

U.S. Open Science Policy Perspectives & Transportation

<https://doi.org/10.21949/1520725>

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Presented to: Transportation Research Board 2021 Annual Meeting
1467 – Open Science in Transportation: Challenges and Opportunities in a COVID-19 Era
2021-01-21



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

Disclaimer

Opinions expressed by me during this presentation, the discussion period, or at other times during the workshop are mine alone, and do NOT necessarily represent the opinions, practices, policies, and/or laws of the National Transportation Library, the Bureau of Transportation Statistics, the U.S. Department of Transportation, or the United States government.

(Typographic errors are also mine.)



Contents

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Sharing U.S. Research before “Open Science”

U.S. Government Publishing Office (GPO)

<https://www.gpo.gov/>

- Opens March 4, 1961 as Government *Printing* Office
- Printing and binding for the Senate and House of Representatives, the Executive Branch, and the federal Judiciary.
- Embraces digital future, and rebranded Government *Publishing* Office in 2014
- GPO Style Manual:
<https://www.govinfo.gov/content/pkg/GPO-STYLEMANUAL-2016/pdf/GPO-STYLEMANUAL-2016.pdf>

National Technical Information Service (NTIS)

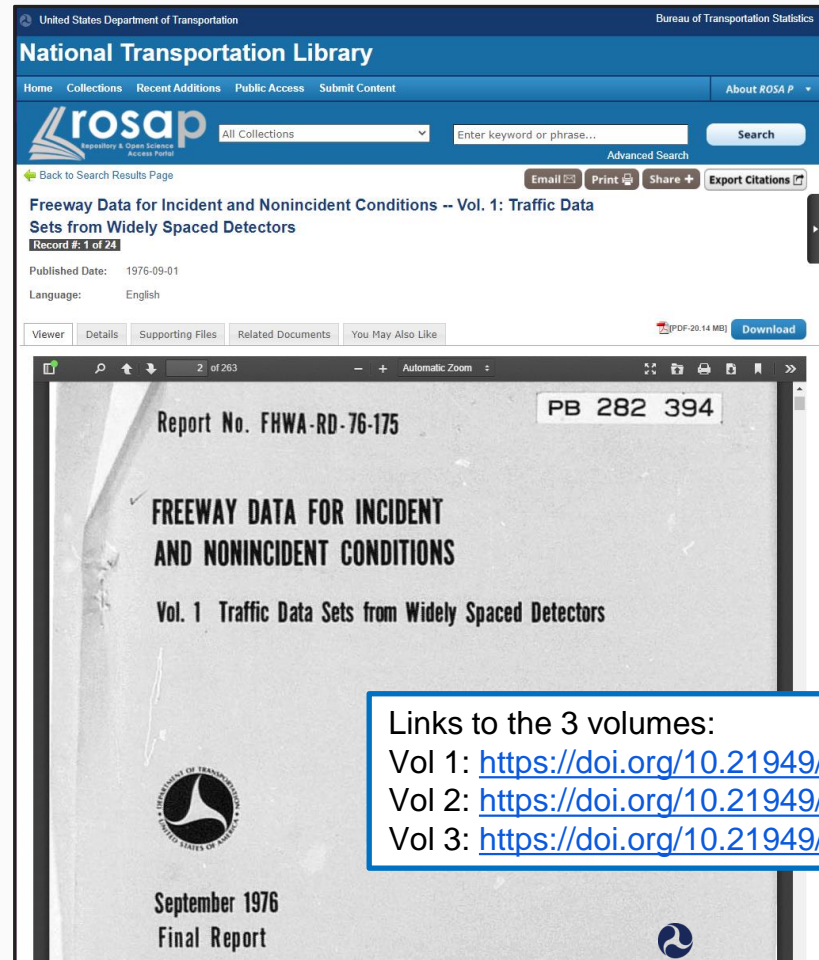
<https://www.ntis.gov/>

- Established by law on September 9, 1950, as “Publication Board”
- Clearinghouse for the collection and dissemination of scientific, technical, and engineering information (STEI)
- Federal agencies are required to send a copy of their STEI products to NTIS
- NTIS catalogs, organizes, preserves and disseminates to public online through National Technical Reports Library (NTRL)
<https://ntrl.ntis.gov/NTRL/>

Freeway Data for Incident and Nonincident Conditions

3 Volumes:

- 600 typeset pages
- Analysis
- Data tables
- Computer program code (in FORTRAN!!)
- Maps
- Road diagrams
- Graphs
- Incident reports
- Survey coding tables
- Mathematical formulae
- Flow charts



