



MEMORANDUM

TO: HPTE BOARD OF DIRECTORS
FROM: KELLY BROWN, HPTE TOLLING OPERATIONS MANAGER
DATE: February 16, 2022
SUBJECT: BLISSWAY PHASE 2 PILOT

Purpose and Requested Action

At the July 14, 2021 Board meeting, the Board directed HPTE staff to enter into Phase 2 of a multi-phase Pilot with Blissway, Inc. (Blissway) to test the Blissway Wireless Autonomous Lane Enforcement (WAL-E) roadside toll equipment technology. The technology is designed to enforce proper Express Lane usage by detecting and recognizing license plate information and other vehicle identification such as make or color. Staff presents the Blissway Phase 2 Pilot Statement of Work for Board approval.

Background

Blissway is the first company to offer tolling-as-a-service turnkey solutions, using cutting-edge artificial intelligence in computer vision and machine learning and borrowing from state-of-the-art yield management practices in the airline industry. Blissway is developing software that they claim will maximize throughput and simultaneously optimize revenue 24/7. At the same time, automatic license plate reading cameras and vehicle occupancy verification technologies deliver near-perfect lane enforcement and occupancy validation.

For your reference, Attachment A (Blissway Info Packet) describes the scope of Phase 2 of the pilot and the responsibilities of each party (HPTE and Blissway). In summary, Phase 2 activities include:

- Developing, testing, and demonstrating the ability of the Blissway System to accurately trip build in a long segment of road that includes multiple entries and exits. The goal is to achieve the following metric:
 - A trip assembly precision of $\geq 99.9\%$. This is, less than 0.1% of all formed trips have the wrong vehicle information or the wrong road segments.
- Provide an array of novel safety features by detecting and documenting (i.e., proofs such as photos, license plate plus additional vehicle fingerprints, and timestamps of the vehicle using the express lane) vehicles:
 - That are weaving around toll gantries to avoid payment
 - With tampered plates (tinted shields, for example)
 - Using the facility outside operating hours
 - Using the facility but unauthorized to do so, such as trucks or trailers

Board Options and Recommendations

1. Staff recommends that the Board direct staff to enter into an MOU with Blissway to conduct the Phase 2 pilot to test their trip building solution and novel safety features.
2. Deny the request for moving into Phase 2 of the Blissway Pilot and allow the Phase 1 Blissway pilot to expire on 12/31/2022.

Next Steps:

If the Board directs staff to enter into an MOU with Blissway to conduct the Phase 2 pilot:

1. Staff will draft an MOU between HPTE and Blissway for the Phase 2 pilot
2. Staff will present the MOU for approval at a future HPTE board meeting

Attachments

Attachment A: Blissway Pilot Phase 2 Statement of Work

EXHIBIT A – STATEMENT OF WORK

1. Purpose

CTIO is entering into this Agreement with Blissway Inc. (“Blissway”) for Phase 2 of a pilot program.

Phase 1 consisted in developing, testing, and demonstrating the ability of the Company’s Wireless Autonomous Lane Enforcer (WAL-E) roadside toll equipment (collectively, the “System”) to achieve the following metrics in a narrow segment of road without entries or exits,

- An uptime of $\geq 99.9\%$
- A vehicle detection rate of $\geq 99.95\%$. This is, capturing images whenever a vehicle has crossed a WAL-E’s field of vision
- A human-readable capture rate of $\geq 99\%$. This is, leakage under 1% ¹ because of inability to capture a clear vehicle image
- A vehicle identification rate of $\geq 99.95\%$. This is, for human-readable captures, properly identifying a vehicle by extracting license plate information and other fingerprints such as make, model, and at certain times of day, color

Phase 2 consists of developing, testing, and demonstrating the ability of the System to,

- Accurately trip build in a long segment of road that includes multiple entries and exits. The goal is to achieve the following metric,

A trip assembly precision of $\geq 99.9\%$. This is, less than 0.1% of all formed trips have the wrong vehicle information or the wrong road segments.

The current trip building issue at the I-70 Mountain Corridor stems from an administrative consideration that triggers a technical challenge: the business rules dictate that during a four-hour window, a vehicle may only be charged once per each direction (i.e. westbound or eastbound). For a License Plate Toll (LPT) account, this could mean multiple images at different toll points that must be reconciled into a single trip. ExpressToll accounts can potentially have a compounded version of this problem if one of the RFID points fails to read a transponder, generating a set of images instead that must now be reconciled with transponder reads. These two variants necessitate costly manual review.

Blissway solves this by: (1) bypassing transponders and instead capturing vehicle fingerprints that go beyond license plate information – in particular, make, model, and during certain times of day, color; (2) sophisticated data crunching to deliver a fully-formed trip/transaction with a very high degree of precision and little manual review.

¹ Does not include inexistent or obstructed plates, such as bicycle racks.

