CONNECTING TRAVELERS TO TRANSIT WITH FIRST-MILE/LAST-MILE SOLUTIONS

U.S. Department of Transportation


Source: iStock

IN THIS CASE STUDY YOU WILL LEARN:

1. How a first-mile/last-mile solution was implemented successfully in the Dallas area
2. How the project secured buy-in from key stakeholders
3. The benefits for commuters, system operators, and the agency
4. The lessons learned from designing and implementing the program

Introduction

In 2016, the United States Department of Transportation (USDOT) Federal Transit Administration (FTA) competitively awarded 11 Mobility on Demand (MOD) Sandbox grants which funded the deployment of innovative transportation technologies across the United States. This case study details one of these deployment programs, the Dallas Area Rapid Transit (DART) First and Last Mile Solution, which used on-demand shared mobility services to connect riders to underutilized fixed-route transit services.

Figure 1. *Microtransit services such as on-demand shuttles can help commuters get to and from fixed-route transit.* ***Source:*** *iStock*

Table 1. Case Study Summary

Problem	Travelers may have difficulty accessing transportation. Even when services exist, it can be challenging to complete a trip when services are inconveniently located.
Goal	Increase access to transit services by facilitating usage of first-mile/last-mile solutions.
Solution	In 2016, FTA's MOD Sandbox Program awarded DART a $1.2 million grant to conduct a demonstration leveraging microtransit (i.e., shared, flexibly routed on-demand transit service) and Transportation Network Company (TNC) services. This system would offer microtransit demand-response services, subsidize trips taken through TNCs, and integrate public and private services into a single application.

Other regions looking to increase transit service utilization and promote multimodal commuting options can find insights from the DART MOD Sandbox initiative.

Background

Many cities in the United States are designed to take advantage of private automobile ownership, as they are geographically dispersed with large, low-density suburban areas [1]. This can make non-automotive travel difficult for residents to access; at the same time, the low customer density of suburban areas can make transportation services financially infeasible.

Dallas, Texas is known for its high degree of urban sprawl [2, 3]. One of the key challenges related to providing public transit in an area with high sprawl is that even when services have a high potential passenger throughput, it can be difficult for travelers to access them in the first place. This is called the "first-mile/last-mile" problem [4]. For example, if a light rail station is not a walkable distance away and must be driven to, it is not reachable to travelers without automobiles, making it an ineffective alternative to vehicle ownership.

This dilemma can prevent transit services from realizing their full benefits of relieving regional congestion and vehicle miles traveled (VMT). A regional rail, for example, may efficiently and effectively connect two cities, but it does not benefit travelers if the stations themselves are difficult to reach. Transit agencies have identified the need to promote first-mile/last-mile solutions in order to boost ridership rates and assist travelers in using the transit options available to them.

Initial Vision

Dallas Area Rapid Transit (DART) is a public agency in the Dallas/Fort Worth region of Texas that operates a variety of modes including bus, light and commuter rail, streetcars, and paratransit and vanpool services. Its light rail service is among the busiest in the United States, and it has expanded services in response to local population growth. However, despite the availability of high-frequency rail and bus services to assist travelers in commuting from home to work, DART has been facing first-mile/last mile issues—many residents within the service area do not live near bus stops or rail stations.

DART sought to reimagine its existing on-demand shuttle service, DART On-Call, to modernize it, reduce operational costs, and make it more convenient and effective for travelers. The existing On-Call service needed to be booked at least an hour in advance, and ridership was low enough to cause reductions in service. Moreover, DART realized that the advent of TNCs offered customers a new mode to travel to and from transit stops [5].

Figure 2. *DART's light rail system is extensive, but riders had difficulty accessing stations.* ***Source:*** *iStock*

In 2016, the USDOT awarded DART a grant of $1.2 million, which was supplemented by $301,000 in local matching funds, to address its first-mile/last-mile issue [6]. The pilot was intended to leverage private ridesharing services and to fund

a new microtransit service that would increase mobility and, in the process, help to collaboratively connect travelers with existing fixed-route transit infrastructure. While focusing on this first-mile/last-mile application, the service allowed for broader usage, including on-demand point-to-point travel within the service area.

