



# Trevor Findley

## Principal

---

### Summary

Mr. Findley has 15 years of experience as a Project Manager and System Architect in the design and delivery of electronic payment systems. He is an industry expert in transport fare collection, and specializes in fare system development, real-time transaction processing, and the integration of emerging payment technologies.

Mr. Findley is one of the founders of Clevor Consulting Group, a boutique consulting firm focused on bringing unique technical talent to the transport industry. As Managing Partner, Mr. Findley helps transport agencies adapt to the world of electronic payments by providing the knowledge and resources necessary to deliver innovative solutions.

### Project Experience

#### **Automated Fare Collection (AFC) 2.0 Implementation, Massachusetts Bay Transportation Authority (MBTA), Boston, MA, February 2019-Present**

MBTA is in the process of replacing their aging CharlieCard fare collection system with a modern account-based system that will enable customers to pay fares using contactless bankcards, agency-branded smartcards, and Near Field Communication (NFC) devices using both mobile wallets and closed-loop virtual media. The system is being built on an open architecture that will support all current transit modes (bus, subway, and commuter rail), and enable future expansion to non-transit services and new partners.

The System Integrator contract was awarded to Cubic | John Liang in November 2017, and Clevor Consulting Group was brought on in February 2019 to serve as MBTA's primary fare collection technology consultant supporting system design and implementation. Mr. Findley is the Fare Collection Technology Lead, leading the consultant team through all technical design and implementation tasks. Mr. Findley is also supporting fare revenue assurance activities, assisting MBTA finance staff in structuring accounting and auditing processes for the future system.

#### **SmarTrip® Mobile App and Fare System Strategy, Washington Metropolitan Area Transit Authority (WMATA), Washington, DC, April 2017-Present**

As of 2019, WMATA's SmarTrip® fare payment system, one of the first of its type in the U.S., is 20 years old. With huge adoption among DC residents and tourists alike, WMATA has a critical responsibility to keep the aging system in a state of good repair. While satisfaction with the system is generally high, there is also a desire for new functionality and more modern payment options from both agency executives and customers.

Mr. Findley has been assisting WMATA in the design and implementation of a mobile app, as an initial step towards modernizing their fare collection operation. Additionally, Mr. Findley was brought in as a strategic advisor to help WMATA identify and prioritize the work needed to keep the current system operating, and to develop a plan for the near- and long-term introduction of innovative technologies.



# Trevor Findley

## Principal

---

Mr. Findley will assist WMATA in structuring procurements, as well as designing an approach for the introduction of modern payment technology without disruption to ongoing operations.

### **Next-Generation ORCA Fare Payment System, Sound Transit, Seattle, WA, April 2016-Present**

Similar to Clipper in design, ORCA is a regional fare collection system that supports payment across nine transport agencies serving the Seattle region. It is also similar in that it is an ageing system, first launched in 2009. As such, Sound Transit is in the process of procuring a replacement system, supporting account-based payment and an open architecture design philosophy.

Mr. Findley is serving as a strategic and technical advisor on the project. He supported the system design, authored functional requirements of the system, and developed the complex transition strategy for the migration of agency operations and existing customers from old system to new.

### **Honolulu Fare System, Honolulu Authority for Rapid Transportation (HART), Honolulu, HI, October 2013-Present**

The Honolulu Authority for Rapid Transportation, City and County of Honolulu, and Oahu Transit Services are in the process of implementing a new electronic fare payment system to support bus, rail, and paratransit services. As part of the project, state of the art fare collection equipment will be installed throughout the brand new, operator-free light rail system, and on 730 bus and paratransit vehicles, to support passenger travel across the entire island of Oahu.

As the Project Manager and System Architect, Mr. Findley has seen the project from inception through implementation, helping to define the strategic direction, authoring the functional and technical requirements for the system, supporting the procurement process, and overseeing vendor development. While based on the framework developed for the Portland system, the implementation strategy and technology solutions were customized to meet the unique needs and customer base of Honolulu. Mr. Findley is currently overseeing integration testing of the new system, with an anticipated launch in 2018.

### **Hop Fastpass™ Fare Payment System, TriMet, Portland, OR, October 2012-Present**

Launched in the summer of 2017, the Hop fare collection system was delivered on schedule and under budget, and pushes both technical and policy boundaries within the industry. The first truly open architecture system of its type, a common set of agency-controlled APIs are used to integrate equipment and systems from nine different vendors. Customers have a variety of ways to pay (bankcards, smartcards, NFC mobile wallets) with a fully integrated retail reload network and system-wide fare capping. At the core of the system, is a state-of-the-art COTS financial management system that provides sophisticated revenue accounting and enterprise-level financial controls.

As the System Architect, Mr. Findley was instrumental in defining the strategic direction of the project. In the planning phase, Mr. Findley assisted the agencies in identifying system needs, making key technology decisions, and developing a concept of operations. He went on to author the core functional



# Trevor Findley

## Principal

---

and technical requirements of the system, and worked with the agencies to complete five successful procurements in support of the multi-vendor system. Following award, Mr. Findley worked with the selected vendors to design and implement core elements of the system (e.g., real-time fare calculation engine, fare capping algorithm, and financial accounting integration), and oversee vendor integration efforts. Mr. Findley is currently working with TriMet in an effort to be the first U.S. transport agency to launch closed-loop NFC-based payments.

