

BOARD MEETING

Monday April 22, 2024

El Monte, CA



access

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**DEMAND FORECASTING
FY 2025 – FY 2034**

PREPARED FOR ACCESS SERVICES

Monday April 22, 2024

Welcome

- Demand Forecasting
 - Scheduled Trips
 - New Applicants

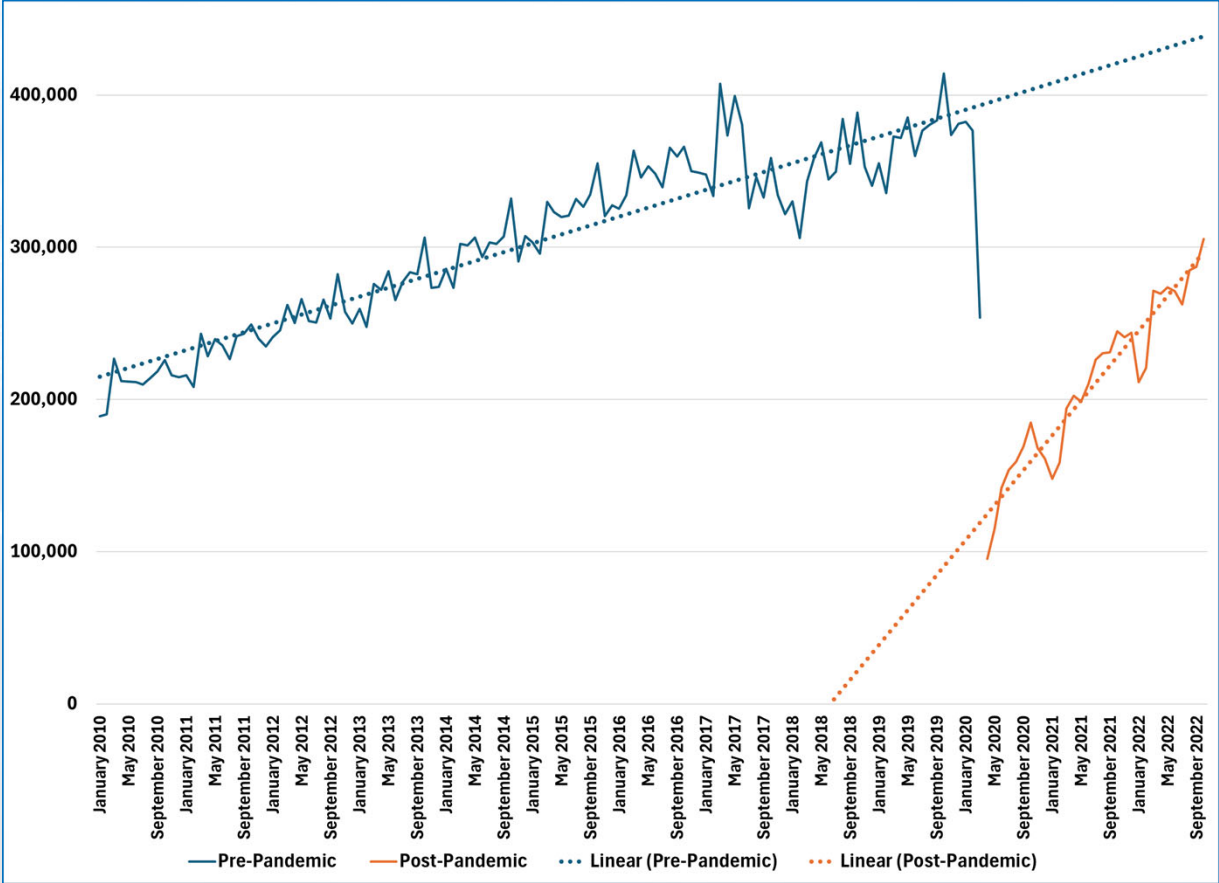
Key Points

- Global pandemic disrupted trends
- National trend exhibit increasing demand response trips
- The LSTM Model is likely to outperform previous forecasts
- Opportunities to enhance accuracy of future projections

