Plan Overview

A Data Management Plan created using DMP Tool

Title: City of Phoenix Passive Detection Technology for Bikes, Pedestrians and Motorists

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Funder: United States Department of Transportation (DOT) (transportation.gov)

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Grant: 69A3552341016

Template: SMART Grants Stage 1 Data Management Plan (DMP)

Project abstract:

There are two components to the proposed project. The first component is passive detection for bikes and pedestrians along the Grand Canal. This component includes installation of passive pedestrian, bicycle, and motorist detection technology at 10 locations on a portion of the Grand Canal. Each of these locations currently have high intensity activated crosswalks (HAWKs) installed that will be upgraded to include passive detection. The second component in partnership with Maricopa Association of Governments (MAG) and business partner NoTraffic is to install advanced video detection cameras at 20 intersections that will collect traffic videos that will run appropriate algorithms, extract traffic counts, and send the data to NoTraffic's cloud-based software.

Start date: 03-01-2024

End date: 02-28-2026

Last modified: 07-08-2024

Copyright information:

City of Phoenix Passive Detection Technology for Bikes, Pedestrians and Motorists

Project Contact Information

Please provide as much of the the following information as possible:

1. **Name of the project;**
2. **Grant number;**
3. **Name of the person submitting this DMP;**
4. **ORCiD of the person submitting this DMP (need an ORCID? Register here: https://orcid.org/);**
5. **Email and phone number of the person submitting this DMP;**
6. **Name of the organization for which the person submitting this DMP is working;**
7. **Email and phone number for the organization;**
8. **Link to organization or project website, if applicable; and,**
9. **Date the DMP was written.**

- City of Phoenix Passive Detection Technology for Bikes, Pedestrians and Motorists
- Grant Number: 69A355234101 SMARTFY22N1P1G04
- Leticia Vargas in c/o Simon Ramos
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- City of Phoenix Street Transportation Department
- simon.ramos@phoenix.gov
- February 21, 2024

Data Description

Please provide as much information as possible:

1. **Provide a description of the data that you will be gathering in the course of your project or data from a third party that you will re-use, if any;**
    1. **If there will be no data collected or re-used from another source, state that this is case;**
        1. **If you answered "No data" above, then you are finished and may skip the most of the steps and sections below, after you:**
            1. **Save your DMP as it exists;**
            2. **Submit it to your Grant Manager or the NTL staff for review.**
2. **Address the expected nature, scope, and scale of the data that will be collected, as best as you can at this stage;**
3. **As best as you can, describe the characteristics of the data, their relationship to other data, and provide sufficient detail so that reviewers will understand any disclosure risks that may apply;**
    1. **If data might be sensitive, please describe how you will protect privacy and security, if you know that now;**
    2. **You may need to update your DMP later to add more detail;**
4. **Discuss the expected value of the data over the long-term.**

1. The City of Phoenix is planning to install advanced video detection cameras at 20 intersections to collect traffic videos. The software will run appropriate algorithms, extract traffic counts, and push all data to NoTraffic's cloud-based software. The software will optimize traffic signal operations and provide detailed traffic signal performance measures, such as red-light running events, speed data, and real-time alerts.

2. Data in each of the six (6) categories can be described using a 0 - 4 category system modeled after the NASA Earth Observing System Data and Information System (EOSDIS)(1) where level 0 data is raw data that has not been processed or data that should not be shared and includes captured video that will be used for verification and validation. Level 0 data may require considerations for privacy and security. Level 1 is data that has had some level of processing but may contain information that should only be used by the system integration team for system testing purposes such as detailed trajectories of VRUs. Level 2 data is data that has been aggregated and may be useful for describing the operation of the system such as average vehicle delay, stops, etc. and number of VRUs detected by category (pedestrians, bicycles, other). Level 3 data includes periodic summary data such as the number of VRU's detected at each location per hour, etc. and traffic performance measures. Level 4 data is model data that has been derived from other data for the purposes of characterizing system performance or assessing impact of the City of Phoenix SMART Grant demonstration to support the decision to move to city-wide deployment.

