

The Loop Autonomous Vehicle Shuttle Pilot - Final Report

The Loop Pilot

- Free service on public roads on Treasure Island
- Fully electric, wheelchair accessible vehicle
- Safety attendant always on board
- Operated 9am - 6pm daily from August to December 2023
- Funded by FHWA, SFCTA and MTC



Autonomous Shuttle Pilot Purpose

- Demonstrate operational capabilities of Autonomous Vehicles in a mixed-use environment
- Understand perceptions of riders and other road users
- Explore partnerships for workforce, education, and economic development possibilities



Shuttle Route and Stops

1. Ship Shape Community Center (850 Avenue I)
2. 13th Street at Avenue H
3. Gateview Avenue at Mariner Drive
4. Avenue B near Gateview Avenue
5. Avenue B at Chinook Court
6. 9th Street at Avenue H
7. Avenue I at the YMCA



Vehicle Testing

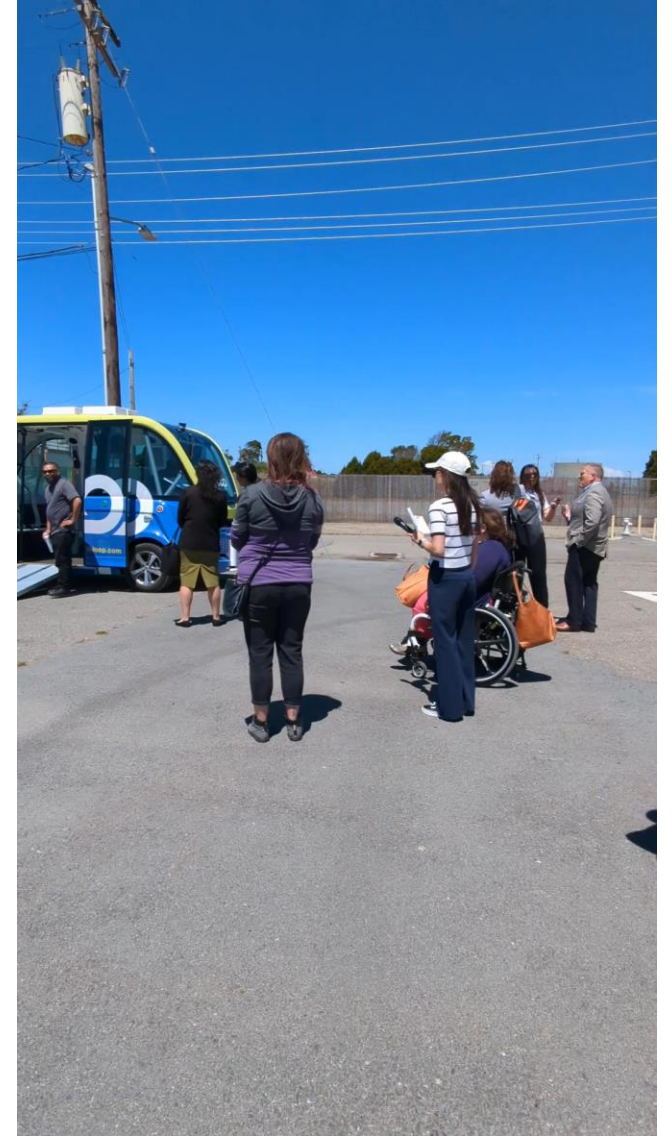
Pre-launch, 30-day testing period

- Vehicle readiness
- First responder training
- SFMTA operator and Muni 25 Treasure Island training



Accessibility

- ADA outreach event to collect feedback
- Shuttle accommodates 1 wheelchair
- Attendants provide boarding assistance and verbal trip updates



Goals and Evaluation

Safety

Understand the safety features and capabilities

Mobility

Understand if/ how AV Shuttle technology can support mobility needs

Operations

Understand organizational and infrastructure needs for operations

Research

Collect feedback from the public and data from the vehicle and share lessons learned

TI AV GOALS

Safety: Without risking safety, understand the public safety implications of an AV Shuttle.