### **Clipper® Fare Payment System, Metropolitan Transportation Commission (MTC), San Francisco, CA, August 2005-Present**

The Clipper® fare payment system provides seamless fare payment across 22 transport agencies serving the San Francisco Bay Area. The system, first launched in 2005, is easily one of the most ambitious ever implemented with seven modes of transport; flat fare, distance-based, and zone-based payment; over 4,000 unique fares, 100+ fare products, and 12,000 recognized transfer combinations; and multi-agency fare capping.

Mr. Findley started on the project in 2005 as the technical lead, and went on to become the Project Manager, overseeing the system implementation on all seven major transport operators serving the city of San Francisco. He has led major system upgrades over the years, ensuring ongoing operation of the now 12-year-old system. In 2017, Mr. Findley reengaged on the project to help MTC develop a strategy to maintain a state of good repair while incrementally migrating Clipper to a next-generation fare collection system, capable of real-time transaction processing and a broad range of fare payment options.

### **New Fare Payment System, New York City Transit (NYCT), New York, NY, January 2014-January 2018**

New York City Transit is replacing their MetroCard magnetic stripe fare collection system, which has been in service since 1994. The project includes the replacement of equipment and installation of new network infrastructure in 427 subway stations and on over 5,800 vehicles. With over 8M riders per day across all partner agencies, the transition to a new system is a massive undertaking.

Mr. Findley served as Technical Lead and Project Manager for the technical consulting team, where he worked with NYCT and the partner agencies to design a next-generation, account-based fare collection system that will allow New York residents and visitors to pay fares using contactless bankcards, agency-branded smartcards, and Near Field Communication (NFC) devices using both mobile wallets and closed-loop virtual media. Mr. Findley supported the agencies through the complex procurement process, contract award, and the early phases of system design review.

### **Ventra™ Fare Payment System, Chicago Transit Authority (CTA), Chicago, IL, January 2012-February 2014**

The Ventra™ fare collection system was the first account-based, open payment system launched on a major transport operator in the United States. The system, which supports the payment of fares on



# Trevor Findley

## Principal

---

buses and rail using contactless bank cards, mobile wallets, and agency-branded General Purpose Reloadable (GPR) debit cards, was launched in under two years.

Mr. Findley was brought on as the Implementation Manager following award of the Design-Build-Operate-Maintain (DBOM) contract to the fare system vendor. Mr. Findley oversaw the system implementation from initial design through public launch, and led a team of staff through all phases of system design, technical development, and functional validation, leading up to the successful launch.

## Work History

### **Principal, Clevor Consulting Group, July 2017-Present**

In 2017, Mr. Findley founded Clevor Consulting Group. The motivation behind the move was to establish a firm that recognizes the need to acquire diverse technical talent to help transport agencies navigate the complex world of electronic payments and bring innovative solutions to their customers.

### **Senior Program Manager, CH2M HILL, August 2011-February 2018**

When CH2M acquired Booz Allen Hamilton's transportation technology practice, Mr. Findley made the transition and brought along the projects he was supporting at the time. Over the next six years, this portfolio grew as Mr. Findley was recognized as an industry leader in transport fare collection.

### **Lead Associate, Booz Allen Hamilton, August 2005-August 2011**

Mr. Findley began his career in electronic payment systems as the technical lead on the San Francisco Clipper project. Over his six years with the firm, his role grew to manage some of the largest projects in Booz Allen's fare collection practice.

### **Embedded System Design Engineer, ESI Electronic Products Corporation, September 2002-April 2005**

Mr. Findley led projects involving the custom hardware and software design of embedded systems used in exercise equipment and other consumer products. He was responsible for the complete development cycle of these products, from conception through production release and support.

## Education

### **B.S., Electrical Engineering, Worcester Polytechnic Institute, Worcester, MA, 2002**

Mr. Findley studied Electrical and Computer Engineering, focusing on both hardware and software design, and minored in Management of Information Systems (MIS). He studied in both Switzerland and Ireland, and graduated with High Honors.

## Professional Accomplishments

**2014** – Selected as one of Mass Transit Magazine's "Top 40 Under 40" transit professionals

**2014** – CEO Excellence Award for Chicago Ventra project (highest honor at CH2M)



# Trevor Findley

## Principal

---

**2008** – Nominated Chairperson of Booz Allen Hamilton’s San Francisco Workforce Leadership Council

### Client References

**Project:** Clipper Fare Payment System

**Contract Budget:** \$16.4M

**Employer and Role:** CH2M HILL, Project Manager

**Client Contact:** Lynn Valdivia, Metropolitan Transportation Commission, Principal, (415) 778-6766

**Project:** Golden Gate Ferry Electronic Fare System

**Contract Budget:** \$400k

**Employer and Role:** Booz Allen Hamilton, Project Manager

**Client Contact:** Jennifer Mennucci, Golden Gate Bridge, Highway and Transportation District, Program Manager, (415) 923-2358

**Project:** Honolulu Fare System

**Contract Budget:** \$2M

**Employer and Role:** CH2M HILL, Project Manager

**Contact:** Whitney Birch, Honolulu Authority for Rapid Transportation, Program Manager, (808) 768-6282