A Deep Dive into Public Access for Research Data

https://doi.org/10.21949/1522407

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U.S. Department of Transportation
Office of the Secretary of Transportation
Bureau of Transportation Statistics

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1. **Review of April Presentation**
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4. **Data Management, Data Curation, & Data Science**

U.S. Department of Transportation
Office of the Secretary of Transportation
Bureau of Transportation Statistics

Review of 2021-04-05 Presentation

Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results
Version 1.1

December 16, 2015

U.S. Department of Transportation

2021-04-05 Slides at:
https://doi.org/10.21949/1522406

1. **How Public Access Came to Be**
    1. Open Science
    2. Federal Policies

2. **What we Mean by Public Access**
    1. Public is aware of & can locate & analyze research outputs
    2. U.S. DOT Public Access Plan, December 2015: https://doi.org/10.21949/1503646

3. **Resources**
    1. U.S. DOT Public Access Plan Guidance Website: https://doi.org/10.21949/1503647

Deep Dive:

Public Access Plan:

1. Background & Purpose

Plan to Increase Public Access to the
Results of Federally-Funded
Scientific Research Results

Version 1.1

December 16, 2015

U.S. Department of Transportation

In December 2015, the U.S. DOT published its plan to affirm and enhance DOT's commitment to Public Access to Scientific Research results.

Deep Dive:

Public Access Plan:

2. Scope

Plan to Increase Public Access to the
Results of Federally-Funded
Scientific Research Results
Version 1.1

December 16, 2015

U.S. Department of Transportation

U.S. DOT Public Access Plan:
https://doi.org/10.21949/1503646

***All Operating Administrations and Secretarial offices* will adhere to the following directives:**

- **Moving Ahead for Progress in the 21st Century Act: National Transportation Library (MAP-21; P.L. 112-141, July 6, 2012; 49 U.S.C. 6304).**
  https://www.govinfo.gov/content/pkg/BILLS-112hr4348enr/html/BILLS-112hr4348enr.htm
- **OSTP Memorandum: Increasing Access to the Results of Federally Funded Scientific Research (February 22, 2013).** https://rosap.ntl.bts.gov/view/dot/34953
- **OMB Memorandum M-13-13: Open Data Policy - Managing Information as an Asset (May 9, 2013).**
  https://rosap.ntl.bts.gov/view/dot/34954

Deep Dive:

Public Access Plan:

2. Definition of Digital Datasets

Plan to Increase Public Access to the
Results of Federally-Funded
Scientific Research Results
Version 1.1

December 16, 2015

U.S. Department of Transportation

"Digital Data Sets (sic):" For the purpose of this plan, will be defined as all scientific data collected through research projects funded, either fully or partially, by federal funds awarded through a DOT contract, grant or other agreement or collected by DOT employees. Such scientific data are the digitally recorded factual materials resulting from research that is necessary to validate research findings.

Question 1: What is, and is not, data?
How much data are we supposed to share?

What is Digital Data?
Digitally recorded factual material commonly accepted in the scientific community as necessary to validate research findings.

What is NOT Digital Data?
Laboratory notebooks;
Preliminary analyses;
Drafts of scientific papers;
Plans for future research;
Communications with colleagues; or,
Physical objects, such as laboratory specimens.

See Holdren Memo page 5 at https://rosap.ntl.bts.gov/view/dot/34953
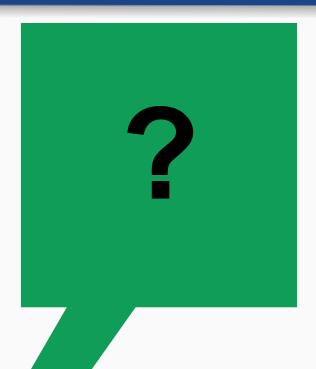
How much Digital Data?
The subset of data collected that is necessary to validate research findings. The data to replicate and validate the research report.

NOT all of the Raw Digital Data, unless…
Very unique event that would be hard to replicate;
Obviously has long-term interest to transportation research:
Example:100-Car Naturalistic Driving Study data
https://vtnews.vt.edu/articles/2005/06/2005-834.html

Audience Question Break

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Deep Dive:

Public Access Plan:

3. Applicability

Plan to Increase Public Access to the
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Version 1.1

December 16, 2015

U.S. Department of Transportation

U.S. DOT Public Access Plan:
https://doi.org/10.21949/1503646

This DOT Public Access Plan applies to the following individuals:
- **All DOT employees, including full- and part-time employees; as well as support service contract employees, consultants and temporary and special government employees.**
- **Awardees from non-DOT organizations that publish Scientific Research material or compile Digital Data Sets resulting from research and development programs conducted under a DOT grant, contract, or other agreement.**