DART transitioned its preexisting DART On-Call demand-responsive service into a new service called GoLink, which offered dedicated microtransit shuttle vehicles in the pilot service areas. Additionally, it updated its existing GoPass app, which provided access to DART transit trip planning, scheduling, and fare payment, to include the TNC partner's pooled trip option. Finally, the deployment included integration with the TNC provider to reduce the cost to users of pooled trips; trips starting or ending at DART transit stations were free to travelers, while other pooled trips were subsidized to half-cost.

Rising to the Challenge

The project included a wide variety of stakeholders and partners, from regional governmental entities to private technology startups, and changed over time in response to the deployment's developing needs. DART had originally anticipated incorporating support for a new carpooling service called GoPool, for example, but found that ridership numbers were too low to justify maintaining the program.

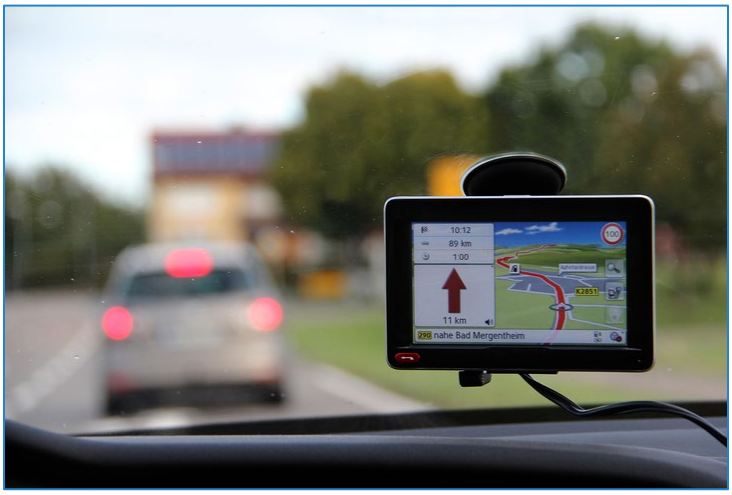

Figure 3. *Testing hardware with the active participation of drivers helped DART develop system requirements that matched real-world use cases.* ***Source****: iStock*

In many cases, DART needed to deal with untested or unproven technologies and services—at the time of its MOD Sandbox grant application, most rideshare companies did not offer the pooling services that would later be critical to the success of the pilot. Similarly, DART needed to source updates for its own microtransit and route-planning apps to include the newly deployed services, as well as handle transactions and fare payments behind the scenes. In recognition of these challenges and the uncertainties they posed, a significant amount of pre-testing was necessary to trial the novel hardware and software under operational conditions. For the same reason, the pilot was implemented in phases, **starting with time- and area-limited deployments that gave the agency ample opportunity to troubleshoot problems** before they impacted large swathes of customers.

This approach—maintaining an appropriate level of caution while still embracing the inherent risks of emerging technologies—served DART well. As expected, technical issues, including routing inefficiencies, unfamiliar tablet hardware, and software bugs, were the main challenges facing the program in its early deployment phases, but the team's ability to respond to these issues demonstrated to agency leadership that these challenges were not major roadblocks and that the

Figure 4. Thanks in part to extensive marketing and outreach, customers were happy to engage with the new modes. Source: iStock

technology could be implemented for practical use. The agency's evaluation report cited this deliberate, realistic approach as helpful in retaining strong internal support for the project.

Technical issues were not the only concerns facing the project. The agency's initial vision for its ridesharing partnership proposed that trips would be booked seamlessly within the proprietary DART app, and that rider data would be available for analysis, as was already the case with fixed-route bookings. However, during contract negotiations the TNC partner rejected these features. Eventually, DART agreed to provide links from its app to the TNC's app, which facilitated the transition between the two applications. The agreement also allowed DART to receive rider data in anonymized, aggregate form [5].

Initial deployment of the GoLink pilot began in October 2017 in one of the areas formerly serviced by DART's On-Call demand-responsive service, allowing travelers to book point-to-point service anywhere within the operating zone. Service hours were strictly limited between 11 AM and 2 PM to allow for testing and troubleshooting. Thanks to extensive marketing efforts, ridership was significant and grew over the course of the project, alleviating earlier concerns that customers would be hesitant to embrace the new modes. To accommodate growing demand, service was extended to two additional contiguous geographic zones in March and August 2018.

