RIDERSHIP

AIR PASSENGER TRAFFIC

Q

Please provide additional information on base-year estimates of total air passenger trips at the LAX and Ontario airports, the percentage that are local versus transferring to other flights, and the number of travelers transferring between these two airports? Additionally, what is your assumed growth rate for air-passenger trips, and ***is*** *it consistent with the FAA's projections for the airport?*

A

As part of the development of the Regional Transportation Plan (RTP), SCAG developed a series of regional aviation scenarios for the region's system of airports. For MAGLEV Phase I, our analysis used the adopted Mid-level RTP Aviation Scenario approved by agencies in the region for the RTP. Given that this is the adopted scenario, it should be in conformance with FAA projections.

The post 2020 growth forecast for regional air passenger demand probably exceeds the conservative 1.01 growth factor used in our financial analysis.

SCAG's aviation forecasts are consistent with FAA projections in that SCAG forecasts are provided to affected airports and the FAA for forecasting purposes. There are some variations because of differences in methodologies and assumptions.

For example, SCAG uses a sophisticated tool called the Regional Airport Demand Allocation Model (RADAM) which is highly specialized to the local area and looks at regional airports as an interactive system. The FAA forecasts look at each airport individually, but consider local airport and regional forecasts when developing their analysis.

STATION MARKET AREAS

Q

Concerning access to the MAGLEV system, please define the market areas surrounding each of the proposed MAGLEV stations in terms of maximum access/egress distances, and the population and employment surrounding each station. Additionally, what percentage of trip-makers do you project will transfer to some other transit mode in addition to MAGLEV to reach their final O/D? What are the assumed transfer and wait times for these trips?

A

Auto access distances were specifically designed for each station scenario and the expected station-to-station line haul trip lengths and times for MAGLEV. For example, the longest auto access distances (maximum of 15 miles) occurred at the eastern end of the line. Auto access to stations in the more urbanized western portion of the corridor was 10 miles or less. Congested auto speeds are generally lower there. Smart shuttle access was limited to four miles. Local bus routes near stations in the transit network were linked to provide intermodal connections. Summarizing, direct access to/from the MAGLEV stations was provided in the model as follows:

- Walk connectors to or from any zonal centroid within 0.5 mile
- Smart shuttle connectors to/from any zonal centroid greater than one-half and less than two miles
- Auto connectors from any zonal centroid within approximately 15 miles

These auto "sheds" were manually adjusted based on the station locations. Indirect access was provided via the transit network. Standard SCAG model transit path parameters were used; e.g., transfer penalties of five minutes, valuing each minute of out-of-vehicle-travel-time (OVTT) as equivalent to 2.5 minutes of in-vehicle-travel-time (IVTT). Transferring patrons were assumed to wait one-half the effective headway for the service to which they were transferring, with each transfer wait time capped at 25 minutes.

We assumed that MAGLEV egress would be similar to that now being experienced by Metrolink riders. As part of our Phase I work, we performed a Metrolink rider survey and asked about mode of egress. Approximately 32% of passengers indicated that they transfer to the Metro Red Line subway, while 31% indicated transfers to bus.

METROLINK

Q

The proposed MAGLEV system covers much the same territory as the existing Metrolink San Bernardino and Riverside lines. Explain how your modeling approach treats the competition between MAGLEV and Metrolink. As both are common carrier rail options, why wouldn't MAGLEV draw proportionately more riders from Metrolink than auto? How are the mode bias constants favoring MAGLEV over Metrolink derived?

A

We based our modeling on thorough research of Metrolink and auto commuters. Market research included stated preference surveys. The market research results indicate that Maglev service parameters justify a more open competition between Maglev and other modes. In addition, we have set up Maglev to be complementary to Metrolink in a systems context. They feed each other in a synergistic way. Thus, Metrolink ridership does not erode when Maglev is introduced.

We did a series of sensitivity tests to explore the inter-relationship of Maglev to other transit modes. This resulted in the selection of an appropriate set of constants that represented the best fit for competition among modes.

MAGLEV is treated as a true "new mode" with substantially different characteristics from all other existing modes. Specifically, the point-to-point travel times are significantly less than they are for Metrolink, and the fares are significantly higher. MAGLEV competes with Metrolink in the same manner that it competes with any of the auto modes. The Project Description described how the modeling approach treats the competition between MAGLEV and Metrolink in Section 5.1.2, Mode Choice Model Structure (pages 5-11 through 5-21).