Links to the 3 volumes:

Vol 1: <https://doi.org/10.21949/1520658>

Vol 2: <https://doi.org/10.21949/1520659>

Vol 3: <https://doi.org/10.21949/1520660>

Science Imprisoned in PDFs

Low Rez Text Scan

1. PROJECT LOCATION

The Los Angeles Area Freeway Surveillance and Control Project (LAAFSCP) provided the basis for this data collection study. The California Department of Transportation had already installed loop detectors in the freeway lanes at about 1/4 mile spacing on 42 miles of urban freeway. These detectors were connected, over phone lines, to a central computer which polls each loop 15 times a second in order to build summaries of vehicle counts and occupancy to be used in ramp metering control and incident detection.

Figure 1 shows the freeways that are under LAAFSCP's control. The Harbor Freeway is an eight lane north-south route that runs from the San Pedro Harbor area to the Los Angeles Central Business District where it becomes the Pasadena Freeway. Average daily traffic on this freeway runs from 110,000 in the south to 210,000 in the north end. Interchanges on the Harbor Freeway are generally either diamond or

No GIS Map Coordinates



Data NOT Machine-Readable

```
TAPE NO. 70120651    TRAFFIC CODE = 7    FROM 5:30: 0
                                TO 6:30: 0

INCIDENT LOCATION: ST IN TO STION

AFFECTED SEGMENTS: 2

SEGMENT(1) ST IN TO STION    SEGMENT(2) 5031S TO 5029S

INCIDENT TYPE:

VEHICLES INVOLVED: 0
LIGHT DUTY VEHICLES = 0 LIGHT TRUCKS = 0 HEAVY TRUCKS = 0

WEATHER AND ROAD CODES
WEATHER = C    VISIBILITY = 0    PAVEMENT = D

DETECTION AND VERIFICATION
DETECTED AT 0: 0: 0 BY CODE
VERIFIED AT 0: 0: 0 BY CODE

LAND MARKS
SIGN = 0    CALL BOX = 0
LOOP STATION = 0    POST MILE = 0. 0

INCIDENT FREEWAY GEOMETRY

M 1 2 3 4 5 6 S R S C C S    COMMENTS
GEOMETRY 1 1 1 1 1 0 0 1 0 0 0 0 0
```

Code, Comments, & Data Dictionary NOT Machine-Readable

3.0 PROGRAM PATH

3.0.1 PURPOSE

This routine controls the calling of the subprograms to be executed. This is the main control program and executes calls to the 8 major functional parts of the program:

- (1) Initialize the installation dependent variables.
- (2) Input and decode documentation information and control information from the input data tape.
- (3) Input and output of user changeable key parameters.
- (4) Output of documentation information and control information.
- (5) Positioning of the input data tape to the proper position.
- (6) Computation and output of the statistical data.
- (7) Speed trap data.
- (8) Data tape rewinding.

3.0.2 SUBROUTINES CALLED

The following subroutines may be called by this routine:

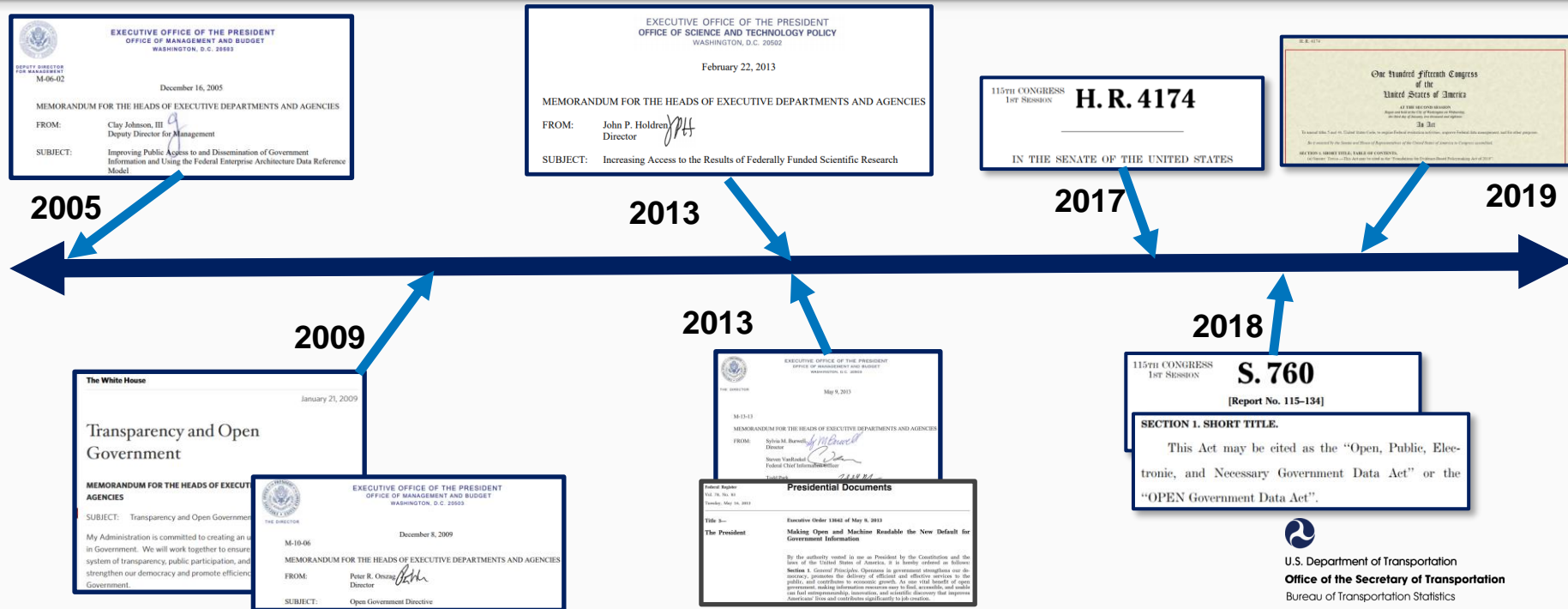


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Bureau of Transportation Statistics

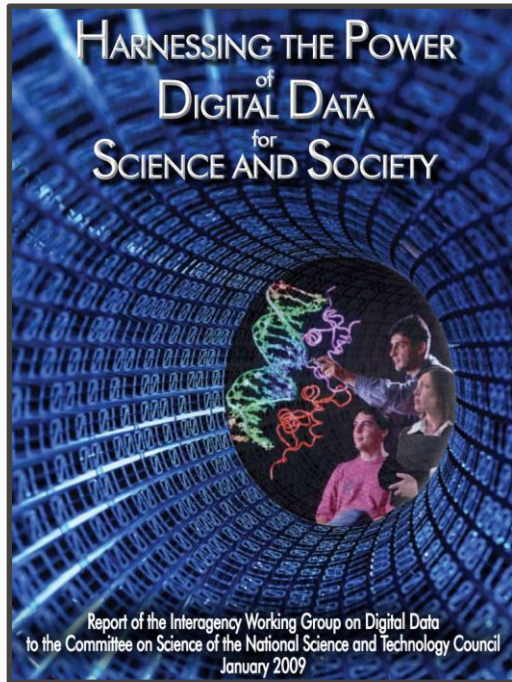
Opening U.S. Government-Funded Science

- Policies
- Practices
- Technology
- Resources

Opening U.S. Government-Funded Science: Policies 2005 to 2019



Opening U.S. Government-Funded Science: Practices



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

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



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OSTP Subcommittee on Open Science



SOS Strategic Objectives

1. Increase the impact and benefit from federally funded scientific research products by making them more accessible to the public, machine-readable, and aligned with FAIR (findable, accessible, interoperable, and reusable) principles.
2. Assess opportunities to increase access to scientific research products while managing associated risks.
3. Collaborate with academia, research communities, and industry to achieve open science objectives in ways that are efficient, effective, and advance national science and engineering priorities. Engage international partners to strengthen open science objectives.

SOS Working Groups for 2020

- Data Management & Repositories
- Data Dictionaries
- Persistent Identifiers
- Publications
- Access Risks
- Collaboration

<https://www.whitehouse.gov/ostp/>



Public Access Implementation Working Group (PAIWG)