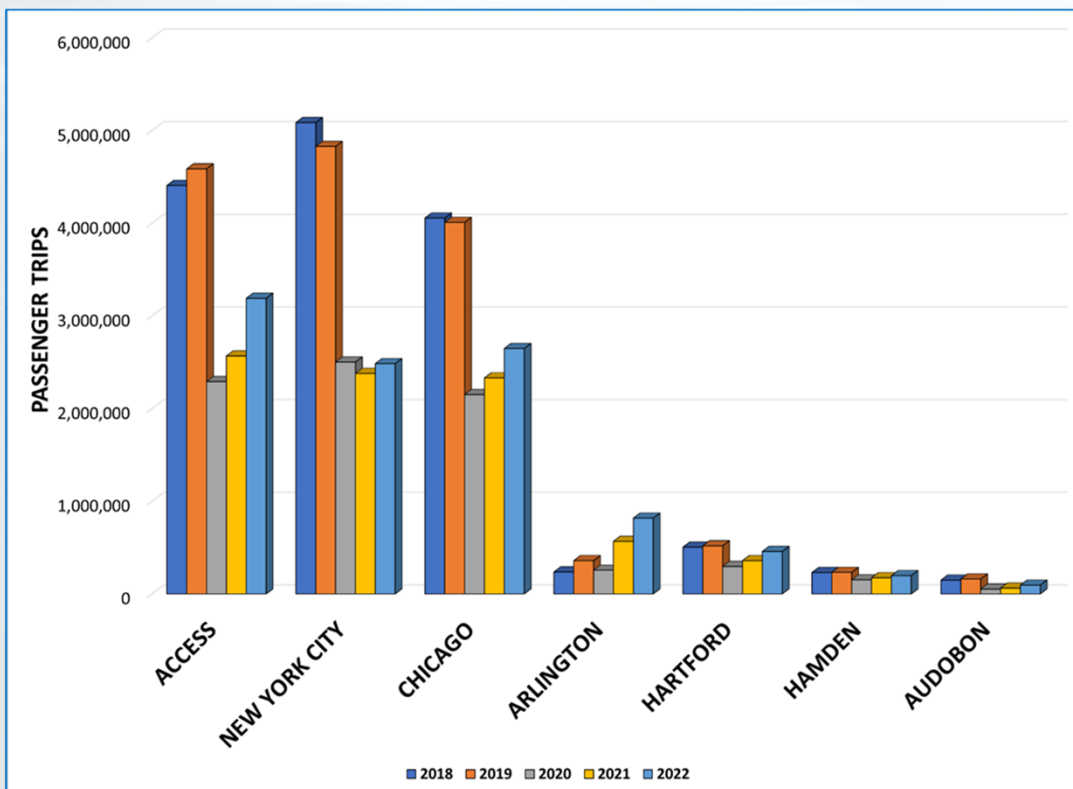
Purpose

- Access Services provides Americans with Disabilities Act (ADA) mandated paratransit service for eligible persons in Los Angeles County, California
- Independent ridership estimates are necessary to fully fund the expected ADA paratransit demand
- Objective: Forecast scheduled trip demand and new applicants
 - Traditional projections that utilize trends and shifts in scheduled trip demand were relatively effective prior to the global pandemic
 - Need for a more robust, dynamic forecasting approach has emerged
 - Forecasting models that utilize machine learning and advanced time series models better position Access Services to meet the demand

Scheduled Trip Demand - Trends



Scheduled Trip Demand - Peer Review



MEASURES	EFFICIENCY	EFFECTIVENESS
	Operating Expense Per Passenger Trip	Passenger Trips Per Revenue Hour
ACCESS	\$ 57.16	1.86
NYC	\$ 188.00	1.20
CHICAGO	\$ 64.57	1.66
ARLINGTON	\$ 15.53	3.45
HARTFORD	\$ 46.60	1.85
HAMDEN	\$ 61.03	1.56
AUDOBON	\$ 41.09	1.95