Mobility: Understand if AV Shuttle technology can meet TIMMA's intra-island transportation service needs at TI.

Operations: Understand TIMMA's organizational capabilities and infrastructure needs to operate an AV shuttle.

TI AV EVALUATION OBJECTIVES

1A. Protect the safety of passengers & road users in TI during pilot operations.

1B. Explore whether AV shuttle technology can safely address the driving challenges of TI.

2A. Explore whether AV shuttle service can be accessible to everyone.

2B. Explore AV Shuttle's ability to meet the intra-island needs of users in TI.

3A. Explore whether AV shuttle technology can meet TIMMA's TI shuttle operation needs.

3B. Explore whether AV shuttle technology can meet TIMMA's TI shuttle service needs and constraints.

Data Collection

Weekly Report

- Data, Name, Site, Shuttle, Rout for Operator Shifts
- Current Mileage, Loops Completed, Ridership
- Starting, Ending Battery %
- Wheelchair Securements
- ADA Ramp Deployments
- Pedestrian, Weather, Congestion Conditions
- Passenger Behavior and Other logged Events

Weekly Hit Ratio Report

- Date, Site, Shuttle, Route
- Average Weekly Hit Ration %

Weekly Ridership Report

- Date, Time, Name, Site, Shuttle, Route
- Stop Station
- Boardings, Alightings
- Loop Number

Weekly Mechanical report (Pre & Post Trip)

- Date, Name, Route, Shuttle, Hit Ratio
- Equipment Validation (Key, Dash Cam, Camera, PC, UI, AMD, AC, Suspension, Computers, Interior Lighting, Seating, Battery, Safety Equipment, ADA Equipment, Microfiber Cloth, External Displays, Tires, Rims, Windows, Exterior Sensors, Exterior Lights, Body, Charging Cable, Mobile Device)

Weekly Disengagement Report

- Name, Site, Shuttle, Route, Time, Location, Weather
- Vehicle Speed
- Number of Passengers
- Pedestrians, Other Vehicles, Other Road Objects
- Operating Mode, Initiated By
- Cause, Causal Description

Weekly Incident Report

- Date, Site, Shuttle, Time, Location, Weather
- Shuttle Operator, Operating Mode
- Incident Type, Reported Injury
- Medical Attention
- Police, EMS, Fire, Media Involved
- Vehicle Speed
- Number of Passengers
- Pedestrians, Other Vehicles, Other Road Objects, Witnesses Involved
- Reported By
- Cause, Cause Description
- MHTSA Reportable