Deep Dive:

Public Access Plan:

4.2 Data Requirements

Useful Links

Evaluating Repositories:
https://doi.org/10.21949/1520563

DOT Conformant Repositories:
https://doi.org/10.21949/1520566

Creating DMPs:
https://doi.org/10.21949/1520562

ROSA P DMP Collection:
https://rosap.ntl.bts.gov/collection_pa_dmp

U.S. DOT Public Access Plan:
https://doi.org/10.21949/1503646

There are 6 digital dataset requirements:

1. Stored and publicly accessible for search, retrieval, and analysis;
2. While protecting national/homeland security, individual privacy, and confidentiality.
3. DOT will allow the inclusion of appropriate costs for data management and access in funding proposals.
4. All digital datasets inventoried in the DOT Public Data Listing.
5. Researchers must comply with OMB's M-13-13 as well as DOT Order 1351.34.
6. All DOT-funded research proposals must include a "Data Management Plan" (DMP):
    1. Including preservation information or justification for non-preservation;
    2. Including choice of repository that fits DOT specifications;
    3. To be reviewed and approved by OA funding research; and
    4. A sample DMP and guidance will be provided for researchers.

Question 2. Is there a checklist or criteria associated with the value of a data set to be shared (would it be of value to anyone else) versus the cost associated with curating and making the data set accessible?

1. No. There is no checklist and there should not be.
2. It is not possible to decide how valuable research data is going to be in the future before research is done.
3. US Government and the Open Science movement, believe it is better to spend some resources on data preservation today than mourn lost data.
4. Over time curatorial staff and stakeholders, can decide about decommissioning data.
5. That decision is not to be made before research is even started.
6. OPEN Government Data Act: Section 3562(b) Open by default: we are required by law to plan to share data. https://www.congress.gov/bill/115th-congress/house-bill/1770/text

Deep Dive:

Public Access Plan:

6. Roles & Responsibilities

Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results
Version 1.1

December 16, 2015

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U.S. DOT Public Access Plan: https://doi.org/10.21949/1503646

The Assistant Secretary for Research and Technology:
- Will coordinate the implementation of this plan with OAs.

Heads of DOT OAs and Secretarial Offices:
- Will include the requirements of this plan as terms and conditions for grants, contracts, and other funding agreements
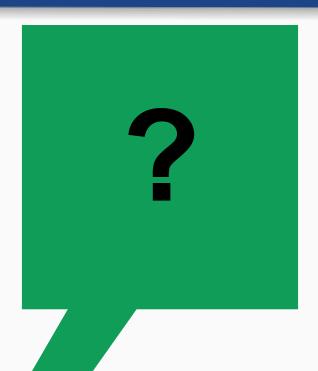
Awardees and Their Institutions:
- Ensure that sub-awardees, researchers and authors are aware of and comply with the DOT Public Access Plan.

Principal Investigators:
- Ensure that all rights under copyright are non-exclusively retained by DOT and that the terms and conditions of publication do not impair the obligation of the authors to comply with the DOT Public Access Plan.

Audience Question Break

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Deep Dive:

Public Access Plan:

7. Implementation

**Plan to Increase Public Access to the
Results of Federally-Funded
Scientific Research Results**
Version 1.1

December 16, 2015

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**U.S. DOT Public Access Plan:
https://doi.org/10.21949/1503646**

Most detailed section. We will focus on:
- **7.2 Before Research Begins**
- **7.3.2 Data Submission**
- **7.4.2 Data Management**
- **7.6.2 Data Preservation**

Deep Dive:

Public Access Plan:

7.2 Before Research Begins

Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results

Version 1.1

December 16, 2015

U.S. Department of Transportation

U.S. DOT Public Access Plan: https://doi.org/10.21949/1503646

DOT will:
- **Establish funding agreements requiring both the immediate grant of a comprehensive non-exclusive, paid-up, royalty-free copyright license to the DOT and the submission of any Publications to the NTL Digital Repository. (DOT DASH 2016-03 and 2016-05)**
- **Use digital object identifiers (DOI) to individually identify each Publication and Digital Data Set.**
- **Require all researchers to obtain and report his or her unique ORCID (Open Researcher and Contributor ID).**
- **Require researchers to include the appropriate funding agreement number(s) on all submissions of research results.**

Deep Dive:

Public Access Plan:

7.3.2 Data Submission

Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results

Version 1.1

December 16, 2015

U.S. Department of Transportation

U.S. DOT Public Access Plan: https://doi.org/10.21949/1503646

- **Intramural Research: both OMB's M-1313 and DOT Order 1351.34, Departmental Data Release Policy govern generation, management, and Public Access to digital research data.**
- **Intramural and Extramural Research: DOT will develop new, standardized requirements for the Data Management Plans (DMPs): at https://doi.org/10.21949/1520562**

Deep Dive:

Public Access Plan:

7.4.2 Data Management

Useful Links

Creating DMPs:
https://doi.org/10.21949/1520562

ROSA P DMP Collection:
https://rosap.ntl.bts.gov/collection_pa_dmp

Evaluating Repositories:
https://doi.org/10.21949/1520563

DOT Conformant Repositories:
https://doi.org/10.21949/1520566

U.S. DOT Public Access Plan:
https://doi.org/10.21949/1503646

DMPs will include sections that:
1. **Describe the data;**
2. **State standards and file formats;**
3. **Discuss access policies to protect PII and sensitive info disclosure;**
4. **State re-use policies; and,**
5. **State chosen repository, and preservation plan.**
See Creating DMPs at https://doi.org/10.21949/1520562

Repositories should:
6. **Meet essential metadata requirements;**
7. **Provide persistent identification of datasets; and**
8. **Provide long-term access.**
See Evaluating Repositories at
https://doi.org/10.21949/1520563

Question 3. What are the metadata requirements, standards, and resources available?

DOT Public Access Plan specifies Project Open Data metadata schema, now known as DCAT-US
https://resources.data.gov/resources/dcat-us/

Datasets should be accompanied by a .json metadata file. Templates can be found at https://resources.data.gov/resources/podm-fiel

For other Federal data and metadata tools and training, go to Resources.data.gov at https://resources.data.gov/

Deep Dive:

Public Access Plan:

7.6.2 Data Preservation

Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results

Version 1.1

December 16, 2015

U.S. Department of Transportation

U.S. DOT Public Access Plan: https://doi.org/10.21949/1503646

The DOT will:
- **Expand NTL repository to meet trusted digital repository requirements;**
- **Engage in digital preservation networks;**
- **Ensure the permanent preservation and long-term accessibility of digital datasets by:**
  - **Adopting sound preservation standards and archival formats;**
  - **Developing practical backup, migration, and technology refreshing strategies;**
  - **Partnering with other appropriate archives;**
  - **Take into account the relative value of long-term preservation and access of Digital Data Sets against the associated cost and administrative burden.**

Question 4. What plans are in place for digital data to preserve it long term because all digital hardware does expire at some point?

The Public Access plan requires digital datasets be shared in open file formats, whenever possible, such as .csv. These open file formats are ubiquitous, long-lived, and less prone to software or hardware obsolescence issues. Other formats have to be monitored over time to watch for obsolescence. When possible, NTL will work with researchers to migrate data into open, preservation friendly formats at the time of submission to NTL. If that is not possible, NTL will, as needed, migrate data from old formats to new formats, using archival best practices.

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Public Access Implementation Working Group
(PAIWG)

Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results
Version 1.1

December 16, 2015

U.S. Department of Transportation

- Mission: Enable cross-modal collaboration to ensure the best possible public access to USDOT scientific research through implementation of the DOT Public Access Plan, common best practices, and shared resources.

- Scope:
  - USDOT Public Access Plan development, implementation, and compliance monitoring
  - Charters time-limited implementation task forces with modal and OST experts;
  - Reports Public Access Plan progress and obstacles to the RD&T Planning Team, including compliance monitoring; and
  - Coordinates U.S. DOT participation in U.S. Federal, domestic and international Public Access, Open Science, and Data Strategy efforts and activities.

Deep Dive:

Public Access Plan:

8.1 Timeline

Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results

Version 1.1

December 16, 2015

U.S. Department of Transportation

U.S. DOT Public Access Plan: https://doi.org/10.21949/1503646

- **Submission of draft plan to OSTP/OMB/OIRA for review and approval – June 10, 2013;**
- **Finalize incorporation of OSTP/OMB/OIRA changes; initiate formal concurrence process within DOT – Not greater than six weeks following receipt of OSTP approval;**
- **Obtain required senior DOT Official signature for implementation – October 1, 2015;**
- **Begin internal DOT initiatives required for implementation of this Plan – May 1, 2015;**
- **Commence effective implementation – December 31, 2015;**

Question 5. What is the time-line we have to provide the access to our output data from the time producing this data to providing access? For existing data sets, will we need to go back and make accessible?

FAA should have been providing Public Access to datasets generated from all research that began on or after January 1, 2016.