The initial assumption made for modeling was that MAGLEV should, in fact, be modeled as a new express transit mode and, thus would compete more directly with Metrolink and express bus (if available) than it competes with auto modes. This is equivalent with the statement in the question that "both are common carrier rail options." However, based on the results of the stated preference data collected in the various surveys performed for the study, and on the analysis of the actual system characteristics (speeds, station spacing, and fares), the decision was made to model MAGLEV as a new, independent mode. Thus, more important than not having steel wheels on an at-grade steel track, the operating characteristics of MAGLEV suggest that travelers will perceive it as an independent mode.

A spreadsheet with alternative mode choice nesting schemes was developed as part of the mode choice model development. The spreadsheet was used to independently check the results of the regional mode choice model for selected interchanges. However, it also provided a means to increase understanding of the differences in the alternative mode choice nesting procedures. The following mode choice nesting procedures were coded into the spreadsheet:

- *MAGLEV as a new mode*: This is the mode choice model structure actually used for the ridership forecasts. It models MAGLEV as a new mode with substantially different characteristics than auto or "current" transit.

- *MAGLEV as a new transit mode:* This alternative structure models MAGLEV as a "transit" mode but with substantially different characteristics than current transit modes.

- *MAGLEV as another transit mode:* This was the alternative structure originally proposed and assumes that MAGLEV is another fixed guideway system with essentially the same characteristics as Metrolink or express bus service.

Table 1 summarizes the results of the different mode choice nesting alternatives for three MAGLEV operating scenarios:

- *No MAGLEV service:* This scenario is the base case and assumes that there is no MAGLEV service for the interchange.

- *MAGLEV = Rail Service:* This scenario tests a situation where MAGLEV is, in fact, equivalent to rail in all characteristics. Note that the alternative specific constants for MAGLEV were also assumed to be equal to the express transit (Metrolink) constants for this case.

- *MAGLEV as MAGLEV:* This scenario tests MAGLEV actually operating with MAGLEV speeds and fares.

The specific example interchange summarized in Table 1 is 55.5 miles. The total travel times (including line haul, transfer, access and egress, and terminal times) and implied travel speeds for the various modes were as follows:

Mode	**Travel Time**	**Implied Speed**
Walk	1,110 minutes	3 MPH
Drive Alone	90.5 minutes	36.8 MPH
Shared Ride 2	95.5 minutes	34.9 MPH
Shared Ride 3+	97.5 minutes	34.2 MPH
Auto to		
Local Bus	n/a	n/a
Metrolink	87 minutes	38.3 MPH
MAGLEV	56.9 minutes	58.5 MPH
Walk to		
Local Bus	n/a	n/a
Metrolink	97 minutes	34.3 MPH
MAGLEV	66.9 minutes	49.8 MPH

As can be seen in Table 1, when there is no MAGLEV service available, transit (Metrolink) captures 5.8 percent of the trips. As should be expected, the results are identical for each of alternative nesting structures.

In the case where MAGLEV is simply assumed to be a new Metrolink line (i.e., with exactly the same travel times, travel costs, and alternative specific constant as Metrolink), the transit and MAGLEV shares are identical under each of the nesting structures. As would be expected, modeling MAGLEV as new mode results in the highest shares for transit and MAGLEV while modeling MAGLEV as transit submode results in the lowest shares. This case describes the classic "red bus-blue bus" scenario used to describe the "independent irrelavent alternatives" (IIA) conundrum associated with Logit-based mode choice models. In such a case, modeling MAGLEV as a transit submode would definitely be the most logical modeling approach (of the three alternatives presented).

In the case where MAGLEV is modeled with full MAGLEV characteristics, the impact of modeling MAGLEV as an independent mode versus the other mode choice model nesting structures can be seen. By comparing the "MAGLEV as MAGLEV" and "No MAGLEV Service" scenarios, the composition of the MAGLEV ridership for the different nesting structures can be seen. When MAGLEV is modeled as a new mode, 0.2 percent of the total 4.0 percent MAGLEV mode share is transferred from Metrolink and 3.8 percent of the share is transferred from auto modes. At the other extreme, when MAGLEV is modeled as a transit submode, 1.2 percent of the 2.0 percent MAGLEV mode share is transferred from Metrolink and 0.8 percent of the share is transferred from auto modes. While modeling MAGLEV as a transit submode cuts the MAGLEV ridership in half as compared to modeling MAGLEV as a new mode, neither case has decimated Metrolink ridership.

While Table 1 cannot answer the question, "What is the proper mode choice model nesting structure?" it does provide insight to the impact of the different nesting structures on both MAGLEV and Metrolink ridership levels.