Monthly Vehicle Travel Data

- Braking Events
- Odometer
- Speeds
- Stops
- Telemetry
- Time

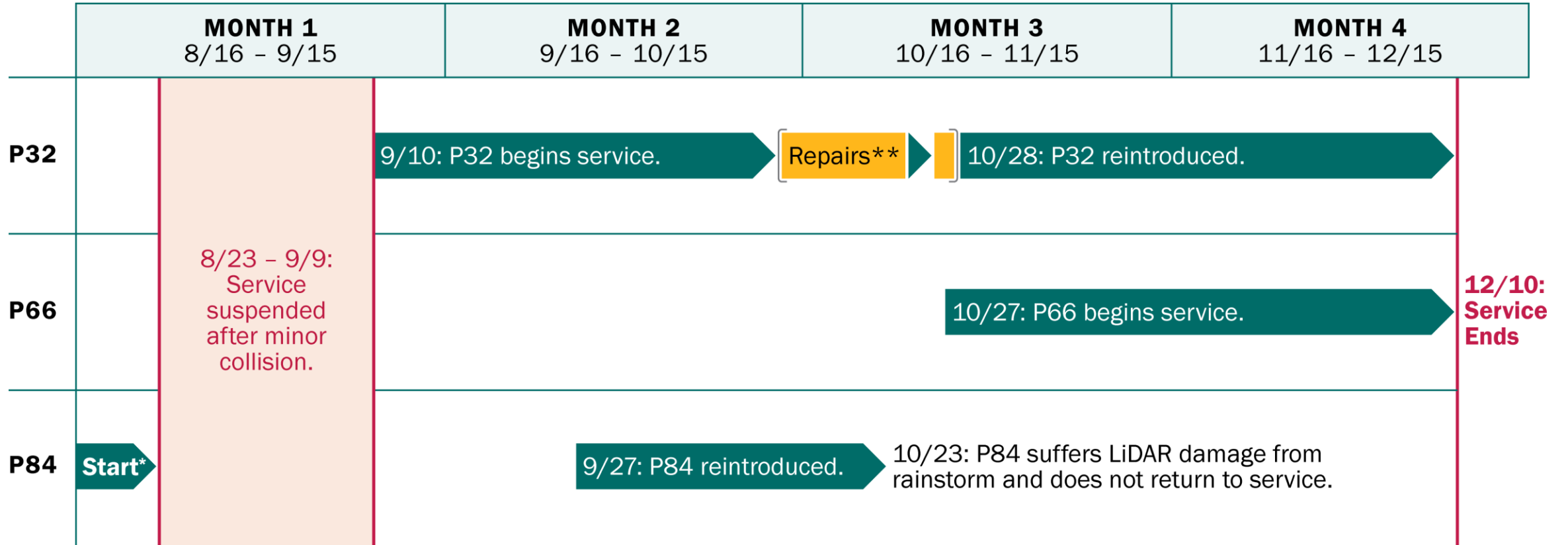
Monthly Availability Tracker

- Date, Shuttle
- Reason for Downtime
- Preventable, Non-Preventable

Survey Data (provided by TIMMA)

- Survey Responses in English, Chinese, Spanish, and Filipino

Overview of Service



* 8/16: Service begins with P84 only. P32 does not begin service due to curb strike. P66 remains in testing due to LiDAR issues.