Realistically, I recommend FAA prepare to begin full implementation starting on January 1, 2022, or some date soon after.

No, there is no expectation that modes go back and try to make existing dataset, created since January 1, 2016, fully publicly accessible. Legacy work is low-return on investment.

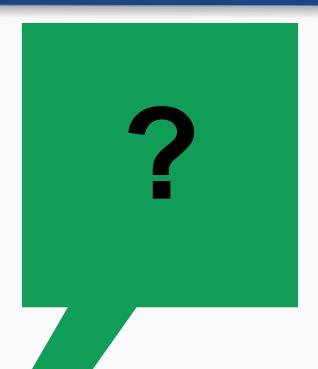However, FAA may choose to do so for specific, high-value, research data. NTL can help.

Question 6: What about Software and Code?

Question: Besides data itself we also generate software code or configuration files for a software tool in our various research projects. Does the accessibility laws require making this code accessible? Can the executable code be shared without the actual source code? There is concern that if the source code is published, it could be altered and thus modified in a way not beneficial for the government because we wouldn't know the code was altered and gov't relied on the output as reported?

Response: Yes. The updated plan calls for the sharing of "research computer software," its documentation, and "source code." Of course this sharing is covered by the same cautions around national/organizational security as apply to publications, datasets, and other research outputs.

Government research results, for the most part, is in the public domain. Because of that, we produce things knowing that people will use them in ways we cannot predict. It is accepted risk.
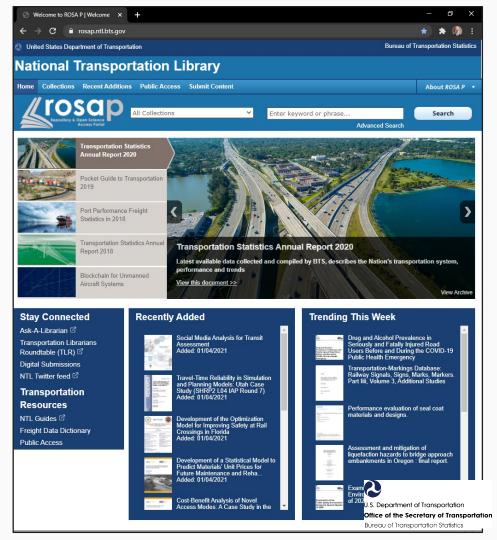
Audience Question Break

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Collecting & Identifying Research:

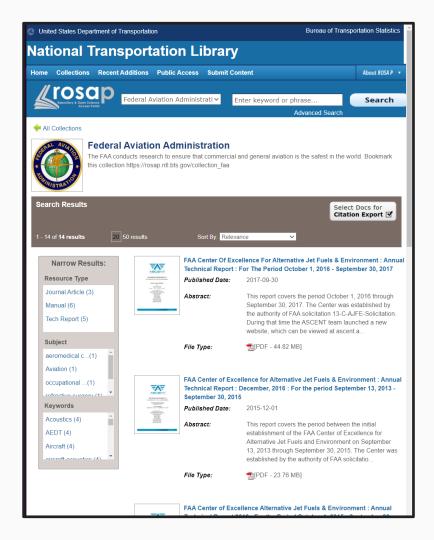## Repository & Open Science Access Portal (ROSA P)

ROSA P is the National Transportation Library's *Repository and Open Science Access Portal*. The name *ROSA P* was chosen to honor the role public transportation played in the civil rights movement, along with one of the important figures, Rosa Parks.

Visit ROSA P at: https://rosap.ntl.bts.gov/welcome

Collecting & Identifying Research:
FAA's Proof of Concept ROSA P Collection

The FAA conducts research to ensure that commercial and general aviation is the safest in the world. Bookmark this collection https://rosap.ntl.bts.gov/collection_faa

Visit ROSA P at: https://rosap.ntl.bts.gov/welcome

Collecting & Identifying Research:
Datasets and Data Packages

DOT-produced Research Data

DOT-funded Research Data

What is a "data package"?
Dataset

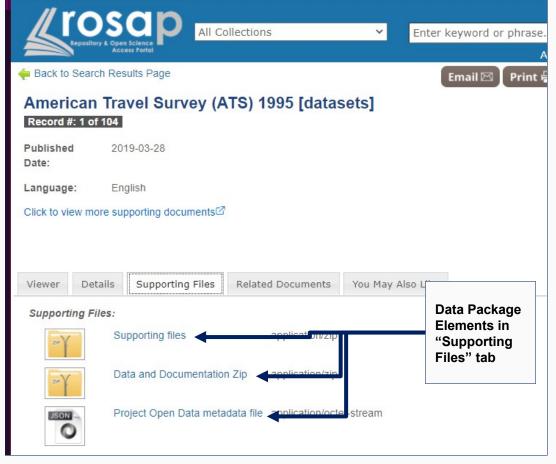README.txt with data dictionary

DCAT-US Metadata file

Data management plan (DMP)

Codes or scripts for analysis

Supporting files and tables
See
https://doi.org/10.21949/1500456

rosap
Repository & Open Science Access Portal

All Collections

Enter keyword or phrase.