The derivation of mode bias constants is documented on pages 5-18 through 5-21. As documented in the PD, the mode choice model estimations using Alogit and with the stated preference data resulted in MAGLEV constants that were between 15 and 24 percent "better" than the premium (express or Metrolink) constants. Based on these results, the MAGLEV constants were set so they were 20 percent "better" than the premium transit constants used in the regional mode choice model. There is a typographic error in Table 5-5. The validated peak constant for "Drive-Express" should be -2.3297, not -3.3297 as shown in the table. With this correction, the "Drive->MAGLEV" constant, -1.94142 is equal to the "Drive-Express" constant (-2.3297) divided by 1.2.

Table 1 – Comparison of Alternative Nesting Procedure Results

Mode	No MAGLEV Service			MAGLEV = Rail Service			MAGLEV as MAGLEV		
	New Mode (%)	New Transit Mode (%)	Transit Submode (%)	New Mode (%)	New Transit Mode (%)	Transit Submode (%)	New Mode (%)	New Transit Mode (%)	Transit Submode (%)
Nonmotorized	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drive Alone	72.3	72.3	72.3	68.3	69.3	71.0	69.4	70.2	71.6
Shared Ride	11.3	11.3	11.3	10.6	10.8	11.1	10.8	10.9	11.2
Auto Passenger	10.6	10.6	10.6	10.0	10.2	10.4	10.2	10.3	10.5
Auto to Local	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Auto to Express	3.6	3.6	3.6	3.4	3.0	2.3	3.5	3.2	2.9
Auto to MAGLEV	0.0	0.0	0.0	3.4	3.0	2.3	2.4	2.0	1.2
Walk to Local	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk to Express	2.2	2.2	2.2	2.1	1.8	1.4	2.1	1.9	1.7
Walk to MAGLEV	0.0	0.0	0.0	2.1	1.8	1.4	2.1	1.9	1.7
Total	**100.0**	**100.0**	**100.0**	**99.9**	**99.9**	**99.9**	**100.0**	**99.9**	**99.9**
Summary									
Nonmotorized	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Auto	94.2	94.2	94.2	88.9	90.3	92.5	90.4	91.4	93.3
Metrolink	5.8	5.8	5.8	5.5	4.8	3.7	5.6	5.1	4.6
MAGLEV	0.0	0.0	0.0	5.5	4.8	3.7	4.0	3.4	2.0
Total – Metrolink and MAGLEV	**5.8**	**5.8**	**5.8**	**11.0**	**9.6**	**7.4**	**9.6**	**8.5**	**6.6**
Total	**100.0**	**100.0**	**100.0**	**99.9**	**99.9**	**99.9**	**100.0**	**99.9**	**99.9**

SMART SHUTTLES

Q

For the "Smart Shuttle" buses that will be available for shared ride A/E trips to some MAGLEV stations, please provide estimates of their total capital and operating costs. Are these costs included in the MAGLEV financial plan? Can you demonstrate why it is appropriate to use 1.4 x auto access/egress time for the average Smart Shuttle user on-board travel time. Wouldn't passenger loads ranging from 4 to 15 (Appendix K, page 4-18) imply longer average travel times? Also, please clarify which Smart Shuttle fares were used. If $10 fares for airport-bound Smart Shuttle users were assumed, how would the operator distinguish these riders from others in order to charge the higher fare?

A

Currently, there are several operational smart shuttle demonstrations in southern California from which cost data can be obtained. A typical four-vehicle shuttle system serving a MAGLEV station could have approximately 15,000 annual hours of operation. The smart shuttle case study in Appendix K for Ontario Airport examined a multipurpose smart shuttle system that could serve the Ontario Convention Center, the surrounding community, Ontario Airport, and a MAGLEV station.

Because of the wide variety of vehicle types available, the potential range in capital costs is wide. A 12-vehicle system might range from $1.5 to $4.0 million. These costs are not included in the financial plan because shuttle systems (or some other form of local transit) are being developed on an ongoing basis by local operators to serve new growth areas, regardless of MAGLEV. The Ontario case study used estimates of unit operating costs of $50 to $60 per service hour. This produces a range in annual operating costs of $750,000 to $900,000 per station area. In our forecasting effort, smart shuttles were assumed to be needed at most but not all MAGLEV stations; LAX, West LA and LA Union Station are already heavy transit hubs and don't require any new feeder services. Capital costs would be primarily for vehicles and dispatch

In our forecasting effort, smart shuttles were assumed to be needed at most but not all MAGLEV stations: LAX, West Los Angeles and Union Station are already heavy transit hubs and do not require any new feeder services. Capital costs would be primarily for vehicles and dispatch.

Similarly, no revenues from these shuttle services were included. Omnitrans, the local operator in Ontario, is already envisioning service improvements for the coming years for this area. To serve all of these different purposes, the case study concluded that a fleet of up to 30 vehicles could be needed in central Ontario by horizon year 2020.