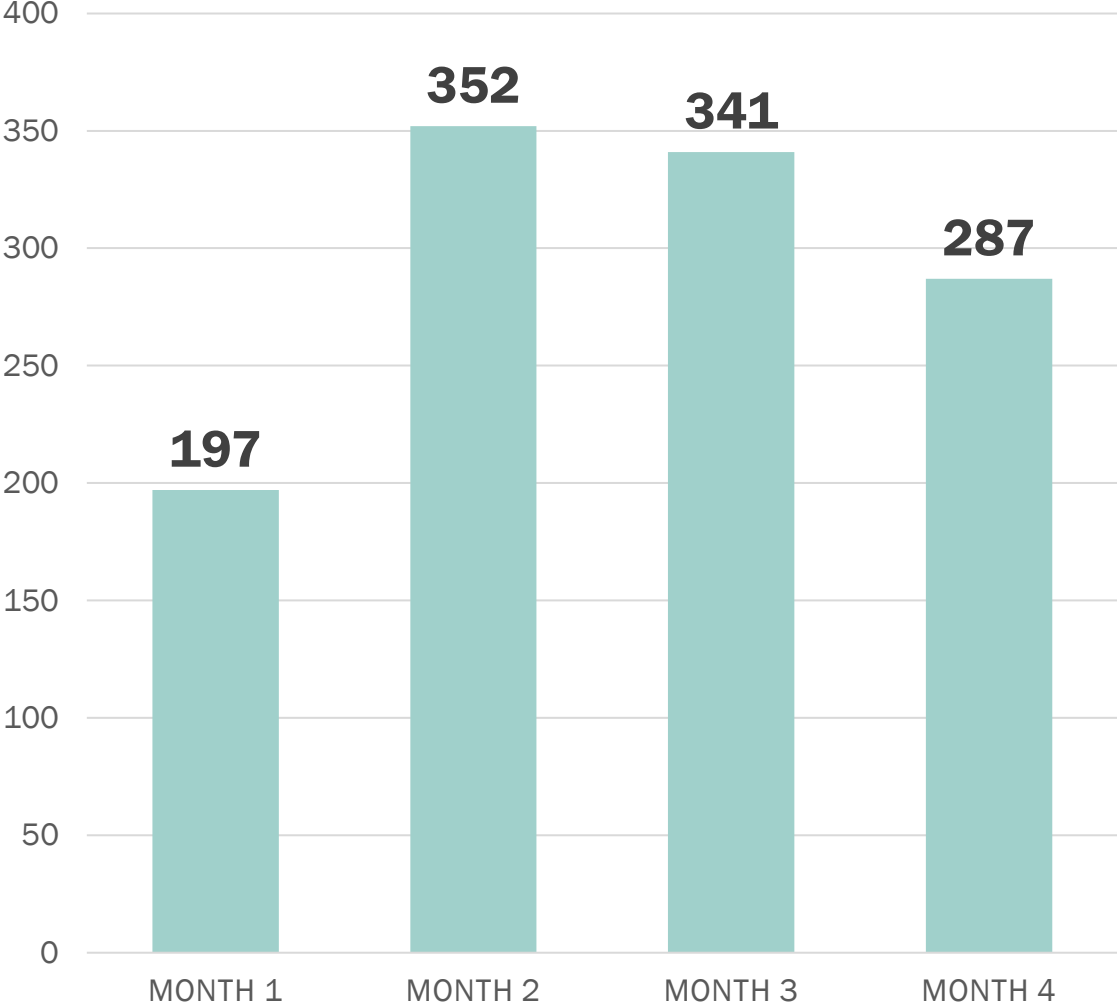
** 10/14 - 10/28: P32 undergoes repairs, is briefly returned to service, and undergoes further repairs until being reintroduced to service once again