Concurrent with these service deployments, the DART GoPass app received significant updates in 2018 and 2019 to incorporate real-time data, fare payment integration and open payment systems, and multimodal transit planning and booking features. The TNC partnership was launched in March 2019, offering further options for traveler mobility [6].

Results

Overall, the first-mile/last-mile service expansion program had positive effects on commuting patterns at the pilot sites. The Independent Evaluation team reviewed a variety of data from the project, including activity data from February 2018 to March 2019, along with assembled agency and expert interview data and the results of two customer surveys. The first survey, with 255 respondents, gathered customer feedback on GoLink specifically; the second, with 196 respondents, solicited feedback on DART's TNC partnership and the GoPass app. The final evaluation report was published in 2021 [7]. Selected results from the project include:

- **Per-rider costs for GoLink were reduced by more than 60 percent from paratransit service and were substantially lower than the costs of the eliminated fixed-route line.** The average subsidy per rider for DART paratransit services is approximately $45, while GoLink subsidies measured during the pilot were around $16 on average. The bus line that was replaced by GoLink in 2018—which was chosen for elimination due to severe financial inefficiency—cost

the agency approximately $34 per rider. System-level bus costs, including downtown high-utilization lines, average approximately $8.30 per rider.

- **Following the pilot, participants were more likely to be satisfied with their access to transportation services.** In a post-pilot survey, 90 percent of participants rated their access to transportation services following the implementation of GoLink as "good" or "excellent;" when asked in the same survey to rate their access prior to the pilot, only 58 percent gave the same positive ratings of "good" or "excellent."
- GoLink trips—including both waiting and in-vehicle travel times—were **2 to 7 minutes faster**, on average, than other public transportation methods.
- More than **75 percent of GoLink trips were taken to or from a public transit station**, indicating that customers were using the service to boost their access to existing services.

These results suggest that the first-mile/last-mile solutions trialed in Dallas have the potential to increase riders' access to public transportation and that the services can be a cost-efficient way for agencies to provide mobility to low-density areas. In particular, the high proportion of trips taken to or from fixed-route transit stations suggests that travelers used the GoLink service to make up for previously unconnected links in their trip chains, rather than having the service stand as a direct competitor to existing services.

Lessons Learned

Internal Knowledge-Sharing Can Help Foster Robust Deployments.

The project included several moving parts, and DART recognized that it was crucial for operational personnel to be included as full stakeholders in the process of procuring software and making service-level decisions. By including DART drivers in the selection of mobility software and hardware and soliciting driver input to generate necessary device parameters, DART was able to ensure that its procurements were targeted to be effective for on-the-ground conditions and that its new services would have buy-in from all driving staff [6].

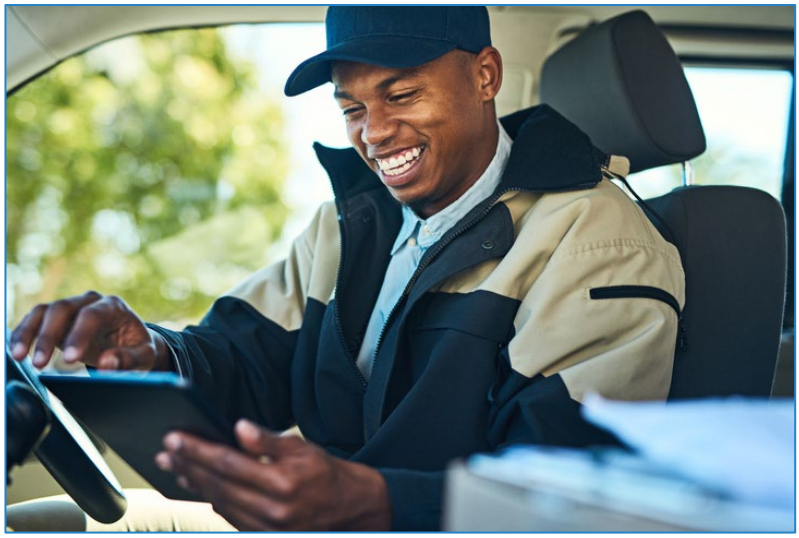

Figure 5. Ensuring that operators were involved with the procurement process ensured that the routing devices met their needs. Source: iStock