- Provide an array of novel safety features by detecting and documenting (i.e., proofs such as photos, license plate plus additional vehicle fingerprints, and timestamps of the vehicle using the express lane) vehicles,
 - Weaving around toll gantries to avoid payment
 - With tampered plates (tinted shields, for example)
 - Using the facility outside operating hours
 - Using the facility but unauthorized to do so, such as trucks or trailers

These transactions are, for the most part, either invisible or/and leakage to a traditional roadside toll system.

Blissway will allow CTIO to not only observe the occurrences, but to charge the violators via proof of use.

In exchange for the opportunity to demonstrate the capabilities of the System, Blissway shall provide the Work to CTIO at no cost.

2. Blissway Responsibilities

Blissway is responsible for obtaining any permits necessary to implement and complete the Work pursuant to this Agreement and will coordinate with CTIO on all matters. Blissway shall provide all oversight, direction, and resources for all Work, as directed by CTIO or CDOT.

The Work shall include the deployment, and occasional maintenance, of the Company's roadside hardware. Blissway shall:

- Remove their equipment, consisting of six WAL-E devices, from I-70 Mountain Express Lane eastbound corridor
- Install up to twenty (20) WAL-E devices along the I-70 Mountain Express Lane westbound corridor
- For the placement and maintenance of such devices, Blissway shall take into consideration, at a minimum, the safety of motorists and Company and State personnel
- Devices shall be placed in the median and protected by the roadway's guardrails
- The installation of the first ten WAL-E devices is scheduled to be completed within a week, notwithstanding Region 1 and FHWA's construction schedule and procedures which may require additional diligence. Installation for the remaining ten WAL-E devices will be determined on a need basis.

3. Placement Locations

Phase 2 consists of up to twenty WAL-E devices deployed over a stretch of ten miles on I-70 westbound, in ten locations extending approximately between the town of Lawson on the west and the town of Idaho Springs on the east (see below).

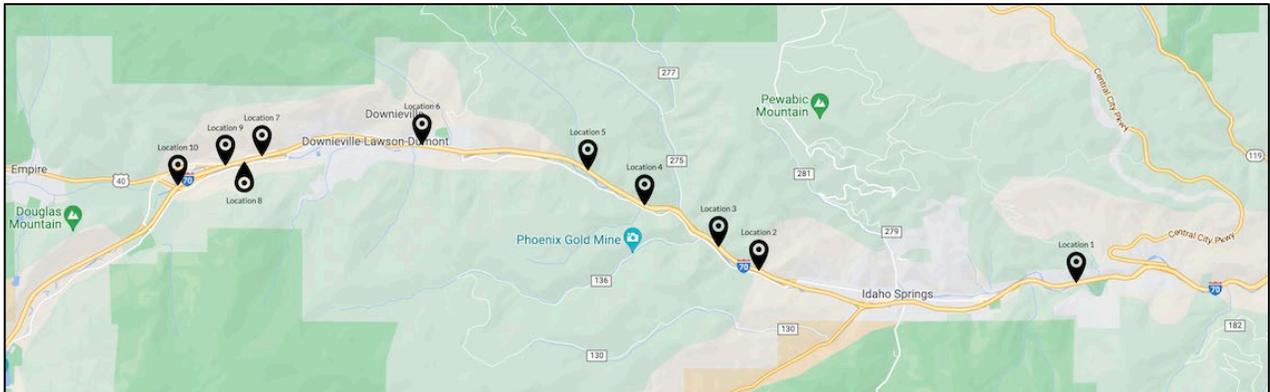


Figure 1. WAL-E placements map view



Figure 2. Location 1 (39.74426, -105.4786)



Figure 3. Location 2 (39.74605, -105.54076)



Figure 4. Location 3 (39.74915, -105.54818). *THIS VIEW IS FROM EASTBOUND, as the grassy median can be better observed*



Figure 5. Location 4 (39.75607, -105.56353). *THIS VIEW IS FROM EASTBOUND, as the grassy median can be better observed*



Figure 6. Location 5 (39.76101, -105.57413)

