



# A Mind the Gap: How Oahu Successfully Implemented Headway Spacing to Deliver Frequent Service During COVID and Beyond

## Oahu Transit Services, 'TheBus'

### Bus

Dynamic Headway Management

“I don't know any other system in existence that allows for a frequency-based system, this is the only system I know that does it in a dynamic way so no matter what the conditions are on the line you can create that even gap”

John Donovan,  
OTS Field Operations  
Manager, Oahu Transit  
Services

On headway routes, 'TheBus' passengers know exactly how long it takes for another vehicle to come along – no need to check the schedule. By minding gap time instead of clock time for stop arrivals Oahu Transit Services can easily add or subtract buses from a route as needed, ensuring seamless service during the COVID pandemic without rewriting schedules.

## Background

Locals and visitors alike rely on Oahu Transit Services (OTS) to get around Hawaii's most densely-populated island, a tropical paradise popular with tourists. Known as "TheBus," Oahu's public transit system goes practically everywhere on an island only 44 miles long and 30 miles wide, making it the most heavily utilized transit network in the United States.

With a passenger rate averaging 48 per vehicle revenue hour, OTS buses were always full and standing room only. Hemmed in by mountains and the Pacific Ocean, Oahu operated a narrow transit corridor with little room for expansion. On such limited space, buses inevitably bunched along major stops on the busiest routes, as the flood of people got on and off. This became a persistently annoying problem for riders. When buses caught up with one other, some became overcrowded, while others ran near empty. Riders got bypassed at stops, or needlessly waited for their vehicle to fill up.

To solve this, OTS partnered in 2017 with Vontas (then part of sister company Trapeze) to develop dynamic headway scheduling. Rather than monitoring adherence to a schedule, dispatch managed routes by keeping buses evenly spaced in real-time, so that vehicles arrived at a stop at a consistent pace, instead of at a specific timepoint.

**535**  
buses

**1,010**  
bus stops

**2**  
Garages

## Challenges

For OTS, the goal was to assure passengers that a bus would be there to pick them up every 8 to 10 minutes. “So long as we keep the consistency for the person waiting at the stop, we feel it’s a success,” explained John Donovan, OTS Field Operations Manager.

Introducing a totally new route management system, however, wasn’t going to be easy. OTS realized that dispatchers and operators needed to be trained to do things differently from what they were used to before.

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Introducing a totally new route management system, however, wasn’t going to be easy. OTS realized that dispatchers and operators needed to be trained to do things differently from what they were used to before. Dispatchers, for example, had to monitor the terminus of each headway route and ensured that buses left their terminus per their headway schedule. They had to ensure that buses along the route stayed less than three minutes ahead or behind their headway schedule. The real challenge became to keep buses ahead of their schedule – for their interlines, street reliefs, pull-ins - to relieve operator stress.

As expected, switching from a paper- to a headway-based schedule was difficult for the operators. Many of them were uncomfortable with the absence of a set timetable. The prompts on the MDT changed frequently even though they were driving at a consistent pace. Operators who had established relationships with riders rued not being able “to pick up my people” at their scheduled times.

Change is hard,” John acknowledged. “The process involved a lot of one-on-one training for dispatchers and road supervisors and a lot of processes for people to buy into the system. It took a lot of work.”

## Solutions

OTS first implemented dynamic headway scheduling on one of the busiest routes, which serviced the urban core and tourist destinations. Headways were implemented from 6 AM to 6 PM Mondays to Fridays. To better manage the system, a dispatcher was assigned to exclusively monitor headway compliance.

Operators logged in from their designated starting points and followed the prompts on their Mobile Data Terminals (MDTs). OTS implemented a stoplight system to guide operators on their performance against the target headway. A red bar on the MDT informed the driver that he was too close to the front vehicle and needed to slow down. Yellow meant being in the “comfort zone,” while green signalled that the driver had to proceed as efficiently as possible. Dispatchers also sent operators chat messages to instruct them to speed up or slow down, or called them if needed. Road supervisors were on standby to intercept buses needing further headway guidance.

This simple system proved highly effective during daily operations. But when it wasn’t business as usual, dispatchers had another useful tool. In case of an accident, they simply pushed a “quarantine” button to take a bus out of the route, automatically recalculating the headway for the remaining vehicles. For dispatchers, it was seamless disruption management.

Buses were normally assigned to quarantine at a terminus and could be moved further down the line, or dropped in front of a unit that's running too fast to slow them down. Again, the system just automatically recalculated the headway operators followed to keep operations running smoothly.

## Results



**SERVICE LEVELS MAINTAINED**  
during COVID pandemic



**INCREASED FREQUENCY**  
on busiest routes



**EFFECTIVELY MANAGED**  
manpower shortages



**INCREASED**  
passenger satisfaction

Adding or removing buses on demand enabled OTS to keep service consistent for passengers, and allowed dispatchers to easily make changes to route operations on the fly. The system greatly helped the agency quickly increase frequency for three of the busiest routes during the COVID pandemic, helping essential workers get to medical facilities faster while remaining socially distanced. The agency also effectively managed manpower shortages with the flexible system.

“Overnight, we literally could add more blocks to the system without a schedule,” John explained. We would just start them at certain locations, we would just put them into the headway mix, and the system would calculate the time. I couldn't stress enough how this has helped us during COVID.”

Likewise, John couldn't sing praises enough for how dynamic headway management had transformed dispatch operations and provided a practically fail-safe solution for managing bus schedules. “I don't know any other system in existence that allows for a frequency- based system,” he said. “This is the only system I know that does it in a dynamic way so no matter what the conditions are on the line you can create that even gap.”

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