million business passengers versus .7 million). A very large difference also exists in the different consultant estimates of induced traffic that will be generated by the system (about 860,000 trips in the KPMG forecasts versus 1,790,000 trips from SYSTRA). A review of the peer review report suggested that these differences were noted in their review process and in some cases an opinion was expressed regarding their relative reasonableness. A consolidated forecast was derived by simply taking the average of the two sets of demand estimates. That consolidated forecast might benefit from the use of informed judgement to select most likely values within the market segments.

Sensitivity Tests - The sensitivity test results reported by the ridership consultants were reviewed and spreadsheet versions of the KPMG model were developed to investigate sensitivities for individual city pair movements. In most cases the reported sensitivity of FOX ridership estimates to changes in assumed input variables appeared reasonable. However, it was found that sensitivity to air fares might be understated (resulting in a possible understatement of air competition with FOX) and the models also appeared to be overly sensitive to access travel times (possibly overstating the impact of additional FOX stations compared to existing air terminals). This apparent lack of model sensitivity to air fare changes, and the sensitivity to access times, are causes of concern.

FOX HIGH SPEED RAIL RIDERSHIP ESTIMATES KPMG and SYSTRA Year 2010 Estimates for Total Travel

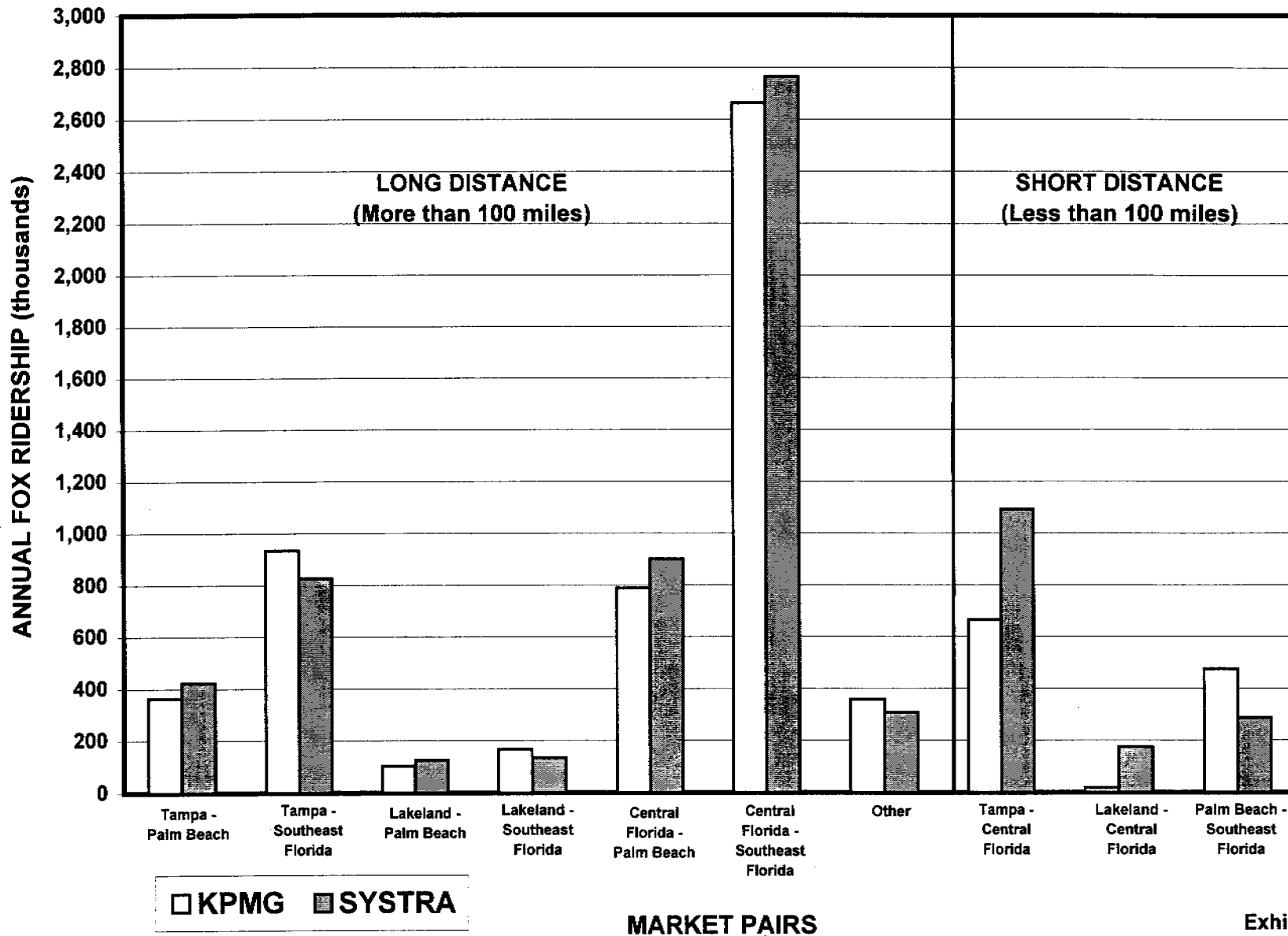
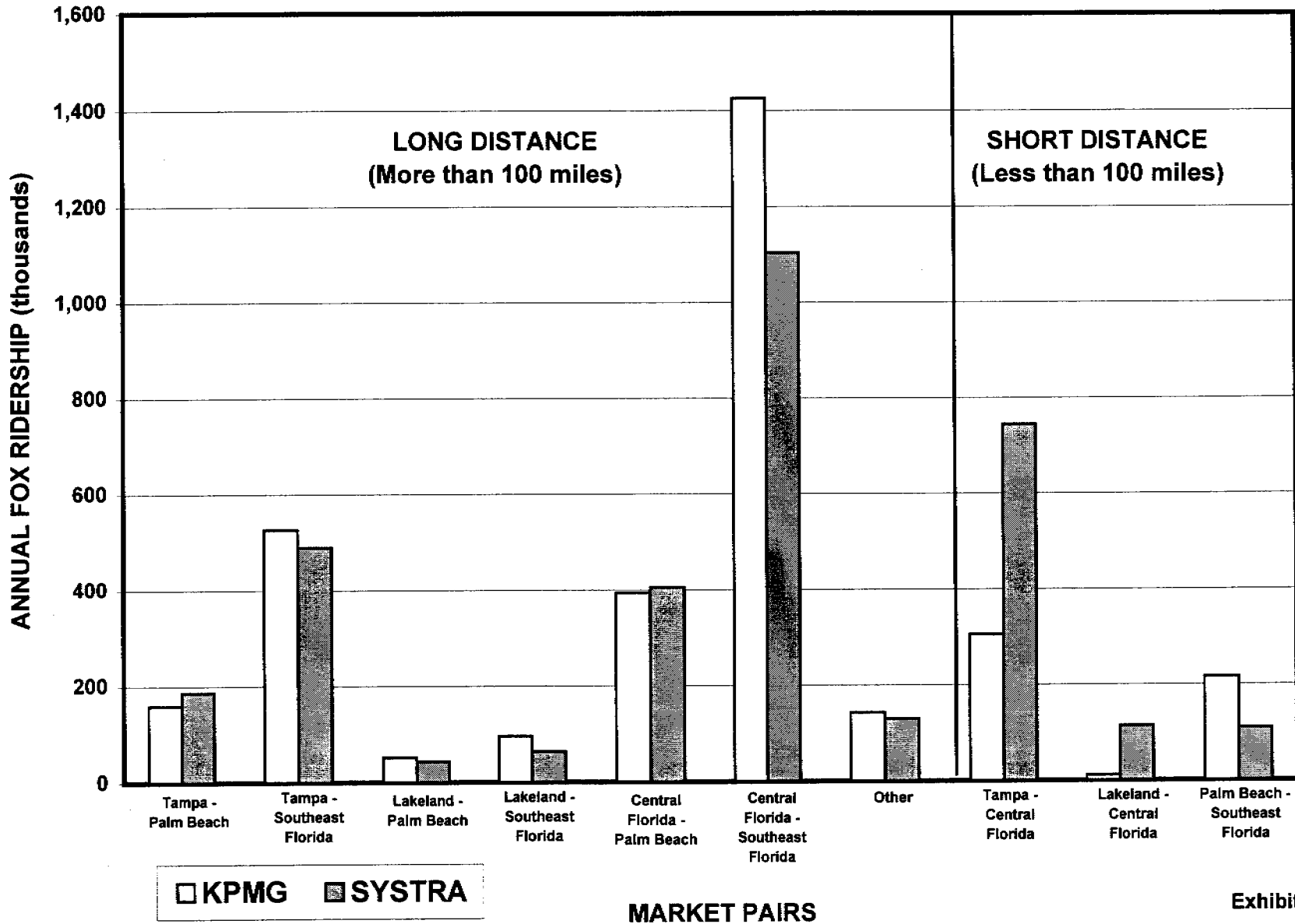
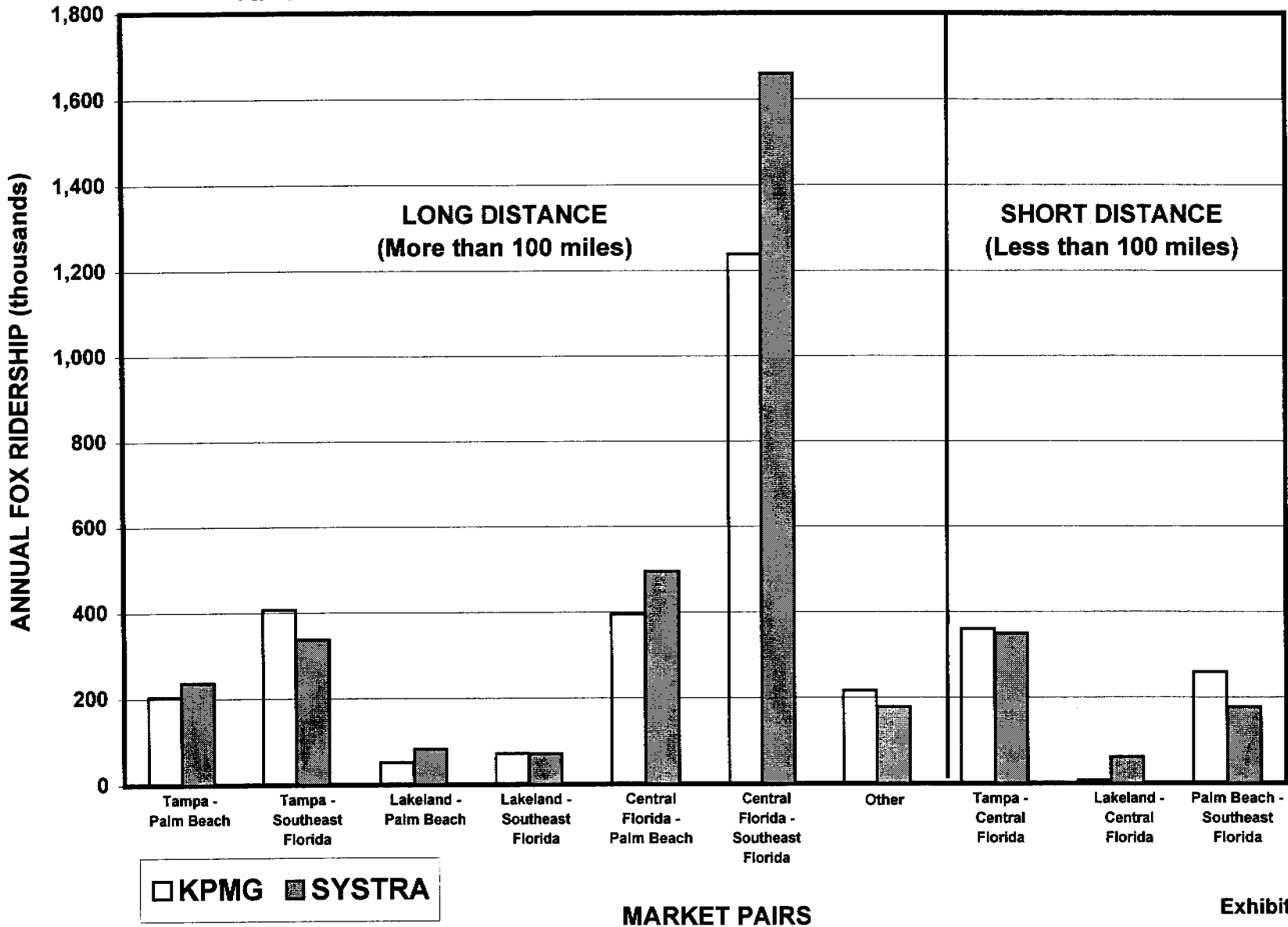


