



# Tier 1 University Transportation Center for Durable and Resilient Transportation Infrastructure (DuRe-Transp) Center Data Management Plan

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<b>Lead Institution</b>	The University of Texas at Arlington Arlington, TX
<b>Partner Institutions</b>	Howard University Washington, DC University of Puerto Rico at Mayagüez Mayagüez, Puerto Rico Missouri University of Science and Technology Rolla, MO Oregon State University Corvallis, OR Purdue University West Lafayette, IN

## Overview

The Center for Durable and Resilient Transportation Infrastructure (DuRe-Transp) is a Tier 1 University Transportation Center funded by the United States Department of Transportation (U.S. DOT) through the Bipartisan Infrastructure Law (BIL). The DuRe-Transp Center identifies research projects in 7 research themes focusing on the statutory research priority area “Improving the durability and extending the life of transportation infrastructure”. The DuRe-Transp Center is strongly committed to comply with the policies on archiving, preservation, dissemination, and sharing of data about the research projects in accordance with the US DOT Public Access Plan, available at <https://doi.org/10.21949/1520559>. We consider the DMP of DuRe-Transp Center as a living document that will be updated as the activities of the Center evolve. The Center’s Director Konsta-Gdoutos and Program Coordinator Danoglidis will have primary responsibility for developing and updating a set of consortium policies on data management, storage, access, and overseeing their implementation.

The DuRe-Transp Center requires all individual project Principal Investigators (PIs) to submit a Data Management Plan (DMP) following the guidelines of the Center’s DMP and describing how data and information resulting from the proposed project will be managed with details and be shared among partnering researchers and institutions. The DMP of each project must be completed and submitted during the Request for Proposals period. The individual project’s DMP will be reviewed and approved by the DuRe-Transp Director Konsta-Gdoutos and Program Coordinator Danoglidis and made available to the U.S. DOT grant manager. DMP is a living research management document that must be reviewed and updated at each individual project’s review stage, at least twice per year, or upon research personnel or data preservation infrastructure change. Changes to individual project’s DMPs will be forwarded to the grant manager and the National Transportation Library team of the U.S. DOT.

## Data Description

The DMP of DuRe – Transp is designed to facilitate the best practices of data documentation and promote the sharing of research results. The DMP will collect all data acquired by DuRe – Transp activities including laboratory testing, field investigations, computational methods, remote sensing, infrastructure performance, traffic conditions, numerical analyses, and societal/economic analyses. The DMP of DuRe – Transp is a living document that changes and grows through the duration of the Center; hence amendments will be made as needed throughout the duration of the Center.

The DMP of the individual research projects must be prepared and updated throughout the duration of the project and when the project is being finalized and published in accordance with the US DOT guidance for preparing DMPs, available at <https://doi.org/10.21949/1520571>. DMPs should address the following:

- Description of the data, data collection project, or data producing program
- Description of the purpose of the research
- Description of the nature and scale of generated data, e.g., numerical data, image data, text sequences, video, audio, database, modeling data, source code, etc.
- Description of methods for creating the data, e.g., simulated; observed; experimental; software; physical collections; sensors; satellite; enforcement activities; researcher-generated databases, tables, and/or spreadsheets; instrument generated digital data output such as images and video; etc
- Discussion of the period of data collection and frequency of data update
- Description of the relationship between collected data and existing data, if using existing data
- List of potential data users
- Discussion of the long-term potential value of the data for your institution and the public
- Indicate the party responsible for managing the data.

## Data Standards and Formats

The DuRe – Transp will generate several types of data related to research, leadership educational, workforce development, and technology transfer activities. To ensure that data generated from the research projects of DuRe-Transp Center can be utilized in future transportation research, PIs will store data in platform-independent, non-proprietary formats. PIs must notify the DuRe-Transp Center about the use of alternative formats during the Request for Proposals process, specifying the software and version, standards, proprietary file formats, and rationale for their use. A public version for very large datasets or sensitive data, in terms of privacy and intellectual properties – IP, that protects privacy and security will be also accessible through the Zenodo (<https://zenodo.org/>) and Mavs Dataverse (<https://dataverse.tdl.org/dataverse/uta>) repositories that conform with with the U.S. DOT Public Access Plan. Data about research projects will also be shared with U.S. DOT OST-R in the annual reports.

Data collected or generated through research activities will include:

- Laboratory and field data: Physical data, Recording data, Imaging data, and Notebooks
- Algorithms and software data from original and commercially available source codes
- Performance metrics data of DuRe – Transp research, such as: number of peer-reviewed publications and citations, publications in conference proceedings, presentations, media

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coverage of DuRe – Transp projects on internet, TV, radio and periodicals, number of implemented strategies, products, techniques, and patent applications

- Data from models and simulations. This data will be saved in batch file format, either ASCII or RTF (Rich Text Format), which can be directly read by the modeling/simulation code
- Reports, papers, graphs, figures, dissertations, and other publications. This data will be saved as Adobe PDF files, READMEs, codebooks, etc.