Data from the infrastructure applications, such as traffic signal system data, will be classified based on its availability publicly (level 3) or not (level 0 of 1) and application data, such as PSM broadcast over the 5.9GHz spectrum or sent to smartphones will be classified as level 3. Data from warnings sent to C-V2X equipped vehicles or individual smartphones will not contain any participant identification information.

The goal of the project is to demonstrate (as part of the planning process) that these video based sensor systems can have significant impact on safety, mobility, and the environment when deployed across the entire city of Phoenix. The planning deployment locations were selected to address critical needs as well as to engage with diverse communities. The data (level 3 and level 4) will be used to characterize the operations and impact of the system.

https://www.earthdata.nasa.gov/engage/open-data-services-and-software/data-information-policy/data-levels

3. The locations of the HAWK and traffic signals is well known public data. Data about the infrastructure technology, e.g., the video detection systems used for intelligent traffic control and detection of vulnerable road users, is part of the city of Phoenix ATMS and controlled by the partners (NoTraffic and Iteris). Each of these organizations provides cybersecurity systems to protect the data from being accessed. The 5.9GHz wireless communications system is secured as part of the city of Phoenix ATMS system and the messages are signed using the MCDOT provides SCMS system (supported for the region). Messages communicated over cellular systems, such as Verizon, are protected by the cellular providers security systems. No PII data will be communicated in this project.

This section of the plan will be updated as details become available.

4. Over the long term, the data generated and archived from this project will support planning decisions for the broad implementation throughout the city of Phoenix. In a fully operational system beyond the pilot, there will not be a need to archive much of the level 0 and level 1 data unless there is a justified case for further analysis. It is anticipated that safety, mobility, and environmental impacts will be significantly improved and the case for further deployments will be supported by the data.

Data Format and Metadata Standards Employed

Please provide as much information as you can:

1. **Describe the anticipated file formats of your data and related files;**
2. **To the maximum extent practicable, your DMP should address how you will use platform-independent and non-proprietary formats to ensure maximum utility of the data in the future;**
    1. **If you are unable to use platform-independent and non-proprietary formats, you should specify the standards and formats that will be used and the rationale for using those standards and formats.**
3. **Identify the metadata standards you will use to describe the data.**
    1. **At least one metadata file should be a DCAT-US v1.1 (https://resources.data.gov/resources/dcat-us/) .JSON file, the federal standard for data search and discovery.**

Data that is to be archived will be collected in the cloud systems used by NoTraffic and Iteris and in the city of Phoenix ATMS in either standard video format (e.g., mpeg,) or in CSV format periodically (e.g., hourly or daily). As analysis methods are developed, the data may be transferred into other formats that support efficient searching and processing such as Apache Parquet (https://www.databricks.com/glossary/what-is-parquet), .db, or possibly STAC (SpatioTemporal Asset Catalogs).

A metadata plan will be developed using the DCAT-US format and will be stored with the data in the city of Phoenix ATMS and in the partner systems. The meta data will describe all data elements that are part of the city of Phoenix SMART Grant advanced technology deployments.

To the extent possible, open-access data will be utilized. If proprietary formats are used, documentation detailing the reason for using such data and software required to access such data will be provided.

Access Policies

In general, data from DOT-funded projects must be made publicly accessible. Exceptions to this policy are: data that contain personally identifiable information (PII) that cannot be anonymized; confidential business information; or classified information. Protecting research participants and guarding against the disclosure of identities and/or confidential business information is an essential norm in scientific research. Your DMP should address these issues and outline the efforts you will take to provide informed consent statements to participants, the steps you will take the protect privacy and confidentiality prior to archiving your data, and any additional concerns. In general, in matters of human subject research, your DMP should describe how your informed consent forms will permit sharing with the research community and whether additional steps, such as an Institutional Review Board (IRB), may be used to protect privacy and confidentiality. Additionally, when working with, or conducting research that includes Indigenous populations or Tribal communities, researcher will adhere to the CARE Principles for Indigenous Data Governance https://www.gida-global.org/care and make an explicit statement to that effect in this portion of the DMP.