Exhibit 4

FOX HIGH SPEED RAIL RIDERSHIP ESTIMATES KPMG and SYSTRA Year 2010 Estimates for Business Travel



FOX HIGH SPEED RAIL RIDERSHIP ESTIMATES KPMG and SYSTRA Year 2010 Estimates for Non Business Travel



Reasonableness Review - The review consultant's approach to reasonableness review consisted of summarizing the travel time and fare characteristics offered by FOX (compared to the existing automobile and air travel modes), reviewing observed use of the air travel mode in the primary FOX service corridor and then assessing whether the mode shifts attributed to FOX were consistent with the service improvements offered by the FOX system. Exhibit 7 compares the FOX travel times, fares charged, and train frequencies with average airline travel times, fares charged and airline departure frequencies, as used by the ridership consultants. This exhibit is interpreted as follows:

- **Line Haul Time** – airport-to-airport times by aircraft, and station-to-station times by FOX. The air mode is shown to have a significant line haul travel time advantage, simply because airplanes travel faster than HSR.
- **Terminal Times** – time spent by the passengers in the airport or in the train station, e.g., waiting for the departure, waiting for baggage, walking, etc. “In” refers to a departing passenger, “out” refers to an arriving passenger. In every instance, FOX is estimated to have a terminal time advantage compared with air.
- **Line Haul + Terminal Time** – the sum of the two. In most markets, the air mode has the time advantage (line haul plus terminal time). This, however, excludes access and egress time to and from the airports and train stations.
- **Line Haul Average Cost** – the average fares charged for the air and rail trips, in dollars, for “business” and “non-business” trips. The results are mixed—sometimes FOX fares are higher, sometimes air fares are higher.
- **Service Frequency** – the number of air and rail departures per day. The results are mixed—sometimes air service is more frequent, sometimes FOX service is more frequent.

The important point is that the time and fare and frequency of services offered by FOX are not perceived to be dramatically better than those offered by the air mode. The fact that FOX has more stations (possibly with easier access) may benefit FOX. However, three of the seven FOX stations are located at or close to existing airports (Orlando, Ft. Lauderdale and Miami), which diminishes this possible FOX advantage. Development within the FOX corridor is relatively dispersed, not concentrated around FOX stations.

**Exhibit 7
TIME, FARE, AND SERVICE CHARACTERISTICS
FOX Compared with Air**

City Pair	Line Haul Time	Terminal Times			Line Haul + Terminal Time	Line Haul Average Cost	Service Frequency
		In	Out	Total			
	Minutes	Minutes	Minutes	Minutes	Minutes	Dollars - 1 Way Bus./Nbus.	Trips Per Day
Tampa - Palm Beach							
Air	50	33	13	46	96	87/87	13
FOX	113	15	5	20	133	89/53	17
Tampa - Ft Lauderdale							
Air	50	35	15	50	100	71/51	19
FOX	138	15	5	20	158	90/64	20
Tampa - Miami							
Air	60	40	20	60	120	79/79	35
FOX	146	23	13	36	182	95/69	20
Orlando - Palm Beach							
Air	50	33	13	46	96	91/68	9
FOX	59	18	8	26	85	67/39	17
Orlando - Ft Lauderdale							
Air	50	35	15	50	100	66/62	15
FOX	79	18	8	26	105	74/36	29
Orlando - Miami							
Air	60	40	20	60	120	106/106	37
FOX	92	25	15	40	132	84/46	29

Source: Best Time (SYSTRA) Average of City Pairs (SYSTRA) Average Yield (SYSTRA) Weekday (SYSTRA)

Exhibit 8 presents the transportation mode shares in four of the long distance markets from the 1992 and 1997 surveys and from the year 2010 KPMG and SYSTRA forecasts. The intent of the comparison is to identify the magnitude of change in mode utilization (particularly the decline in automobile travel) forecast to occur in response to FOX.

The exhibit is interpreted as follows:

