README for Smarter Intersections Pilot Project dataset.
Bureau of Transportation Statistics (BTS), U.S. Department of Transportation (USDOT)
2025-07-10

LINKS TO DATASET

A. Dataset archive link: https://doi.org/10.18738/T8/RG94KT
B. Data Management Plan Archive Link: https://doi.org/10.48321/D1D37C

SUMMARY OF DATASET

The Smarter Intersections Pilot Project deployed and tested smart infrastructure technology in College Station, Texas to achieve two main goals: 1) Improve intersection safety and mobility for pedestrians, bicyclists, and those using other mobility devices, including people with mobility and visual disabilities: and 2) Demonstrate that the technology functions as proposed. The project used Cellular Vehicle-to-Everything (C-V2X) units at five intersections in tandem with on-board units (OBUs) in transit vehicles to alert pedestrians and bicyclists using crosswalks and bike lanes of turning buses through auditory and visual cues. It is also incorporated that information into a Smart Phone application that blind/low-vision people can use to navigate an intersection. Further, the project simulates how the information can be communicated to an automated shuttle and an emergency vehicle approaching an intersection.

TABLE OF CONTENTS

A. GENERAL INFORMATION
---

0. Title of Dataset: Smarter Intersections Pilot Project

1. Description of Dataset:
The Smarter Intersections Pilot Project deployed and tested smart infrastructure technology in College Station to achieve two main goals: improve intersection safety and mobility for pedestrians, bicyclists, and mobility device users, including people with mobility and visual disabilities; and demonstrate that the technology functions as proposed. Technologies used in the project fell within the categories of connected vehicles, intelligent sensor-based infrastructure, and smart technology traffic signals. The project used cellular vehicle-to-everything (C-V2X) roadside units (RSUs) at five intersections in tandem with onboard units (OBUs) in transit vehicles to do the following:
• Alert pedestrians and bicyclists using crosswalks and bike lanes of turning buses. This alert was provided through auditory and visual cues from pole-mounted devices that receive information from the C-V2X RSUs.
• Explore the feasibility of incorporating related vehicle information into a smartphone application that blind/low-vision (B/LV) individuals could use to navigate the intersections.
• Communicate with automated shuttles to alert them of turning transit and emergency response vehicles at the intersection.
The project provides visual and audible alerts to pedestrians and bicyclists that a bus is turning at the

intersection. A bus equipped with an OBU broadcasts a Basic Safety Message (BSM) 10 times a second as it is approaching the intersection. The RSU at the intersection receives the BSM and sends it to a laptop computer inside the signal cabinet, which activates the visual and audio alert based on the signal status, detector status, and the bus position.
As part of the pilot project, TTI researchers monitored the performance of the system over a four-month period from November 2024 through February 2025. Examples of the data logs are provided in the data package. The project also simulated communication with an automated shuttle and a fire truck. Information on the process used for these simulations and the results of the automated shuttle simulation are provided as separate file. Files on the script used to interview pedestrians and bicyclists at the intersection to obtain their feedback and results are provided. The questions and results from the online survey of Texas A&M University bus operators are included in the data package. The project also developed and tested a beta smartphone app for use by B/LV individuals. Files with the interview questions used with B/LV individuals in developing and testing the app and the results are provided. As required with research involving human subjects, protocols, scripts, recruitment process, ,and other items for the interviews and surveys conducted during the project were developed and submitted to the Texas A&M University Institutional Review Board (IRB). All of the protocols were approved.

2. Dataset archive link: https://doi.org/10.18738/T8/RG94KT

3. Authorship Information:

Principal Data Creator or Data Manager Contact Information
Name: Katie Turnball
ORCID: https://orcid.org/0000-0002-8841-4990
Institution: Texas A&M Transportation Institute
Address: 1111 RELLIS Parkway, Bryan, TX 77807
Email: k-turnbull@tti.tamu.edu

Associate Data Creator or Data Manager Contact Information
Name: Mohammad Askariyeh
ORCID: https://orcid.org/0000-0001-5376-8978
Institution: Texas A&M Transportation Institute
Address: 1111 RELLIS Parkway, Bryan, TX 77807
Email: m-askariyeh@tti.tamu.edu

Organizational Contact Information
Name: Texas A&M Transportation Institute
Institution: Texas A&M Transportation Institute
Address: 1111 RELLIS Parkway, Bryan, TX 77807

4. Date of data collection and update interval: Monitoring from November 2024 through February 2025 at five intersections.

5. Geographic location of data collection: Five intersections in College Station, Texas, United States of America

6. Information about funding sources that supported the collection of the data: SMART Grant, U.S. Department of Transportation

---
B. SHARING/ACCESS & POLICIES INFORMATION
---
0. Recommended citation for the data:
Turnbull, Katie, and Mohammad Askariyeh. 2025, "Smarter Intersections Pilot Project", Texas Data Repository, https://doi.org/10.18738/T8/RG94KT

1. Licenses/restrictions placed on the data:

2. Was data derived from another source?:
No.

3. This dataset and its documentation was created and shared to meet the requirements enumerated in the U.S. Department of Transportation's "Plan to Increase Public Access to the Results of Federally-Funded Scientific Research" Version 1.1 << https://www.transportation.gov/sites/dot.gov/files/docs/Official%20DOT%20Public%20Access%20Plan%20ver%201.1.pdf >> and guidelines suggested by the DOT Public Access website << https://ntl.bts.gov/publicaccess/ >>, in effect and current as of April 10, 2019.