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

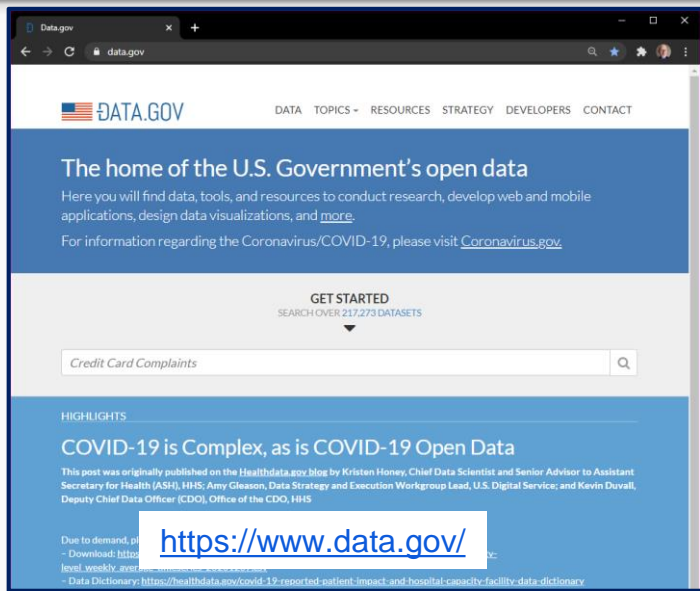


December 16, 2015

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.

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

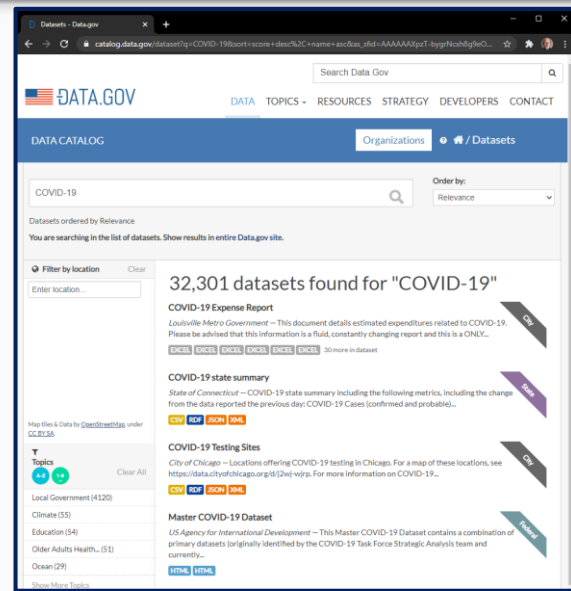


Data.gov
Quick Stats

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>



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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/>

The screenshot shows the Data.Transportation.gov website. The header includes the Transportation.gov logo, a search bar, and navigation links for Home, Catalog, User Guide, and Developer. A large banner image of a train is at the top. Below the banner, a grid of icons represents different transport modes: Railroads, Roadways & Bridges, Pipelines & HAZMAT, Trucking & Motorcoaches, Aviation, Public Transit, Automobiles, Maritime & Waterways, Research & Statistics, and Bicycles & Pedestrians. At the bottom, there are five featured datasets with their respective visualizations: TxDOT Active Work Zones (map), BSM Point Map (map), Site Analytics (bar chart), Border Crossings by Mode, Border, and State (line chart), and Takata Recall - Priority Group Repaired and Remaining (bar chart).

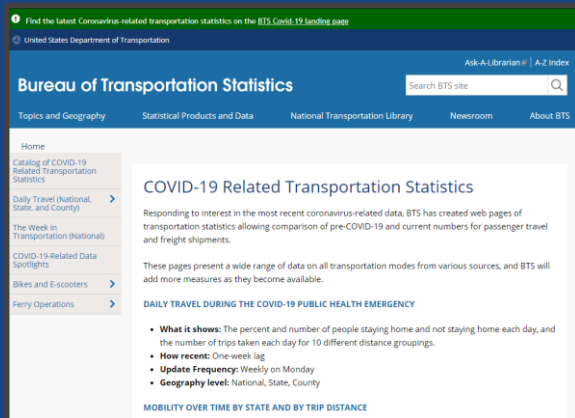
Repository & Open Science Access Portal (ROSA P)

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.