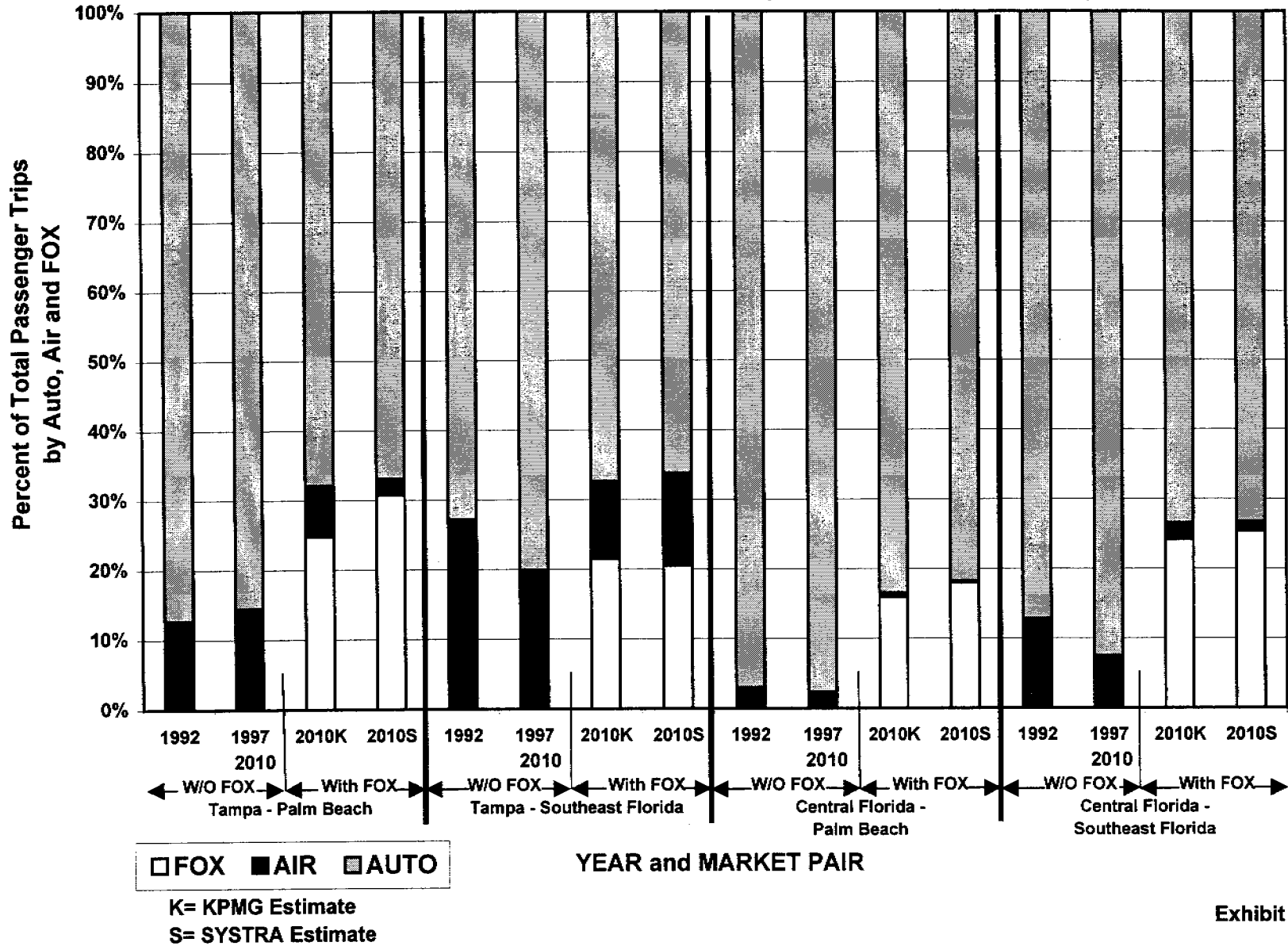
- “W/O FOX” indicates the percent auto and percent air shares, by corridor, from the 1992 and 1997 surveys. The 1997 survey results are likely more reliable than the less intensive 1992 surveys. The 1997 percent auto and air shares were also used in the 2010 “without FOX” forecasts.
- “With FOX” lists the percent auto, air and FOX shares in 2010 if FOX is built. The extent to which FOX is estimated to divert both air and auto passengers is shown for the KPMG (K) estimates and the SYSTRA (S) estimates.

Comparison of the 1992 and 1997 air shares suggests a possible decline in the share of total corridor travel made by the air mode (even if FOX is not built). Observed 1997 air shares range from about 2 percent for trips between central Florida and Palm Beach to about 20 percent between Tampa and southeast Florida (stated another way, private auto was used for between 98 and 80 percent of existing travel between major city pairs in the corridor). The introduction of FOX is forecast to produce the following shifts in mode shares (using the average of KPMG and SYSTRA estimates):

- 1 - Auto share between Tampa and Palm Beach is estimated to decline from 86 percent to about 67 percent, air share from 14 to 5 percent; FOX is estimated to carry 28 percent.
- 2 - Auto share between Tampa and southeast Florida is estimated to decline from 80 to 67 percent, air share from 20 to 12 percent; FOX is estimated to carry 21 percent.
- 3 - Auto share between central Florida and Palm Beach is estimated to decline from 98 percent to 83 percent, air share from 2 to less than 1 percent; FOX is estimated to carry 17 percent.
- 4 - Auto share between central Florida and southeast Florida is estimated to decline from 93 percent to 73 percent, air share from 7 to 2 percent; FOX is estimated to carry 25 percent.