Total Ridership by Month

During the 4 months of operations, there were over **1,100** passengers

Monthly, ridership fluctuated between **200 - 400** passengers

Total Ridership by Month

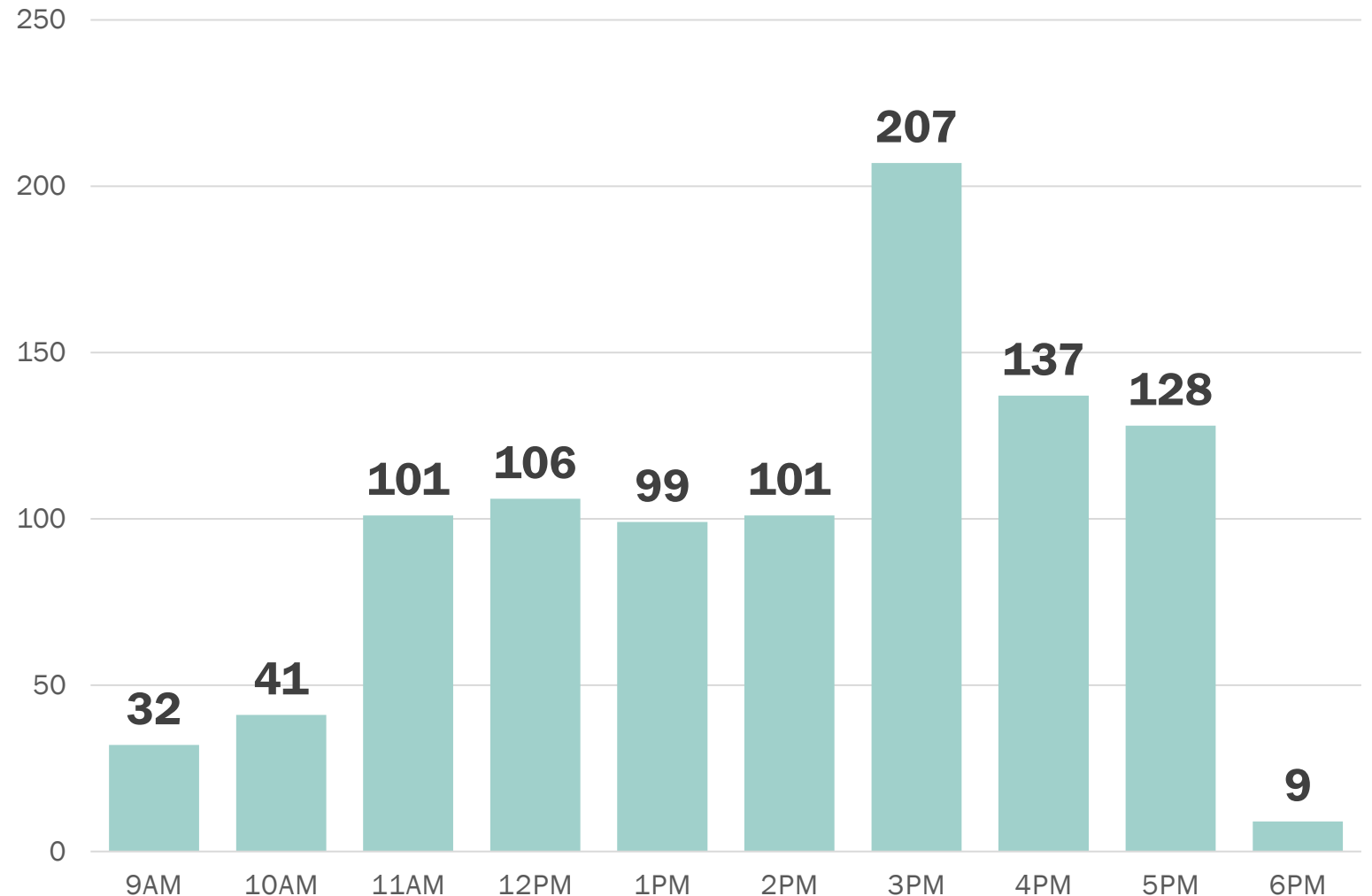


Ridership by Time of Day

Ridership was strongest during the PM hours, with an uptick in the later hours of service

The highest hour of ridership was the **3PM** hour.