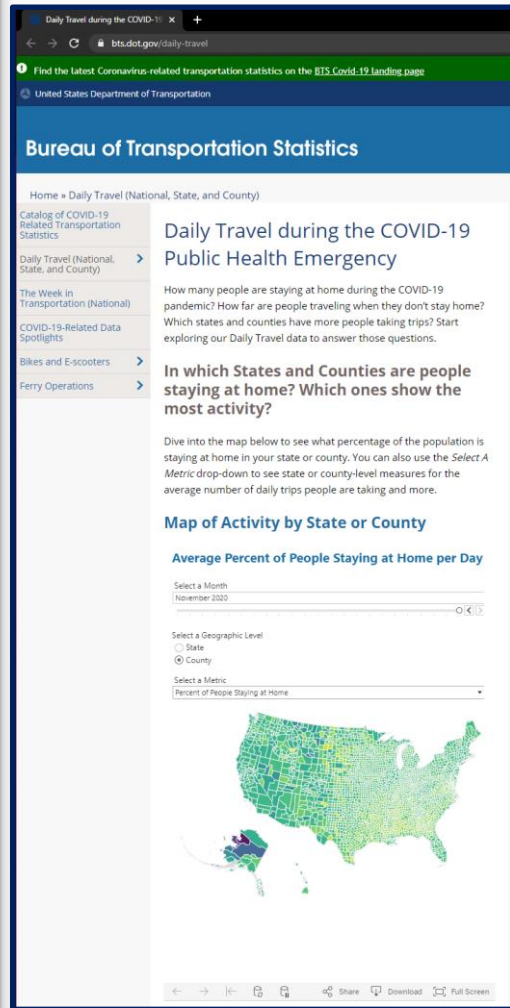
Visit ROSA P at:
<https://rosap.ntl.bts.gov/welcome>

The screenshot shows the ROSA P website interface. At the top, there's a navigation bar with links like Home, Collections, Recent Additions, Public Access, and Submit Content. Below this is a search bar with a dropdown menu set to 'All Collections' and a search button. The main content area features a large banner for the 'Transportation Statistics Annual Report 2020' with a description: 'Latest available data collected and compiled by BTS, describes the Nation's transportation system, performance and trends.' To the left of the banner is a sidebar with links to various reports: 'Transportation Statistics Annual Report 2020', 'Pocket Guide to Transportation 2019', 'Port Performance Freight Statistics in 2018', 'Transportation Statistics Annual Report 2018', and 'Blockchain for Unmanned Aircraft Systems'. Below the banner, there are three columns: 'Stay Connected' with links to 'Ask-A-Librarian', 'Transportation Librarians Roundtable (TLR)', 'Digital Submissions', and 'NTL Twitter feed'; 'Transportation Resources' with links to 'NTL Guides', 'Freight Data Dictionary', and 'Public Access'; 'Recently Added' with a list of recent publications including 'Social Media Analysis for Transit Assessment', 'Travel-Time Reliability in Simulation and Planning Models: Utah Case Study (SHRP2 L04 IAP Round 7)', 'Development of the Optimization Model for Improving Safety at Rail Crossings in Florida', 'Development of a Statistical Model to Predict Materials' Unit Prices for Future Maintenance and Reha...', and 'Cost-Benefit Analysis of Novel Access Modes: A Case Study in the'; and 'Trending This Week' with a list of trending publications including 'Drug and Alcohol Prevalence in Seriously and Fatally Injured Road Users Before and During the COVID-19 Public Health Emergency', 'Transportation-Markings Database: Railway Signals, Signs, Marks, Markers. Part III, Volume 3, Additional Studies', 'Performance evaluation of seal coat materials and designs.', and 'Assessment and mitigation of liquefaction hazards to bridge approach embankments in Oregon : final report.' The footer includes the U.S. Department of Transportation logo and the text 'Office of the Secretary of Transportation Bureau of Transportation Statistics'.