Back to Search Results Page

Email ✉   Print 🖶

American Travel Survey (ATS) 1995 [datasets]
Record #: 1 of 104

Published Date: 2019-03-28

Language: English

Click to view more supporting documents ⧉

| Viewer | Details | Supporting Files | Related Documents | You May Also Li |

Supporting Files:

ZIP Supporting files — application/zip

ZIP Data and Documentation Zip — application/zip

JSON Project Open Data metadata file — application/octet-stream

Data Package Elements in "Supporting Files" tab

Collecting & Identifying Research:
Data Package Publications

NTL Dataset Data Package Elements

1) **Dataset**
   ⇒ .csv or other open format
2) **Readme.txt**
   ⇒ Includes Data Dictionary
   ⇒ Notes standards used
   ⇒ Defining Zero, Null, and Unknown
   ⇒ FAQs and other notes
3) **Metadata file** in Project Open Data .json
4) **Data Management Plan (DMP)**
5) *Code or scripts* used in data analysis
6) *Supporting files, tables, etc.*

(**Bold** = Required; *Italics* = Optional, or Required if Applicable)

National Transportation Library
Data Services

Delivering Data Packages for Discovery, Analysis, and Preservation
Leighton Christiansen
https://doi.org/10.21949/1500456

Data Management Strategies for the National Transportation Data Archive: Dealing with Legacy Data
Jesse Long
https://doi.org/10.21949/1506098

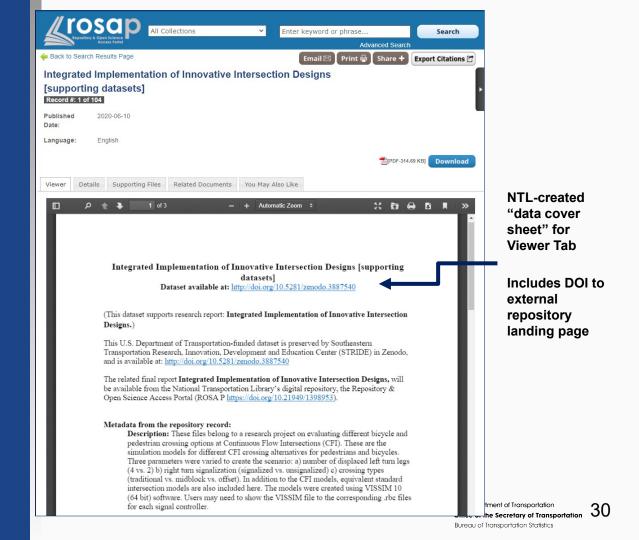# Collecting & Identifying Research:
External Datasets

DOT-funded Research Data held in third-party repository

NTL Policy: We hold a local copy against loss, and link to external repository in metadata and ROSA P

DOT paid for it; DOT must hold a copy (if not too large)

NTL librarians create "metadata data cover sheet" from external repository metadata

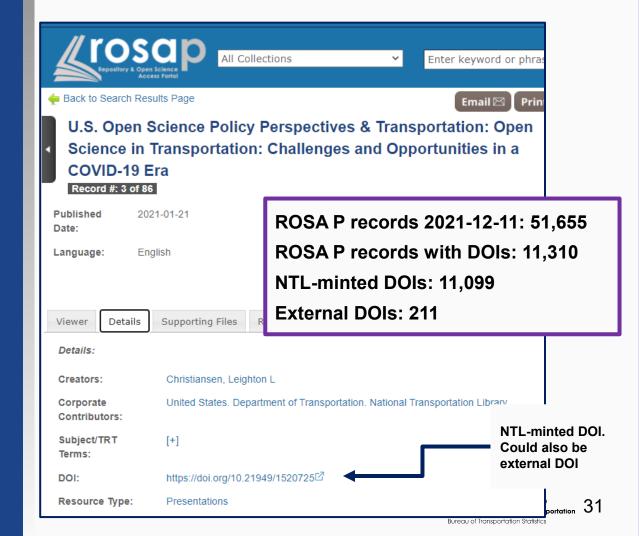NTL librarians relate datasets to reports, but this manual process and can be out of sync