C. DATA & RELATED FILE OVERVIEW
---

1. File List for the FinalDoc.zip collection
A. 01 Repository Data Package Content.docx
Word file of Smarter Intersection Pilot Project Repository Data Package Content

B. 01 Repository Data Package Content.pdf
PDF file of Smarter Intersection Pilot Project Repository Data Package Content

C. 02 Project Overview and Pilot Intersections.docx
Word file with overview of project and map of the five intersections.

D. 02 Project Overview and Pilot Intersections.pdf
PDF file with overview of project and map of the five intersections.

E. 03 SmartIntersection_DataDictionary.csv
Excel file with the data dictionary for the intersection traffic signal data.

F. 03 SmartIntersection_DataDictionary.pdf
PDF file with the data dictionary for the intersection traffic signal data.

G. 04_CSVFiles_TrafficSignalLogs.zip
CSV files with the traffic signal logs for the five intersections.
a. 41-George Bush and Penberthy Boulevard
b. 42_University Drive and Boyett Street
c. 43_Texas Avenue and New Main Drive
d. 44_Spring Loop and Tarrow Street
e. 45_Harvey Mitchell Parkway and Welsh Avenue

H. 05 Simulating Communications with an Automated Shuttle and a Fire Truck.docx
Word file summarizing the procedures and output of communications with an automated shuttle and a fire truck.

I. 05 Simulating Communications with an Automated Shuttle and a Fire Truck.pdf
PDF file summarizing the procedures and output of communications with an automated shuttle and a fire truck.

J. 06 documenting simulation of communicating with and automated shuttle.pcap
.PCAP file documenting simulation of communicating with an automated shuttle. Download the Wiresharkapplication to read the file.

K. 07 Ped-Bike Count Summaries 06252024.docx
Word files with summary of pedestrian counts at the five intersections (no original video data as College Station data used was deleted after use per city guidelines).

L. 07 Ped-Bike Count Summaries 06252024.pdf
PDF files with summary of pedestrian counts at the five intersections (no original video data as College Station data used was deleted after use per city guidelines).

M. 08 Intercept Interview Script for Pedestrians and Bicyclists.docx
Word file with the intercept interview questions.

N. 08 Intercept Interview Script for Pedestrians and Bicyclists.pdf
PDF file with the intercept interview questions.

O. 09 Bus Operator Survey 2.docx
Word file with the online bus operator survey.

P. 09 Bus Operator Survey 2.pdf
PDF files with the online bus operator survey.

Q. 10 Initial Online Interview with BLV Individuals.docx
Word files of the Blind/Low Vision (B/LV) online interviews on interest in a beta smartphone app.

R. 10 Initial Online Interview with BLV Individuals.pdf
PDF files of the Blind/Low Vision (B/LV) online interviews on interest in a beta smartphone app.

S. 11 Interview Script for Blind Low Vision Individuals Testing the Smartphone App.docx
Word files on the interviews conducted testing the app with B/LV and typical-sight individuals at one of the intersections.

T. 11 Interview Script for Blind Low Vision Individuals Testing the Smartphone App.pdf
PDF files on the interviews conducted testing the app with B/LV and typical-sight individuals at one of the intersections.

U. 12 - Penberthy+Ped+Surveys+Feb+2025+-+Smarter+Intersections_April+11+2025_09.06.pdf
Excel file with intercept survey responses (all possible personal identifiers removed).

V. 12 - Penberthy+Ped+Surveys+Feb+2025+-+Smarter+Intersections_April+11+2025_09.06.xlsx
PDF file with intercept survey responses (all possible personal identifiers removed).

W. 13 Bus+Operator+Survey+2+Feb+2025_March+5+2025_09.02.pdf
PDF file with online bus operator survey responses (all possible personal identifiers removed).

X. 13 Bus+Operator+Survey+2+Feb+2025_March+5+2025_09.02.xlsx
Excel file with online bus operator survey responses (all possible personal identifiers removed).

Y. 14 Initial Online Interviews with BLV Individuals.docx
Word file summarizing the results of the initial B/LV online interviews.

Z. 14 Initial Online Interviews with BLV Individuals.pdf
PDF file summarizing the results of the initial B/LV online interviews.

AA. 15 Testing the Beta BLV App with BLV and Typical-Vision Individuals.docx
Word file summarizing the test of the B/LV app at one of the intersections by B/LV and typical-sight individuals (all possible personal identifiers removed).

BB. 15 Testing the Beta BLV App with BLV and Typical-Vision Individuals.pdf
PDF file summarizing the test of the B/LV app at one of the intersections by B/LV and typical-sight individuals (all possible personal identifiers removed).