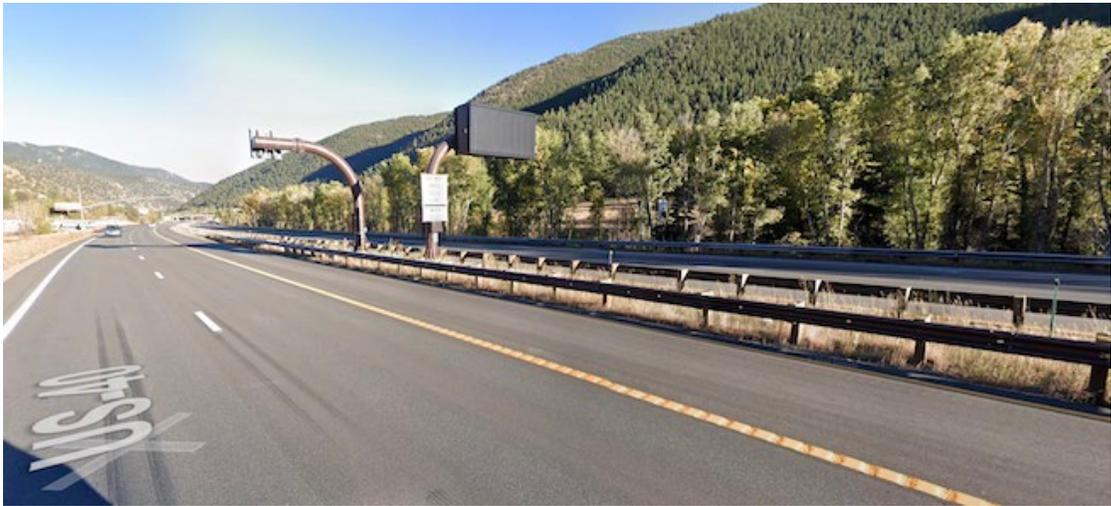


Figure 7. Location 6 (39.76517, -105.60788)



Figure 8. Location 7 (39.76348, -105.63801)



Figure 9. Location 8 (39.763, -105.64061)



Figure 10. Location 9 (39.76248, -105.64341)



Figure 11. Location 10 (39.75877, -105.65536)

4. General Blissway Activities

- A. Installation activities will be completed by Blissway technicians and engineers.
- B. Blissway will provide all installation components required to provide power and connectivity to the System.
- C. Installation/tuning will be planned to be performed during mutually agreed hours, subject to CDOT approval. Blissway personnel and subcontractors have agreed to perform installation and tuning during overnight hours if the impact of the Work on the roadway is deemed significant during the week and/or weekends.
- D. It is estimated that no roadway closures will be needed for this Pilot as the parking and work will be performed in areas protected by guardrails and only during days in which the Mountain Express Lane is closed. If, however, CDOT Region 1 deems it necessary, Maintenance of Traffic (i.e. cones, attenuator truck, etc.) could be needed during equipment installation.
- E. Images will be analyzed using Blissway's proprietary algorithms to determine license plate information and other vehicle fingerprints such as make or color.
- F. Data collection and analysis will commence upon completion of all installation and calibration tasks (see “Testing and Success Criteria” below).
- G. During the implementation Blissway will:
 - Park any equipment in a protected area designated by CTIO and CDOT; and
 - Set up, calibrate, train, and test the System software.



Figure 12. An example of the roadside hardware to be installed in Phase 2

5. CTIO Responsibilities

CTIO will:

- A. Assist Blissway to obtain any permits necessary to conduct the Work.
- B. Assist in providing access to required State equipment/property for the Work.
- C. Provide Blissway with plans that shows the location of the existing equipment for the sites specified in section 3.
- D. Provide Blissway with periods of time of lane closures for Blissway to perform the Work, if deemed necessary and subject to FHWA and CDOT approval.

6. Testing and Success Criteria

To demonstrate Blissway system's ability, a combination of simulated and scripted testing with an unscripted volume demonstration will be conducted. This will also include a comparative analysis between Blissway's roadside technology and the existing CTIO toll system of record.

The specifics of testing (and associated success criteria) exceed the purpose of this document and will be agreed separately.

7. Results and Documentation

Starting April 30, 2022, Blissway will deliver to CTIO a quarterly report containing the testing described in "Testing and Success Criteria", as well as other data, statistics, or reports that CTIO deems of interest.

To assist in the installation and planning for the Work, Blissway will provide the following documentation to CDOT /CTIO for review: overall installation schematic diagram for project sites prior to installation.

8. Schedule

Blissway will coordinate with CDOT/CTIO in installing and testing the System. Start date and time will be mutually agreed to by CDOT/CTIO and Blissway. Blissway will provide adequate notice to CDOT/CTIO for scheduling of its responsibilities. Current schedule is estimated to be as follows, subject to approval:

Calibration Period between the Effective Date and April 30, 2022, date after which Blissway will start sharing the collected data with CTIO via quarterly reports.

9. **Image Analysis**

A. **Storage**

- Images will be stored for the duration of the Agreement and for 60 days post completion of the data gathering phase in unredacted form.

B. **Classification**

- Images will be classified into various categories, as requested by CTIO.

10. **Decommissioning**

- A. System implementation shall not exceed a period of 360 days (the “**Test Period**”).
- B. CTIO, in its sole discretion, shall provide a 45-day notice to Blissway to remove the installed System.
- C. Decommissioning shall comply with FHWA and CDOT Region 1 guidelines.
- D. At the end of the Test Period, CTIO may, in its sole discretion, allow the pilot to run for additional time.
- E. All test equipment and cabling shall be removed from the site and site remediation shall return the site to its original condition.