Data collected or generated through educational, workforce development, and technology transfer activities will include:

- Educational materials to support student research, course modules, syllabi and lecture notes in DuRe – Transp certification programs, K-12 outreach, educational software, recordings of seminars and other professional events
- Technical documents, such as TechNotes and technical presentations, prepared by DuRe – Transp researchers and students
- Instructional videos for seminars, webinars, lectures, workshops, and other events
- Images, animations, videos and other data for social media posts
- E-newsletters published in DuRe – Transp website
- Annual progress reports
- Performance metrics

Research and other data will be stored and managed under the specific management plans for each funded research project. A copy of data, or its metadata leading to the repository where the data is stored, will be submitted to the National Transportation Library. All researchers and staff must possess final datasets that are not proprietary and are in the standard data formats commonly used in the field, such as CSV, TXT, etc. Moreover, the Center’s Director, Program Coordinator and PIs will be responsible for data accessibility and relevant metadata. PIs should be prepared to describe their project’s quality control measures, tools, and software necessary to read their datasets, and any supplemental documentation needed to understand the collected data. This can be done when the data is uploaded to an open-access data repository by providing a brief description of the data collection process.

### **Data Access and Protecting Sensitive Data**

The data resulted in part or fully from the project activities funded by the DuRe-Transp Center will be made publicly available as described in the section “Archiving and Preservation”. Exceptions to this policy are applied when the data contain personally identifiable, confidential, and classified information. PIs are responsible for outlining the measures they will implement to ensure privacy and confidentiality before archiving the data. They will also describe how responsibility for safeguarding and protecting the data will be divide among the staff of the project.

Researchers will articulate their plans for obtaining informed consent from participants and outline the measures they will implement to ensure privacy and confidentiality before archiving the data. Additionally, they will address any additional concerns, such as embargo periods for data, and if applicable, describe how the responsibilities for safeguarding and protecting the data will be divided among project staff. In case of involving human subject research and sensitive information, the PI must clearly describe the measures that will be taken, such as an Institutional Review Board, to ensure the privacy, and the confidentiality of the participants and the data while maintaining the integrity of the dataset. General guidance:

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- Description of publicly shared data in terms of types of data, how the files will be shared, and how other will access them
- Indication of private or confidential information including (i) discussion about the research team will guard against disclosure of identities and/or confidential business information; (ii) a list of what processes the PI will follow to provide informed consent to the research team; and (iii) mention about the party responsible for protecting the data.
- Description of privacy, ethical or confidentiality concerns due to data sharing, if any
- Description of how the PI will deidentify the data before sharing. If not (i) identify what restrictions on access and use you will place on the data; and (ii) Discuss additional steps, if any, you will use to protect privacy and confidentiality.

The data management librarian at UTA will assist the research teams of the DuRe-Transp Center and answer any questions that arise from consortium members with data management during the data lifecycle, i.e., creation, description, accession, preservation, including but not limited to training, where appropriate and applicable.

### **Data Sharing, Re-use, and Redistribution**

The PIs must submit a copy of all final data created by the project to the DuRe-Transp Center to be deposited on Zenodo (<https://zenodo.org/>) which conforms with the U.S. DOT Public Access Plan. PIs will also submit a copy to UTA’s Mavs Dataverse Repository in the Texas Data Repository (<https://dataverse.tdl.org/dataverse/uta>) that also conforms with the U.S. DOT Public Access Plan. The University of Texas at Arlington or the home institution of the PI will hold the intellectual property rights for the data and other materials created by the project. The U.S. DOT also reserves a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use and to authorize others to use the work for government purposes.

PIs will be required to submit the recommended citation for the data source and the data license under which they used the data of others in their project DMPs. Faculty will be required to release their data in an open license for reuse, redistribution and derivative products which will be based upon the open licenses and provided by the archive. The DMP should include:

- Name who has the right to manage the data.
- Indicate who holds the intellectual property rights to the data.
- List any copyrights to the data. If so, indicate who owns them.
- Discuss any rights be transferred to a data archive.
- Describe how your data will be licensed for reuse, redistribution, and derivative products

### **Data Preservation and Archiving**

Preservation of research data is a vital aspect of scientific replicability, reproducibility, and open science. Upon completion of a research project, the PI will submit all data and metadata created by the project to the DuRe-Transp Director Konsta-Gdoutos and Program Coordinator Danoglidis. The Center’s Program Coordinator will upload the data to Zenodo and Mavs Dataverse repositories for access and data sharing. The data will be assigned a digital object identifier (DOI) upon uploading to Zenodo and Mavs Dataverse repositories. All PIs will be required to provide sufficient metadata when submitting to DuRe-Transp to ensure its discoverability. Data and metadata will be retained for the lifetime of the repository.

### **Change log:**

2023-09-15: Original draft

2023-10-05: Revisions and additions based on feedback