NTL-created "data cover sheet" for Viewer Tab

Includes DOI to external repository landing page

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Collecting & Identifying Research:
Digital Object Identifiers (DOIs)

Persistent and Unique identifier for any object that can be described in a computerized (digital) environment
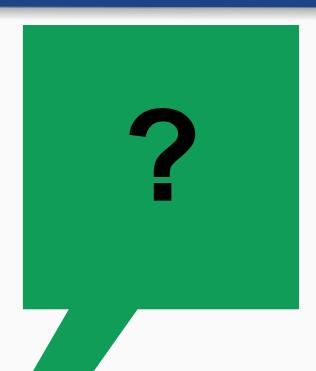
NTL DOIs lead to landing pages, they do NOT trigger downloads

NTL registers DOIs with DataCite through contract with DOE OSTI

NTL mints and supplies to any mode which asks for inclusion in publications and metadata

ROSA P records 2021-12-11: 51,655

ROSA P records with DOIs: 11,310

NTL-minted DOIs: 11,099

External DOIs: 211

NTL-minted DOI. Could also be external DOI

Audience Question Break

Data Management, Data Curation, & Data Science:
Expected Outcomes

U.S. DOT Public Access Plan: https://doi.org/10.21949/1503646

Expected Outcomes include:
- **Long-term access to, & preservation of, research;**
- **Enhanced scientific discovery and deployment; &**
- **Promotion of scientific & economic innovation.**

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Data Management, Data Curation, & Data Science:
Definitions

Data Management (DM):
deliberate planning, creation, storage, access and preservation of data produced from a given investigation[1, 2]

Data Management, Data Curation, & Data Science:
Definitions

Data Management (DM):

deliberate planning, creation, storage, access and preservation of data produced from a given investigation

Data Curation (DC):

enables data discovery and retrieval, maintains data quality, adds value, and provides for re-use over time

Data Management, Data Curation, & Data Science:
Definitions

Data Management (DM):
deliberate planning, creation, storage, access and preservation of data produced from a given investigation

Data Curation (DC):
enables data discovery and retrieval, maintains data quality, adds value, and provides for re-use over time

Data Science (DS):
drawing useful conclusions from large and diverse data sets through exploration, prediction, and inference

Data Management, Data Curation, & Data Science:
Linked Processes

DM is a **Necessary** element of **DC**

$$\text{Data Management} \in \text{Data Curation}$$

DC Enables robust **DS**

$$\text{Data Curation} \Rightarrow \text{Data Science}$$

Data Management, Data Curation, & Data Science:
Linked Processes

DM is a **Necessary** element of **DC**

$$\text{Data Management} \in \text{Data Curation}$$

DC Enables robust **DS**

$$\text{Data Curation} \Rightarrow \text{Data Science}$$

Data Management, Data Curation, & Data Science Dependencies Model

Data Management $\in$ Data Curation $\Rightarrow$ Data Science

$$DM \in DC \Rightarrow DS$$

Review

1. **Review of April Presentation**
2. **US DOT Public Access Plan Data Deep Dive**
3. **Collecting & Identifying Research**
4. **Data Management, Data Curation, & Data Science**

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Resources: Contact Info

**Leighton Christiansen
Data Curator,
National Transportation Library**

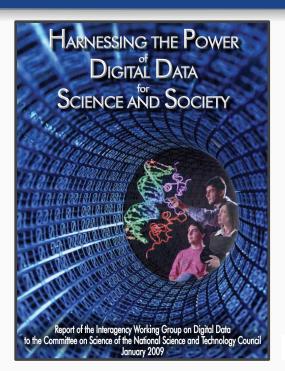**leighton.christiansen@dot.gov
202-366-2759**

Thank you!

Leighton Christiansen https://orcid.org/0000-0002-0543-4268
Data Curator, National Transportation Library (NTL),
Bureau of Transportation Statistics (BTS), Office of the Assistant
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Supplemental Slides

The following Supplemental Slides include further resources for those interested.