For modeling, it was decided that shuttles would have a uniform fare commensurate with Omnitrans current average fare per trip (approximately $0.63 one way). Its published fare without discounts is $1.00. For the regional travel model, the $0.63 was converted to year 1989 dollars ($0.50 one way). Air passengers were forecast using the Regional Air Demand Allocation Model (RADAM). No smart shuttle service was assumed for RADAM runs in Phase I. No $10.00 shuttle fare for an air passenger was assumed for modeling. The case study in Appendix K to the Project Description suggested that different fares might be charged for different users; these were not part of our modeling assumptions. A different fare for passengers on the same vehicle is a minor technological challenge in this era of growing electronic capabilities.

The smart shuttle case study looked at a larger composite shuttle system that might operate as far as six miles from stations. For modeling, it was assumed that smart shuttles could go out only as far as four miles from a station. In terms of travel times input to the model, the 1.4 times congested auto times falls within the accepted normal range of local bus feeder service (1.3 to 1.5 times auto time). Under heavier demand loads, several routes that radiate out from stations would be created based on service area call-ins. These routes would reduce vehicle circuitry, operating much like a conventional feeder route. When demand is lighter, passenger loads would certainly be less, and on average, a passenger might experience only two or three stops. Under this, the 1.4 factor also fits because it is a square root of 2 “circuitry factor” to account for dropping off (or picking up) intermediate passengers.

GROWTH RATES

Q

Trip and revenue growth of 3.63% per year from 2010 to 2020 results in about a 43% increase in revenues over that period and is a key factor in the viability of the financial plan. (We assume your forecasts are for 2010 and 2020, and interpolated for intervening years.) A lower growth of 1.01% per year is used to extrapolate after year 2020. We would like you to provide more information and discuss the basis for the 3.63% growth rate. It would be helpful if you could indicate how much of the 2010–2020 growth is due to population and employment growth, an increase in trip-making rates, and/or a change in impedance of competing modes that results in an increasing market share for MAGLEV.

A

We did not use a "3.63% growth rate." We used the regional model to estimate ridership for the years 2010 and 2020. These model analyses resulted in the growth reported in the Project Description. The socioeconomic data used in the regional travel model is based on adopted demographic growth forecasts for the SCAG Region. The increases in population and the increases in roadway congestion are not separable; one arises from the other. The same tripmaking behavior is modeled for each horizon year. It is possible that MAGLEV is achieving a somewhat higher market share in 2020 than 2010 because auto speeds are slower because of more congested roads.

The location of the growth can be more important than the degree of growth. If population growth occurs disproportionately in one end of a corridor, the corridor trips could grow faster than regional growth. They may also shrink, if travel patterns shift, adjusting to the new population centers.

Q

What is your estimate of induced travel (as a percent of MAGLEV travel diverted from other modes)? Show why this is consistent with the assumed improvement in transportation level-of-service in MAGLEV-served market areas. To what extent do your models project (or assume) permanent changes in population, employment and regional trip making due to the new MAGLEV system?

A

We did not use or need a large induced growth in ridership. None of our modeling tools directly address (or produce) induced demand. Two earlier analyses of high-speed ground transportation in California estimated 5.1% and 4.3% induced demand, respectively:

- *Independent Ridership and Passenger Revenue Projections for High Speed Rail Alternatives in California.* Prepared for California HSR Commission by Charles River Associates, July 1996. Table E-2, p. E-14, and

- *Ridership and Revenue Projections for Las Vegas-Southern California MAGLEV System*, Charles River Associates, 1998.

Both these numbers are the percentage that the induced demand is of the total demand, not the demand without induced demand. It would be a little higher percentage of the base demand.

Based on the tourist attractions and the tourism level in the Los Angeles Basin, we used a factor of 4% in our forecasts. Given the substantial increase in levels of service MAGLEV brings to its station market areas, this is indeed conservative, because it not only includes all catalytic trips that might occur as a result of MAGLEV, but it also includes all induced, visitor and other discretionary trips that would result from the operation of the high-speed MAGLEV line in the Corridor. Our travel model runs for Phase I did not assume any MAGLEV induced socioeconomic or land use changes. Future model runs are being considered to look at this issue in more depth**.**

PARKING AND CONCESSIONS

Q

Parking and concession revenues grow much faster than passenger trips and farebox revenues. Please explain why this occurs.

A

Yes, our analysis showed justification for an escalation in both of those categories of revenues for the out years of the analysis period due primarily to the effects of supply and demand and ever-increasing passenger activity at stations. It was assumed that parking fees eventually could be increased as demand for limited spaces grows. Concession revenues would escalate as passenger activity at stations increases through time.