DATA and SOURCES

Mode of Service: Demand Response

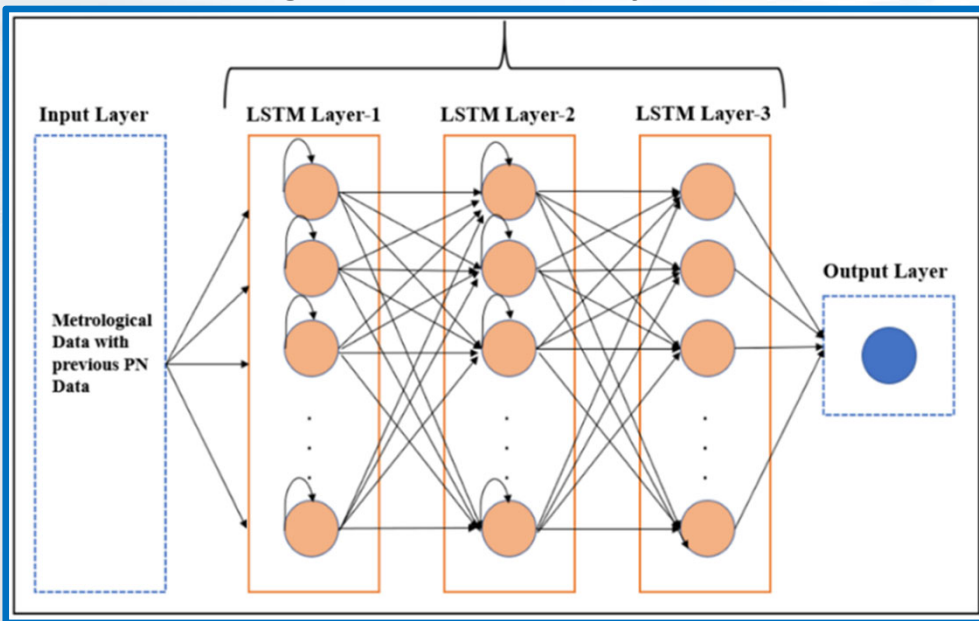
Passenger Trips: National Transit Database (NTD)

Peer Identification, Efficiency, Effectiveness:

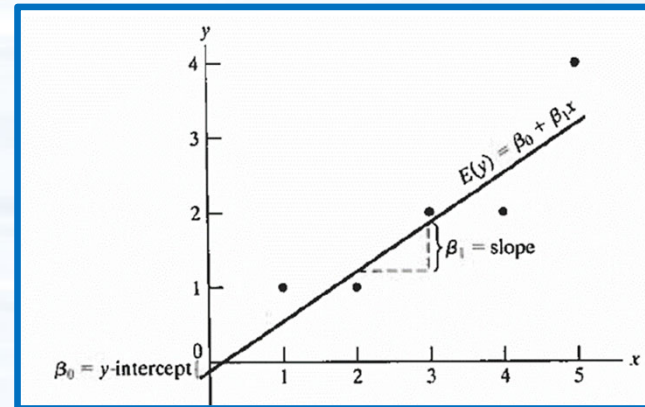
Florida Transit Information System (FTIS)

Conceptual Models

Long Short-Term Memory (LSTM)



Linear Regression



ARIMA

The **ARIMA** (Autoregressive Integrated Moving Average) model is a handy tool for analyzing and predicting sequential data.

IT COMBINES THREE IMPORTANT ELEMENTS:

AR

AutoRegressive (AR) for looking at past observations

I

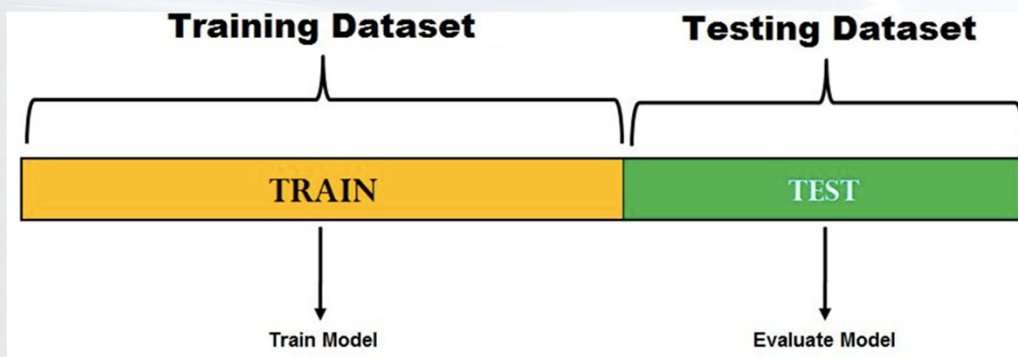
Differencing (I or Integrated) for handling changes in data patterns

MA

Moving average (MA) for considering error terms

Scheduled Trip Demand - Model Testing

Training Validation Testing Model



Testing Results

FORECASTING METRIC	LSTM	PREVIOUS FORECAST
MAD	3.260	25.874
MAPE	0.93%	7.31%
MSD	11,634,562	714,755,962

Testing Dataset: August 1, 2023 - October 31, 2023

Scheduled Trip Demand Forecast

Fiscal Year 2025

Fiscal Years 2025 through 2034

Fiscal Year	TOTAL	Antelope Valley	Eastern	Santa Clarita	SF Valley	Southern	West/ Central
2023*	3,604,820	178,348	991,530	38,311	527,040	1,264,195	605,396
2024**	4,330,423	206,833	1,200,175	45,965	612,268	1,541,322	723,860
2025	4,857,458	237,126	1,321,500	54,635	676,516	1,752,553	815,127
2026	5,386,553	262,955	1,465,444	60,586	750,205	1,943,448	903,914
2027	5,660,881	276,347	1,540,076	63,672	788,412	2,042,425	949,949
2028	5,994,824	292,649	1,630,927	67,428	834,921	2,162,910	1,005,988
2029	6,259,951	305,592	1,703,057	70,410	871,846	2,258,567	1,050,479
2030	6,411,324	312,982	1,744,239	72,112	892,929	2,313,182	1,075,881
2031	6,491,570	316,899	1,766,070	73,015	904,105	2,342,134	1,089,347
2032	6,892,726	336,482	1,875,207	77,527	959,975	2,486,870	1,156,664
2033	6,942,227	338,899	1,888,674	78,084	966,870	2,504,730	1,164,971
2034	6,950,682	339,311	1,890,974	78,179	968,047	2,507,780	1,166,390

* Actual Scheduled Trips (Trip Requests)

** Projections Include Actual Scheduled Trips (Trip Requests) through October 31, 2023

Scheduled Trip Demand - Conclusions

Conclusions

- Forecasting models need to utilize post-pandemic historical data
- Long Short-Term Memory (LSTM) model is the best fit
- Completed trip ratio = 80.21%
- National trend exhibit increasing demand response trips

Next Steps - Future Forecasts

Accuracy Enhancement

- 35% increase in historical data available for testing and training for Fiscal Year 2026
- Incorporate detrending such as Empirical Mode Decomposition (EMD) in the LSTM model
- Utilize transformer in the LSTM model

Additional Models to Test

- Meta (Facebook) Prophet model
- Time-Series Foundation Model (Google)

Summary

Findings from Testing and Data Analysis

- Scheduled Trip Demand
 - Error for the LSTM model is 0.93% while previous forecasts were 7.31% for the same testing period.
 - Completed trip ratio: 80.21%
 - LSTM Model is likely to outperform previous forecasts

Next steps – Future Forecasts

- Accuracy Enhancement:
 - Increase in availability of post-pandemic observations
 - Utilization of additional detrending techniques and transformers in LSTM model
- Additional Models: Meta (Facebook) Prophet, Time-Series Foundation Model (Google), Koopman Filter