Total Ridership by Month



Ridership by Stop

Avenue B at Chinook Court

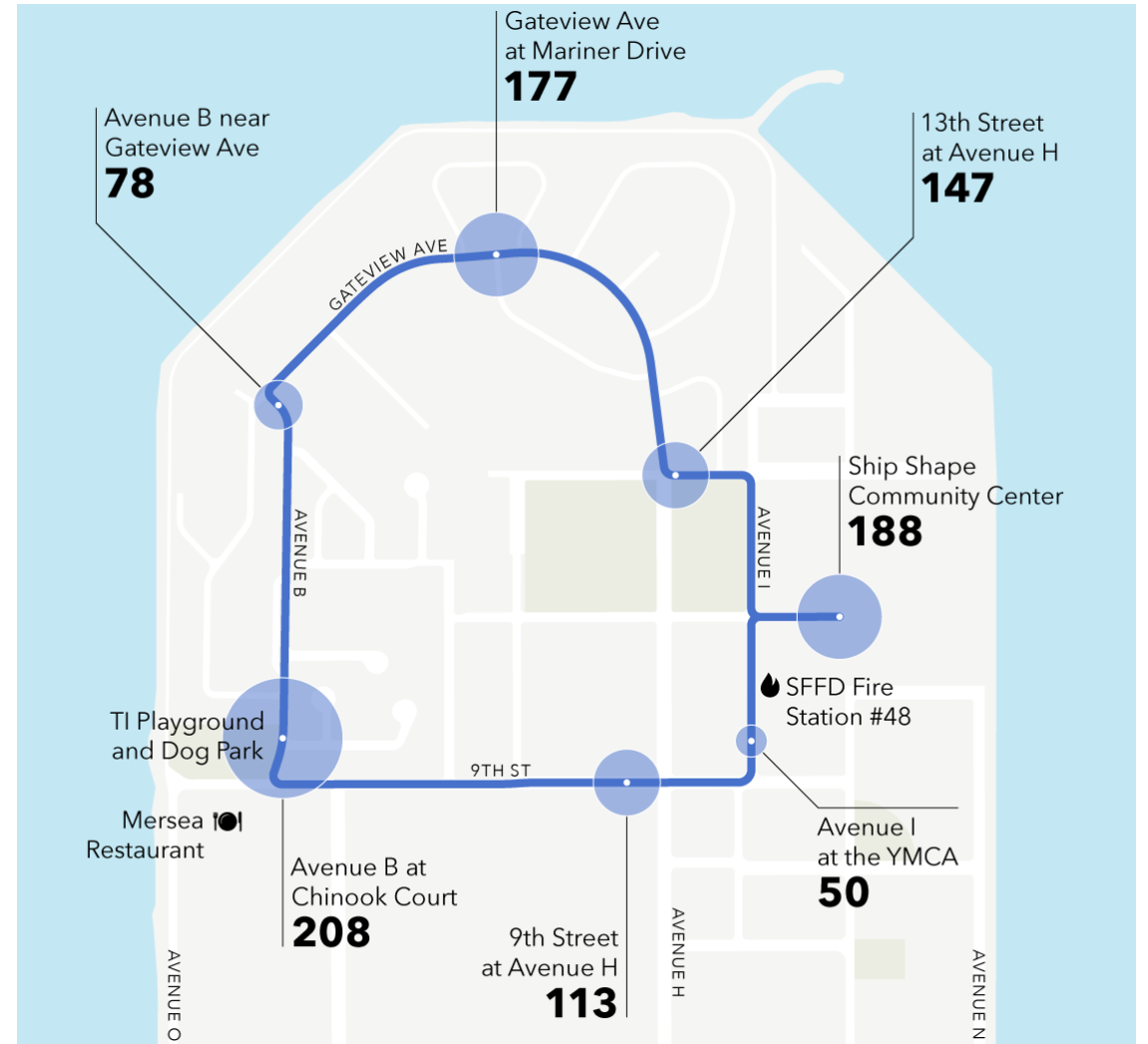
was the most boarded and alighted stop

YMCA stop was the least boarded and alighted stop

Ship Shape Food Pantry

68% of all riders who boarded at Ship Shape did so on Tuesdays between 2 - 5PM