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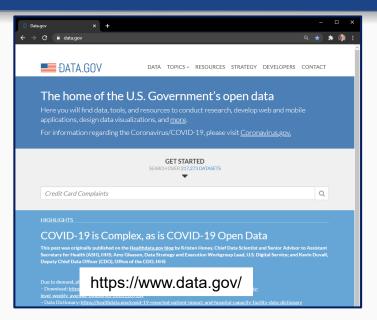**Office of the Secretary of Transportation**
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Guiding Principles

· Science is global and thrives in the digital dimensions;

· Digital scientific data are national and global assets;

· Not all digital scientific data need to be preserved and not all preserved data need to be preserved indefinitely;

· Communities of practice are an essential feature of the digital landscape;

· Preservation of digital scientific data is both a government and private sector responsibility and benefits society as a whole;

· Long-term preservation, access, and interoperability require management of the full data life cycle; and

· Dynamic strategies are required

HARNESSING THE POWER
of
DIGITAL DATA
for
SCIENCE AND SOCIETY

Report of the Interagency Working Group on Digital Data
to the Committee on Science of the National Science and Technology Council
January 2009

https://www.nitrd.gov/Publications/PublicationDetail.aspx?pubid=25

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Opening U.S. Government-Funded Science: Technology: Data.gov
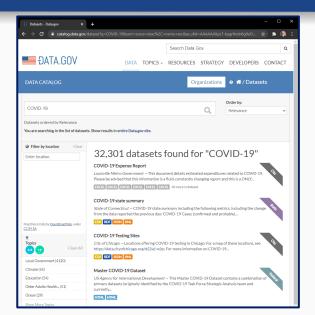

https://www.data.gov/

Data.gov
Quick Stats

217,000+ datasets

32,000+
COVID-19-related datasets

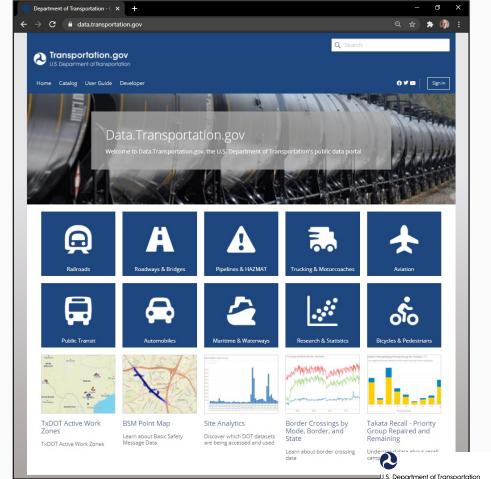**7**
U.S. DOT COVID-19-related datasets

Want just the DOT data in data.gov?
https://catalog.data.gov/organization/dot-gov

U.S. DOT's Open Data
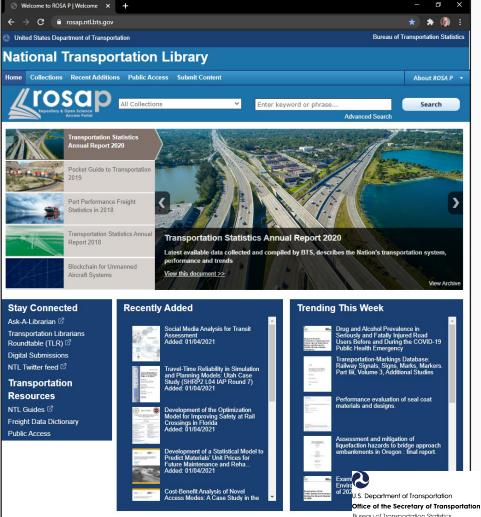
Data.transportation.gov

Highlights:
- 4000+ datasets
- All transport modes
- Visualization tools
- Data management best practices:
  - Machine-readable datasets and subsets
  - Open formats
  - API access
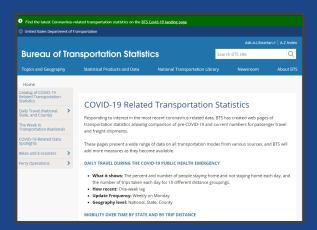
https://data.transportation.gov/

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Repository & Open Science Access Portal
(ROSA P)

ROSA P is the National Transportation Library's *Repository and Open Science Access Portal*. The name *ROSA P* was chosen to honor the role public transportation played in the civil rights movement, along with one of the important figures, Rosa Parks.