CC. 16 DMP_Smarter_Intersections_Pilot_Project.pdf
PDF of the Data Management Plan for this Project. It can also be accessed here: https://doi.org/10.48321/D1D37C

DD. 17 Implementation Report.docx
The Final Implementation Report for this project.

D. METHODOLOGICAL INFORMATION
---

1. Description of methods used for collection/generation of data:
Technologies used in the project fell within the categories of connected vehicles, intelligent sensor-based infrastructure, and smart technology traffic signals. The project used cellular vehicle-to-everything (C-V2X) roadside units (RSUs) at five intersections in tandem with onboard units (OBUs) in transit vehicles to do the following:
• Alert pedestrians and bicyclists using crosswalks and bike lanes of turning buses. This alert was provided through auditory and visual cues from pole-mounted devices that receive information from the C-V2X RSUs.
• Explore the feasibility of incorporating related vehicle information into a smartphone application that blind/low-vision (B/LV) individuals could use to navigate the intersections.
• Communicate with automated shuttles to alert them of turning transit and emergency response vehicles at the intersection.
The project provides visual and audible alerts to pedestrians and bicyclists that a bus is turning at the intersection. A bus equipped with an OBU broadcasts a Basic Safety Message (BSM) 10 times a second as it is approaching the intersection. The RSU at the intersection receives the BSM and sends it to a laptop computer inside the signal cabinet, which activates the visual and audio alert based on the signal status, detector status, and the bus position.

2. Instrument- or software-specific information needed to interpret the data:
The total size of the zip file is 30.8 MB. The .docx file is a Microsoft Word file, which can be opened with Word and other free word processor programs, such as Kingsoft Writer, OpenOffice Writer, Apache OpenOffice, and ONLYOFFICE. The Portable Document Format (PDF) file format was developed by Adobe Systems and represents two-dimensional documents in a device-independent and resolution-independent format. There are PDF readers available on many platforms, such as Xpdf, Foxit, and Adobe's own Adobe Acrobat Reader. PDF readers/viewers or online services for basic functions are generally free (for more information on .pdf files and software, please visit https://www.file-extensions.org/pdf-file-extension). A TAB file is a very simple textual data format which allows tabular data to be exchanged between applications that use different internal data formats. These files can be opened using open-source programs such as Notepad or other open source, tabular file readers. These files are more commonly known as .tsv files (for more information on .tab files, please visit https://www.file-extensions.org/tab-file-extension-tab-separated-value). The .xlsx files are Microsoft Excel files, which can be opened with Excel, and other free available spreadsheet software, such as OpenRefine. The .txt file type is a common text file, which can be opened with a basic text editor. The most common software used to open .txt files are Microsoft Windows Notepad, Sublime Text, Atom, and TextEdit (for more information on .txt files and software, please visit https://www.file-extensions.org/txt-file-extension).

E. DATA-SPECIFIC INFORMATION
---

1. CTPP Data Part 3 data tables

A. Number of variables (columns): 27

B. Number of cases/rows:

C. Each row represents: An event

D. Data Dictionary/Variable List:
Date (Time attribute)
Hour (Time attribute- Hour)
Min (Time attribute- Minute)
Second (Time attribute- Second)
Millisecond (Time attribute- Millisecond)
BusSign-AudioMsg (Type of event taking place)
Status (True=Turning bus sign on and playing Audio message False=Turning bus sign off and stop playing audio message)
TurnMovement (Turn direction (Left/Right))
PrevID (ID of Bus previously detected in turn lane)
CurrID (ID of turning Bus the warning being provided for)
PrevDist (The last distance of the bus from the center of intersection when the bus was detected)
CurrDist (The current distance of the bus from the center of the intersection when the warning was provided)
InTurnBay (If the bus is in the turn bay or not)
BusDetected (Indicates a Bus planning to turn at the intersection has been detected)
FirstBusDetection (The first detection of the Bus planning to turn at the intersection)
TT (Travel time to the center of the intersection (second))
PedStatus (If a pedestrian was detected at the intersection)
PhaseStatus (If the light is green for the turning bus or not)
CurrPhaseStatus (If the light is green for the turning bus or not)
Latitude (The bus location latitude at the intersection when warning was provided/turned off)
Longitude (The bus location longitude at the intersection when warning was provided/turned off)
Speed (Bus speed (mph))
"Heading (Bus direction between zero to 360 (degrees): zero is northbound, 90 is east, 180 is south and 270 is west)"
"Direction (Character based description of direction (NB, SB, EB, WB))"
PedDetectors (Pedestrian detector for the crossing conflicting with the bus turn)
Phases (Traffic signal controler phase controling the bus truning movement)
Error (Status/Error)

F. UPDATE LOG

This [FinalDoc] file was originally created on 2025-07-10 by [Katie Trunbull] [https://orcid.org/0000-0002-8841-4990] [Senior Research Fellow at Texas A&M University], [K-Turnbull@tti.tamu.edu]

[Note changes or update to the readme.txt file, e.g.:]

2025-07-10: Original file created