Computer Aided Dispatch/Automated Vehicle Location Real-Time Passenger Information System

Staff Report 20-201

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AGENDA

1. Operational Overview
2. Requirements for Accurate Predictions
3. Other Considerations
4. Wayside Signs
5. Conclusion

Operational Overview

Vehicle Location

Max 15 seconds

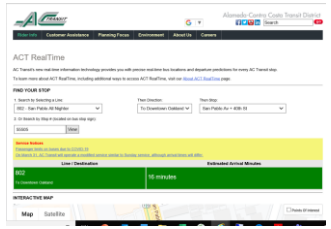
BUSTIME@

Vehicle Location

ACT Real-Time

API

ACT Real-Time Website, Mobile App, Developers' APIs



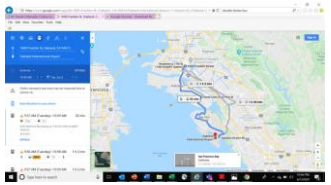
Predictions

GTFS-RT Feed

API

Real Time Message Signs

511



511.Org, Google Maps Developers' APIs, Third Party Transit Apps

Requirements for Accurate Predictions

1. The Vehicle Must Have the Current Schedule
2. All Equipment and the Infrastructure Must be in Good Working Order
3. The Vehicle Must be ON
4. The Operator Must Log On

5a. The Vehicle Activity Must Follow its Schedule …..or…..

5b. Implement Disruption Management

1. The Vehicle Must Have the Current Schedule

- Four times a year a new schedule from HASTUS is downloaded to the fleet
- All vehicles must receive the current schedule by day 1 of the new signup
- **Without the updated schedule:**
  - Operators can not logon
  - Unpredicted vehicles can suddenly show up at a stop
- **This problem has decreased significantly:**
  - By monitoring the fleet's receipt of the new schedule the week prior to the signup

2. All Equipment and Infrastructure Must Function in Good Working Order

- **The vehicle determines it's location, then communicates it to BusTime through:**
  - Onboard Equipment
  - The Network and Infrastructure
- **Any failure of any onboard equipment, network, or services will result in the following:**
  - A predicating vehicle can suddenly disappear
  - An unpredicting vehicle can suddenly show up at a stop
  - No predictions at all
- **To mitigate this problem:**
  - Operation Control carefully monitors loss of communication messages
  - ACT initiated campaign to ensure vehicle leaves the yard with equipment in good order

3. The Vehicle Must Have its Power On

- **The vehicle must have its power ON to communicate its current location**
- **Generally, this a challenge with long layovers**
- **When the vehicle is turned off:**
  - The vehicle is not communicating its location to BusTime
  - Predictions for this vehicle will not appear
  - A previous prediction may disappear
- **To mitigate this problem:**
  - AC Transit adjusts power down configurations

4. The Operator Must Log On

- The Operator Logon connects the vehicle to the schedule
- **A correct and timely logon or logoff must occur:**
  - At Pull-out
  - At Road Calls and Relief Points
  - At the last stop of the trip
- **If the Operator does not log on or log off in a timely manner:**
  - An unpredicted vehicle will show up at a stop
  - A prediction can disappear
  - Operator will not be able to log on to a replacement vehicle
  - The vehicle's next trip will predict inaccurately

More About The Operator log on

- **A correct and timely logon will enable:**
  - Head signs, interior signs, the farebox, next stop announcements, exterior route announcements, schedule adherence, Clipper Driver Console, Next Stop Announcements, accurate KPIs, Missed trip and OTP reports
- **The Most Important Reason that the Operator should log on:**
  - The Operator logon identifies and provides protection for the Operator
- **To Enforce Operator Logon, AC Transit has employed:**
  - OCC Campaign
  - Operator Training Video

5a. The Vehicle Movement Must Follow Its Schedule

- **If the vehicle leaves the garage too early or too late**
  - Predictions will be inaccurate
- **If a vehicle is too far behind schedule**
  - Predictions may get confused with the following trip
  - The vehicle prediction will appear as a no-show
- **If The vehicle goes off-route more than 500 feet**
  - BusTime will stop predicting for this vehicle
- **If the vehicle does not stop at the last stop on the trip**
  - BusTime will think the vehicle is delayed
  - Predictions for the next trip will be inaccurate

5b. Implement Disruption Management When the Schedule Changes

- Disruption Management Communicates schedule interruptions to the entire system and to BusTime
  - Detours
  - Cancels
  - Express
  - Short Turns
- **If Disruption Management is not implemented when a schedule is disrupted:**
  - Unpredicted Vehicles can suddenly appear at a stop
  - Vehicles predictions can disappear
  - Vehicle no-shows can occur
  - Vehicle predictions become inaccurate

Other Considerations

- **At Relief points:**
  - The Original operator should log off and the relief operator should logon before pulling out
- **At a Road Call:**
  - The Operator should completely log off of the roadcalled vehicle
- **When the Vehicle goes off route:**
  - Predictions will start when the bus goes back on-route
- **Avoid Bunching**
  - When vehicles bunch, predictions will appear on top of each other
- **Prediction Window:**
  - Note that BusTime begins to predict when the vehicle is 60 minutes away or less

Wayside Signs

- **AC Transit owns 113 Wayside Signs purchased through the NextBus Contract**
  - 87 Are Installed throughout the District
  - 16 Spares at CMF
  - 2 LCD signs are waiting deploy at Fruitvale BART
- **Clear Channel owns the Shelters that provide the Power to the signs**
  - 8 Signs are waiting for power either through the City of Oakland or PG&E
  - Planning and Schedules works with Clear Channel to resolve power and shelter issues
- **Clever Devices has completed installation of 46 new signs on BRT platforms**
- **The AC Transit Electronics Team is responsible for sign Maintenance**

Conclusion

- Equipment and infrastructure failures, operational deviations, or missed logons can cause prediction failures.
- The AC Transit team is working on several campaigns to monitor and modify operations which will result in improved prediction reliability

  - OCC Logon Campaign
  - Alerts to OCC for Specific Loss of Communication
  - Disruption Management
  - Configuration Adjustments
  - Fully training our Operators
  - Focus on Operational practices that affect predictions
  - Take Over Responsibility of wayside signs

Questions?