To further encourage communication across the entire team and break down expertise "silos," DART required back-office staff, such as dispatchers and reservationists, to complete ride-along trips with drivers so that they could understand the applications and limitations of the routing technology from firsthand experience. The agency credited this decision with improving its ability to respond to technological limitations and subsequent fine-tuning of its software requirements.

DART found that staff buy-in was one of the most important factors to facilitate a smooth roll-out of novel software. Software deployments often, by their nature, require extensive bug identification

and patching, while simultaneously requiring operators to re-learn processes in a new interface. By engaging operators throughout the development process and incorporating their feedback, DART was able to secure operator buy-in from the project onset and solicit greater commitment than if drivers felt that changes were being pushed onto them.

Starting on a Small Scale Can Be Especially Useful for Emerging Technology Deployments.

From the outset, project managers knew that integrating new technologies into the existing system could present challenges. In recognition of this, the pilot was deliberately paced to start small and ramp up in scope. This way, the agency had time to recognize and troubleshoot technical or operational problems as they happened without disrupting services for a larger customer base. At the same time, the new service was quickly available to benefit users rather than being tied up in an extended period of closed-door proof-of-concept testing. The approach taken by DART balanced the desire of the agency to provide robust testing on important transportation infrastructure with its mission to provide its customers with optimal services. [6]

In a similar issue of scaling, during the pilot DART found that expanding the number of available service vehicles—or, more specifically, the number of drivers—was not feasible. To allow service expansion to continue, the agency contracted with a TNC to provide another on-demand mobility option to users. DART was able to use the additional capacity managed by this service to ensure that the GoLink service, which used a DART-operated fleet of ADA-compliant WAVs, could be available to serve riders with specific mobility needs and ensure that the benefits of the enhanced on-demand services remained reachable. This TNC partnership was launched in March 2019, and the evaluation report found that the addition of the new service increased the customer base overall rather than simply migrating existing vanpool riders to the TNC's services. [7]

This building-up approach was successful in identifying and responding to on-the-ground deployment challenges—such as giving drivers experience using the routing units. However, the incremental deployment style could not address all challenges that the program faced. For example, the development of contractual agreements between partners was a major focus as DART and the private service providers sought to come to a consensus on items such as data sharing. In such a case, a scaling deployment would not be able to start at all without an agreement in place.

Figure 6. Using the TNC partner's vehicles in combination with its existing WAV fleet to expand service capacity allowed DART to proceed with its scaling despite unexpected challenges. Source: iStock

Targeted Marketing Can Boost Success.

For the pilot to be successful it needed to have a base of users. DART recognized the importance of having a robust marketing initiative to promote and support the technical developments that were being tested. This advertising was in many cases straightforward, such as using branded GoLink

vans to promote awareness of the program as they completed trips. At other times, though, detail-oriented techniques were used: DART tailored outreach efforts across deployment zones to address individual neighborhoods' needs, focusing on the unique rider makeups of each area and identifying how to best target riders based on their needs. Marketing was conducted through social media, local print and digital publications, outreach to employers and local governments, and in-person outreach with DART staff approaching users in DART stations or conducting ride-alongs to guide users through the service [6].

This tailored approach to outreach brings higher costs compared to broad appeals. DART found that their marketing campaign was "staff-intensive" and would have been less expensive if the area-by-area marketing design were not in place. However, the agency was able to leverage its relationship with city communicators within the service area, as well as area employers, to promote its simple central promotional messages (e.g., "Ride GoLink!") through a wide range of channels.

In Summary

The DART MOD Sandbox project demonstrated that novel technologies and services can be an effective, efficient way of connecting travelers with existing mobility networks. By engaging in forward-thinking deployments that allow time to develop necessary stakeholder buy-in and software troubleshooting procedures, transit agencies can minimize the risks inherent to using cutting-edge solutions and modernize their services.

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