Total Boardings (across all Months) by Stop

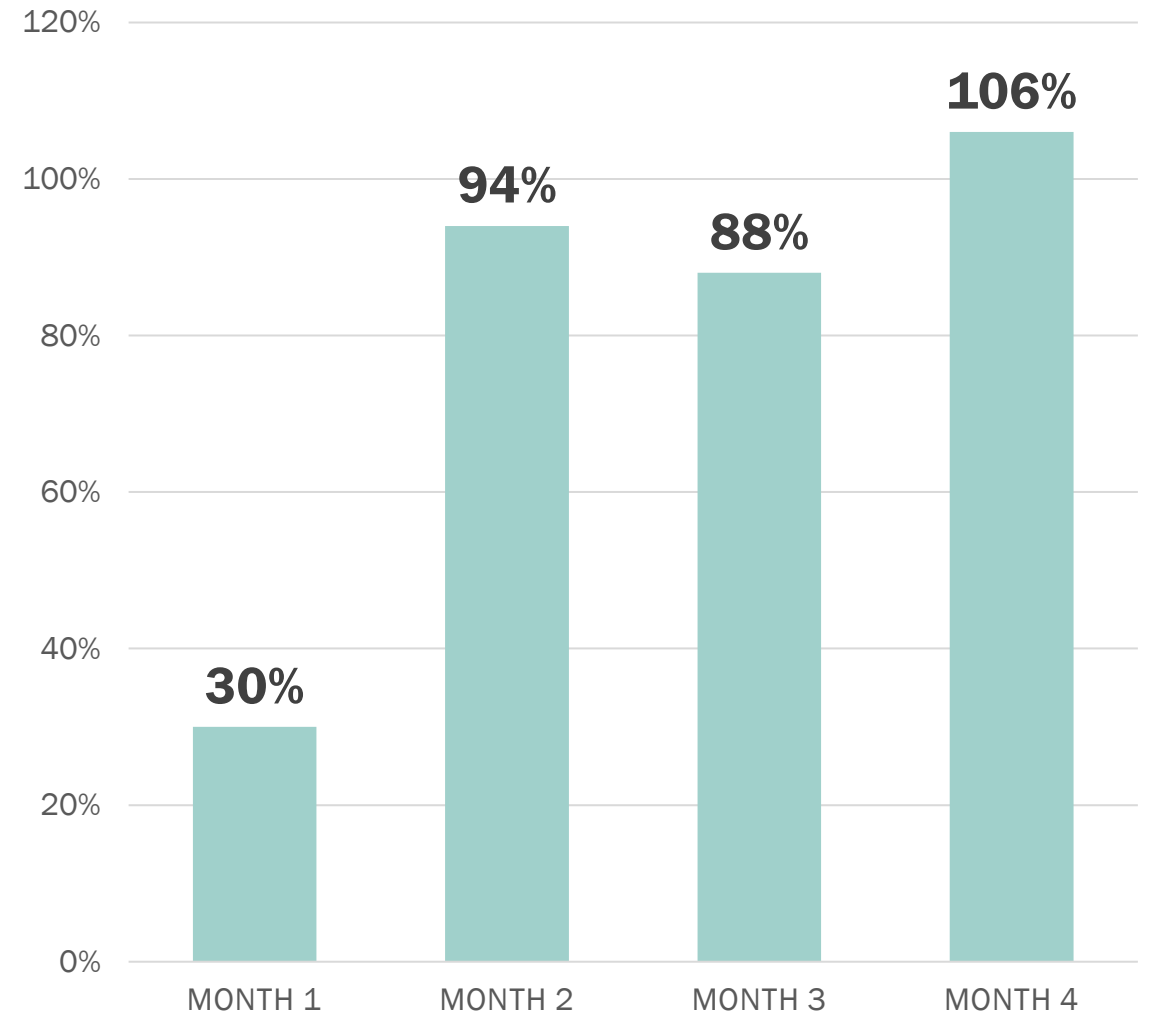


Service Miles and Hours

The Loop had a goal of 95% service uptime.

- 1,973 of runs were delivered (78% of planned)
- 3,015 service miles were traveled (79% of planned)