Questions

Item 8

Operations Update



Statistics

	Feb. 2020	Feb. 2021	Feb. 2022	Feb. 2023	Feb. 2024
Vehicle Trips Completed	300,974	131,903	175,577	226,878	268,376
Passenger Trips Completed	385,412	162,182	222,081	280,187	328,935
Reservation Calls Answered	251,947	114,211	145,046	178,155	191,738
ETA Calls Answered	46,779	28,873	36,781	42,726	49,153

Statistics

	February 2023	February 2024	% Change
Vehicle Trips Completed	226,878	268,376	+18%
Passenger Trips Completed	280,187	328,935	+17%
Reservation Calls Answered	178,155	191,738	+8%
ETA Calls Answered	42,726	49,153	+15%
Online Reservations	24,971	39,323	+57%

Ridership Recovery - Monthly Vehicle Trips

Region	February 2020	February 2024	% Recovery
Southern	98,488	89,442	90.8%
Eastern	84,922	81,170	95.5%
West/Central	46,840	44,094	94.1%
Northern	53,474	39,584	74.0%
Antelope Valley	13,489	11,867	87.9%
Santa Clarita	3,703	2,187	59.0%
Systemwide	300,974	268,376	89.1%

Performance Report Card

Key Performance Indicator	Standard	February	
		2024	FY24
On Time Performance	≥ 91%	91.4%	92.4%
Excessively Late Trips	≤ 0.10%	0.06%	0.02%
Excessively Long Trips	≤ 5%	4.4%	3.6%
Missed Trips	≤ 0.75%	0.39%	0.34%
Denials	≤ 0	1	3
Access to Work On Time Performance	≥ 94%	95.2%	95.8%
Average Hold Time in Seconds (Reservations)	≤ 120	56	53
Calls On Hold > 5 Min (Reservations)	≤ 5%	4.7%	2.3%
Calls On Hold > 5 Min (ETA)	≤ 10%	5.3%	2.4%
Complaints Per 1,000 Trips	≤ 4.0	1.9	2.1
Preventable Incidents per 100,000 Miles	≤ 0.25	0.09	0.18
Preventable Collisions per 100,000 Miles	≤ 0.75	0.79	0.84
Miles Between Road Calls	≥ 25,000	47,526	44,531

Access Flex Program Current Status

- The program is active in the Southern Region utilizing Uber
- Total of 195 riders in the program who have enrolled and set up their Electronic wallet
- Five riders have opted out
- 1,518 trips completed since July 2023
- Highest trip count month was October 2023
- Low number of completed trips since January 2024

2028 Olympics Planning

- Staff continues to meet with Metro to plan for the 2028 Olympic and Paralympic Games
- Staff has discussed the 2002 Winter Olympics experience with staff at the Utah Transit Authority (UTA) in Salt Lake City
- Access will be asking for a seat at the table on the main Olympics transportation planning committee
- Access expects demand for paratransit trips will be based on ticket sales and voluntary identification of disabled visitors
- Access is planning to develop an updated process for visitor eligibility to incorporate out-of-country visitors
- Access will focus on pick-up and drop-off locations at event venues
- Access looking at opportunity to participate in Observers Program for Paris 2024 Olympic and Paralympic Games

Vehicle Procurement Status

- > Build of 58 small Ram ProMasters continues
 - > 55 units have been delivered as of 4/19/24
 - > Remaining units in production and are at various stages of completion
- > Build of 101 units started; 56 units delivered as of 4/19/24



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Current & Upcoming Vehicle Orders

Vehicle Type	# Ordered	# Completed	# Delivered to Contractors
Ram ProMaster 136	58	55	55
Ram ProMaster 136	101	56	56
Ram ProMaster 136	48	NA	NA
Ram ProMaster 136	Order of 68 Pending	NA	NA
Turtle Top Class B Cutaway	Order of 3 Pending	NA	NA

CNG Safety Campaign

- A non-Access CNG incident in Wilmington in February sparked LAFD to collaborate with transit agencies on CNG safety
- Access was one of three transit operators to participate in LAFD's CNG training event on April 10-11
- Access currently operates 137 CNG vehicles
- An upcoming campaign will address driver training, incident communication, and vehicle recognition



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