For these model share estimates to be accurate, FOX would essentially replace air travel in the corridor and also would divert a significant number of people from their automobiles. Given the review consultant's opinion that the proposed FOX services, on overall consideration, may not provide a major improvement over the fast, frequent and inexpensive air services currently provided in the corridor, it is possible that the forecasted high speed rail penetration of the air and the automobile markets may be optimistic.

FLORIDA TRAVEL DEMAND ESTIMATES Auto-Air-FOX Percent Shares (Without and With FOX)



E. Air Connect Passenger Market

The FDOT/FOX forecasts include a component of FOX ridership derived from the substitution of FOX transport for existing air connect travel. The substitution is primarily to be obtained from Delta and American airlines which operate hubs at Orlando and Miami, respectively. In 2010, the ridership forecasts estimate that about 1,476,000 trips (about 18 percent of total FOX riders) will be obtained from this source.

Forecasting models were not used to estimate FOX riders from this source. Rather, assumptions were made regarding the growth in this potential FOX market (from 1,703,000 trips in 1997 to 2,681,000 in 2010 - a 57 percent increase) and that Delta and American Airlines would find the substitution attractive (primarily because of cost savings).

Discussions with FOX representatives suggested that negotiations with the referenced airlines are underway - but that no agreement has been reached. The review consultant did not contact the airlines involved - partially to avoid interference with these negotiations.

Until an agreement is obtained, the review consultant suggests that uncertainty exists regarding whether this ridership expectation will be realized. It is also suggested that, even with an agreement, the assumed growth in air connect travel may be optimistic. It would seem that, from a competitive and cost reduction standpoint, that as Orlando destinations increase and Miami destinations increase that more direct services may be provided to serve these cities (thereby reducing the need for connecting services).

AREAS OF POTENTIAL CONCERN IN THE FOX RIDERSHIP FORECASTS

The following summarizes findings from the independent consultant's review. First, it is recognized that FOX, the Florida Department of Transportation and the two ridership consultants embarked on a difficult task (the estimation of ridership for what is essentially a new mode of travel in North America) in a responsible manner consistent with generally accepted forecasting techniques. Sufficient resources were allocated to the task to produce credible forecasts.

The independent review found no 'fatal flaw' in either approach or procedure that would invalidate the FDOT/FOX ridership estimates.

While the review consultant found no "fatal flaws" in the analyses, Wilbur Smith Associates has three concerns which, if founded, individually and in composite would reduce the estimated ridership below the 8.25 million:

- **Diversion from Automobiles** – The ability of a new High Speed Rail system to cause auto users to instead use High Speed Rail is not yet proven in the U.S. The estimates rely on stated preference data, observations from elsewhere, models, and the respective consultant's judgement. While these represent the best information and professional experience available, uncertainties remain that could affect FOX performance. While the forecast level of diversion could occur, lesser rates of diversion from private autos are also plausible. WSA is concerned with the magnitude of this HSR market.
- **Air Connect Passengers** – The studies assume that one or more of the major airlines will cooperate with FOX, and willingly will give their air connect passengers to the HSR. This is uncertain at this time and needs to be verified with the airlines. The airlines may not perceive that the substitution of air connect services with FOX service is in their overall best interest. Also, air connect travel may not grow to the extent assumed in the forecasts. WSA is therefore concerned with this entire HSR market.
- **Induced Travelers** – The two ridership studies estimate that HSR will create additional travel in the corridor. While WSA agrees that some HSR "induced" travel is likely, the amount of induced travel that will actually occur is uncertain. While generally accepted mathematical procedures were used to produce the induced traffic estimates it is the review consultant's opinion that the accuracy of such procedures are questionable - particularly in a corridor that already has excellent, multi modal transportation services and facilities. WSA is therefore concerned with the magnitude of this HSR market.

In the view of WSA, the HSR forecasts should not be viewed as conservative, and may prove to be optimistic.

CONCLUSIONS

Although Wilbur Smith Associates has concerns about the reasonableness of the estimates, these concerns involve differences of opinion and judgement rather than differences of fact. It is Wilbur Smith Associates' opinion that the High Speed Rail financial calculations should be tested not only using the ridership estimates contained in the FOX reports, but also at a lower to-be-determined ridership level (as two equal financial tests, not as a sensitivity test).