% of Runs Completed by Month

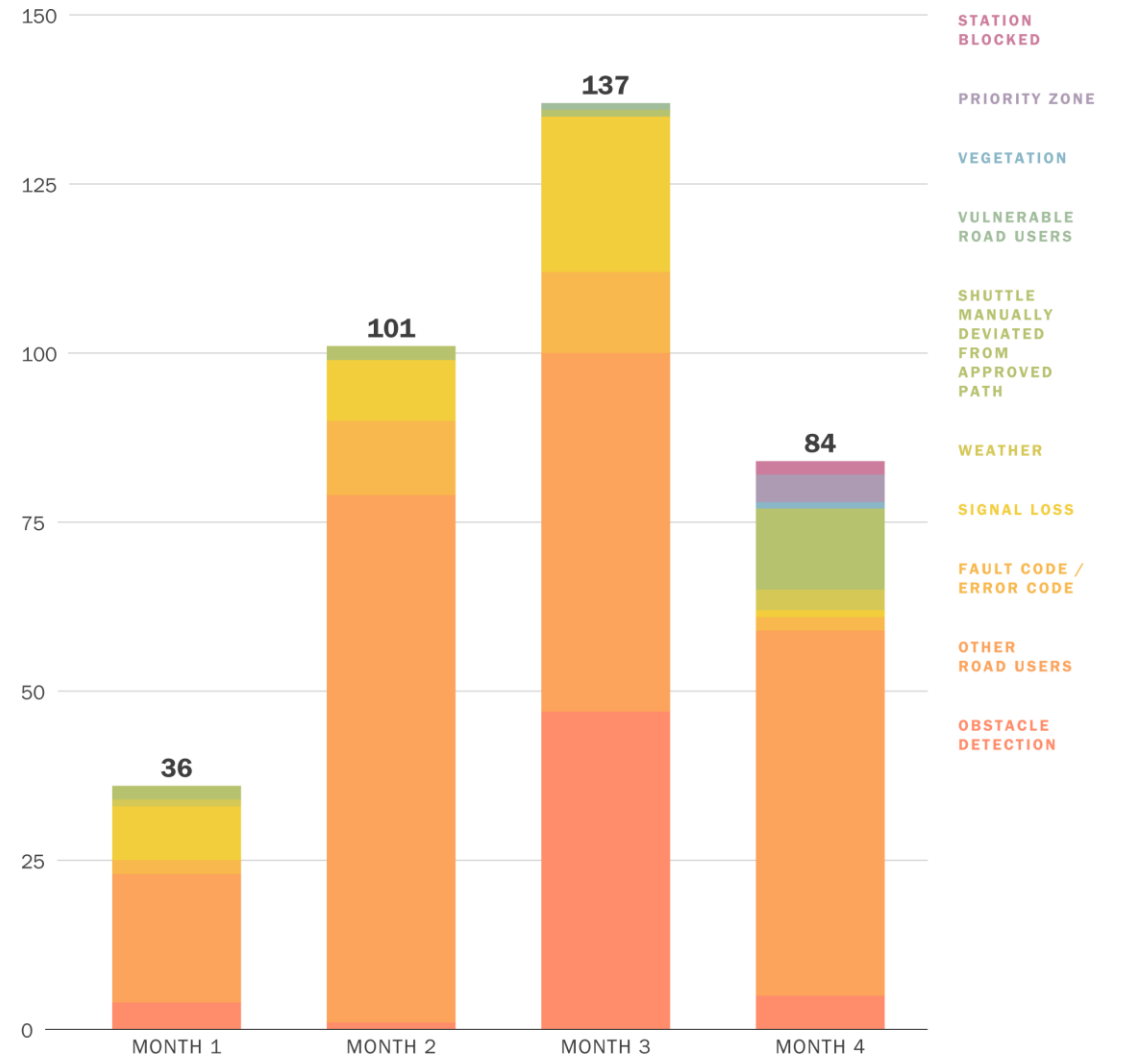


Disengagements

Other Road Users accounted for highest number of disengagements, followed by instances of **Obstacle Detection**

Signal Loss accounted for the third highest number of disengagements

Total Disengagements by Month



Survey and Partnerships

Survey

Received 80 surveys of riders and non riders

- The majority of respondents had a **neutral or positive** perception change of AV shuttles after riding on one or traveling near one
- The majority of respondents felt the quality of information received for the AV shuttle was **fair to excellent**
- Overall **positive shift in safety perception** after riding the Loop

Partnerships

- Held partnership events with Willie Brown Elementary and local labor groups



Findings and Lessons Learned

- Incident response and management can require significant resources
- Technology can be unreliable
- Complex operating environment presented risks to delivery
- Demand exists for first and last mile solutions and AV shuttle public perception was generally positive
- Well specified milestone-based contract is appropriate for future pilots

Action Requested

- Recommend acceptance of the Evaluation and Final Report for the Loop Autonomous Vehicle Shuttle Pilot

Thank you.

sfcta.org/treasure-island-shuttle

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