Visit ROSA P at: https://rosap.ntl.bts.gov/welcome

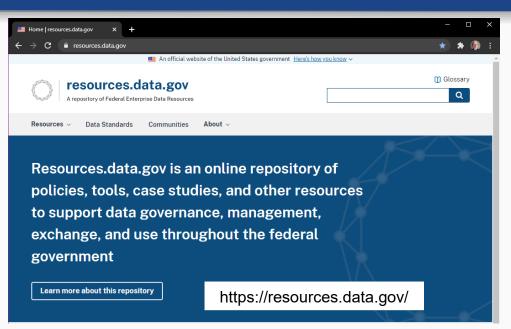# COVID-19 Transportation Statistics from BTS

https://www.bts.dot.gov/covid-19

COVID-19 Related Statistics

- Daily Travel During the COVID-19 Public Health Emergency
- Mobility Over Time by State and By Trip Distance
- The Week in Transportation: Selected Measures During COVID-19
- Monthly Transportation Statistics
- County Transportation Profiles
- Daily Vehicle Travel
- Effects of COVID-19 On Travel Behavior
- Effects of COVID-19 On Travel Behavior by Income Groups
- Effects of COVID-19 On Bikeshare and E-Scooter Operations
- Docked Bikeshare Ridership: COVID-19 Effects
- Ferry Operators Status
- Ferry Routes for Top Ten Operators

https://resources.data.gov/

Some Available Resources:

· DCAT-US Schema v1.1 (Project Open Data Metadata Schema)
· Principles of Open Government Data
· Data Ethics Framework
· Geoportal Server
· JSON Validator
· Digital Analytics Program (DAP)
· Improving Agency Data Skills Playbook
· Case studies & examples

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Science.gov

Interagency federated search
Focused COVID-19 search
Results include:
Journal articles

Technical reports

Datasets

Conference papers

Videos

Audio files

Images

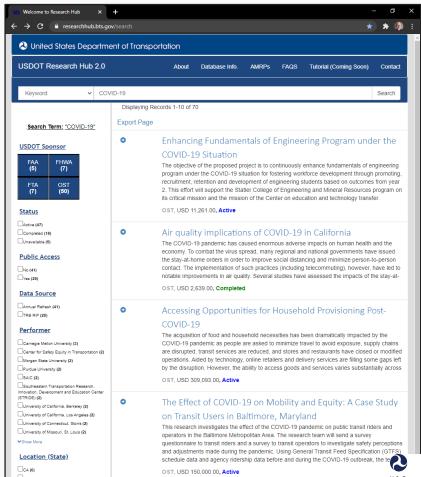https://www.science.gov/

Science.gov Alliance Members
- Department of Agriculture (USDA, Forest Service)
- Department of Commerce (NTIS, NIST)
- Department of Defense
- Department of Education
- Department of Energy
- Department of Health and Human Services (NIH)
- Department of Homeland Security
- Department of Transportation
- Environmental Protection Agency
- Government Publishing Office
- National Aeronautics and Space Administration
- National Science Foundation

Click here for the Science.gov COVID-19 search results.

U.S. DOT Research Hub

Research Hub is a publicly accessible database of USDOT-sponsored research, development, and technology project records.

https://researchhub.bts.gov/search

ITS JPO CodeHub

ITS CodeHub promotes a reuse-first mentality and aims to support the discovery of open source code by putting it directly into the hands of developers to customize, transform, expand, and improve, as trends evolve and needs change.

https://its.dot.gov/code/

Purpose
Empower innovation through code reuse, collaboration, and continuous improvement in the open

Capabilities
- Discover projects and modules
- Evaluate code health for reuse
- Connect to developers and other re-users
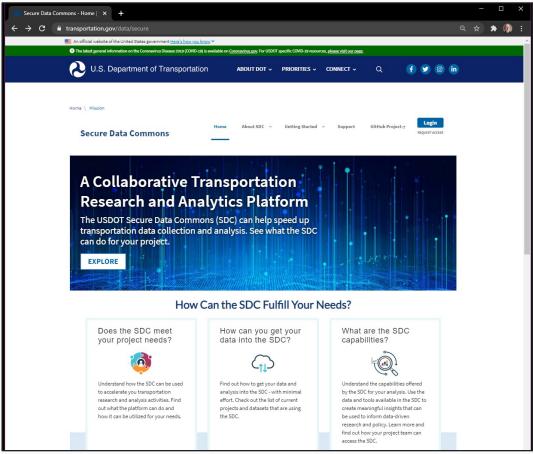- Analyze development trends

Community
Grassroots, collaborative development of open-source ITS software

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U.S. DOT Secure Data Commons

The USDOT Secure Data Commons (SDC) can help speed up transportation data collection and analysis.

https://www.transportation.gov/data/secure

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NCHRP Report 936

NCHRP 936: A Guide to Ensure Access to the Results of Federally Funded Transportation Research

- Report Link: http://www.trb.org/main/blurbs/180230.aspx
  - Project NCHRP 20-110: https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp
  - Designed to help DOT-funded researchers improve data management and data sharing
  - Already a little out of date because of things like Federal Data Strategy that came about while report in publication limbo
  - National Transportation Library planning series of video trainings

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