Please provide as much information as possible:

1. **Describe any sensitive data that may be collected or used;**
2. **Describe how you will protect PII or other sensitive data, including IRB review, application of CARE Principles guidelines, or other ethical norms and practices;**
    1. **If you will not be able to deidentify the data in a manner that protects privacy and confidentiality while maintaining the utility of the dataset, you should describe the necessary restrictions on access and use;**
3. **Describe any access restrictions that may apply to your data;**
4. **If necessary, describe any division of responsibilities for stewarding and protecting the data among Principal Investigators or other project staff.**

Access to the data will be based on Data Use Agreements (see section 5 below) and the 0-4 levels established for each type of data.

As stated in the Data Description section, no PII data will be communicated in this project.

Re-use, Redistribution, and Derivatives Products Policies

Recipients are reminded:

1. **Data, as a collection of facts, cannot be copyrighted under US copyright law;**
2. **Projects carried out under a US DOT SMART Grants is federally funded; therefore, as stated in grant language:**
    1. **Recipients must comply with the US DOT Public Access Plan, meaning, among other requirements, project data must be shared with the public, either by the researchers or by US DOT;**
    2. **That by accepting US DOT funding through this grant, recipients have granted to US DOT a comprehensive non-exclusive, paid-up, royalty-free copyright license for all project outputs (publications, datasets, software, code, etc.). This includes all rights under copyright, including, but not limited to the rights to copy, distribute, prepare derivative works, and the right to display and/or perform a work in public; and,**
    3. **In accordance with Chapter 18 of Title 35 of the United States Code, also known as the Bayh-Dole Act, where grant recipients elect to retain title to any invention developed under this grant, US DOT retains a statutory nonexclusive, nontransferrable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any such invention throughout the world.**

Please provide as much information as possible:

1. **Describe who will hold the intellectual property rights for the data created or used during the project;**
2. **Describe whether you will transfer those rights to a data archive, if appropriate;**
3. **Identify whether any licenses apply to the data;**
    1. **If you will be enforcing terms of use or a requirement for data citation through a license, indicate as much in your DMP;**
4. **Describe any other legal requirements that might need to be addressed.**

Different data belongs to different project partners and a Data Use Agreement will be developed between partners based on the 0-4 level system described above and the intended use. For example,

traffic signal phase and timing data, detected vehicle and vulnerable road user data belongs to the city of Phoenix. PSM data that is generated from the vulnerable road user sensors will also belong to the city of Phoenix. Use of the data by others will require development of a data use agreement that describes the intended use and procedures for ensuring safety and security. These data agreements will be developed on an as needed basis.

In summary, the intent of the project team is to use open-access format data and make it available to public. Where making of data public is not feasible, data use agreements will be required.

Archiving and Preservation Plan

Please provide as much information as possible:

1. **State where you intend to archive your data and why you have chosen that particular option;**
2. **Provide a link to the repository;**
3. **You must describe the dataset that is being archived with a minimum amount of metadata that ensures its discoverability;**
    1. **Whatever archive option you choose, that archive should support the capture and provision of the US Federal Government DCAT-US Metadata Schema https://resources.data.gov/resources/dcat-us/**
4. **In addition, the archive you choose should support the creation and maintenance of persistent identifiers (e.g., DOIs, handles, etc.) and must provide for maintenance of those identifiers throughout the preservation lifecycle of the data;**
5. **Your plan should address how your archiving and preservation choices meet these requirements.**

The team will explore a plan to use the city of Phoenix ATMS for data archiving and preservation. Similarly, NoTraffic and Iteris will develop agreements with the city of Phoenix for data archiving and preservation that cover the time periods required.

A special data repository will be considered for the city of Phoenix SMART Grant project that will include data from all six (6) categories. The details of the data repository will be determined in collaboration with the project partners and this section of the plan will be updated accordingly.

A metadata plan will be developed using the DCAT-US format.

In summary, this section will be updated during the project to reflect decisions made regarding where the final data will be stored and its public accessibility. The team intends to choose a repository that meets the requirements outlined in the USDOT Public Access Plan.