COVID-19 Transportation Statistics from BTS



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

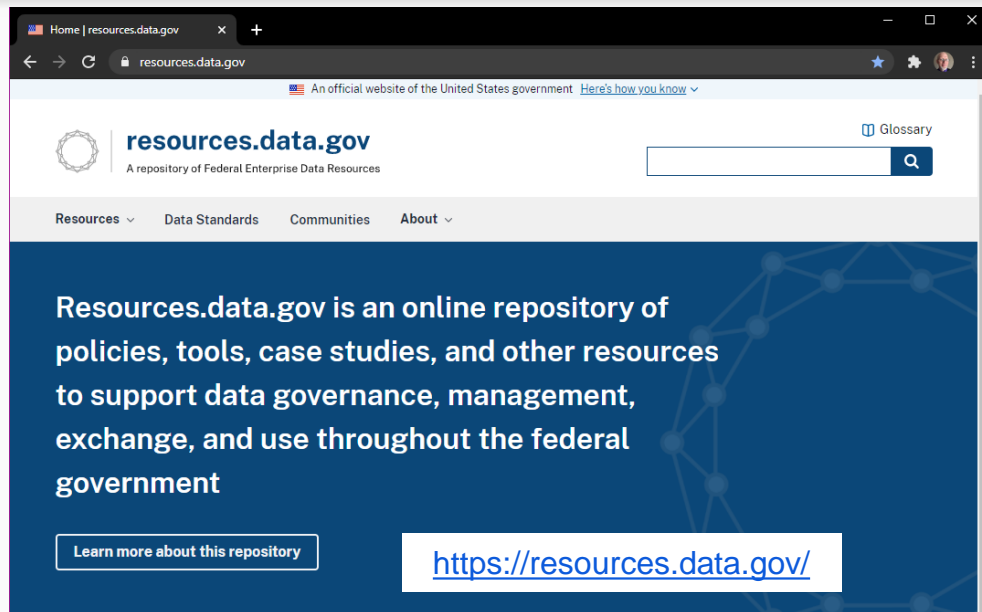


COVID-19 Related Statistics

- 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



Opening U.S. Government-Funded Science: 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



Opening U.S. Government-Funded Science: Challenges

Policy Challenges

- Policy writing can take time
- Leadership changes can mean policy changes
- Open Science policy ROI can be hard to measure
- New policy socialization & implementation can be uneven

Practice Challenges

- Culture change is hard
- Researcher resistance to openness
- Retraining and reskilling existing employees

Technology Challenges

- Existing infrastructures may not be adaptable
- System integrations can be complex

Resource Challenges

- Flat research funding
- Resistance to creating new positions
- Creating new resources takes time

COVID-19

- Good examples: NLM expands access to coronavirus research in PubMed Central in March 2020
- Learn from COVID-19 experience, and prepare for next time



Opening U.S. Government-Funded Science: Conclusions

U.S. Government & U.S. DOT:

- Have long histories of sharing research results
- Are implementing policies and practices; deploying technologies; and gathering resources to keep in step with current Open Science movement
- Have deployed a number of systems, including Data.gov, to open federally-funded science to the public
- Are working to fund COVID-19-related research projects, and share results with public, as quickly as possible, as best practices and privacy/security concerns allow
- We still face many challenges to sharing research outputs, especially datasets, and software code



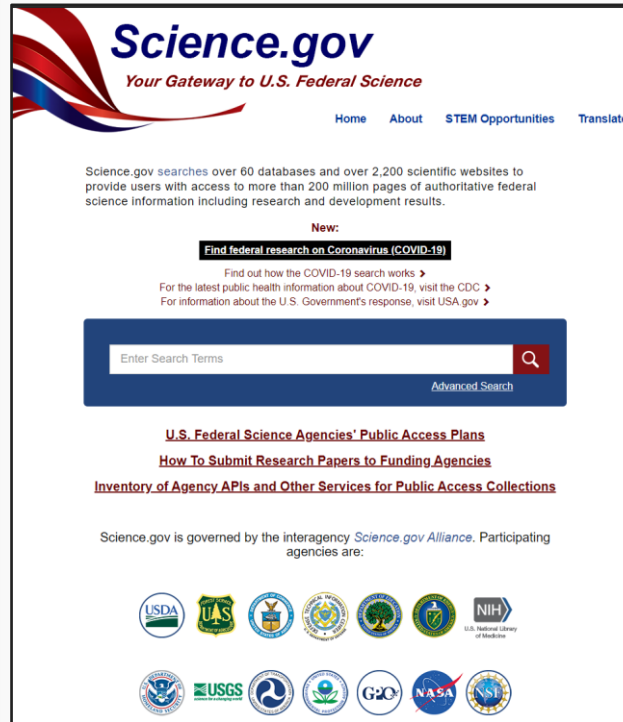
Supplemental Slides

The following Supplemental Slides were intended for the presentation. However, they were trimmed from the presentation in order to remain in the 10 minute time limit.



Science.gov

- Interagency federated search
- Focused COVID-19 search
- Results include:
 - Journal articles
 - Technical reports
 - Datasets
 - Conference papers
 - Videos
 - Audio files
 - Images



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.](#)

<https://www.science.gov/>



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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>

The screenshot shows the USDOT Research Hub 2.0 search results page. The header includes the United States Department of Transportation logo and navigation links: About, Database Info, AMRPs, FAQs, Tutorial (Coming Soon), and Contact. A search bar at the top shows the keyword 'COVID-19' and a search button. Below the search bar, it indicates 'Displaying Records 1-10 of 70' and an 'Export Page' link.

Search Term: "COVID-19"

USDOT Sponsor

FAA (5)	FHWA (7)
FTA (7)	OST (50)

Status

☐ Active (47)
☐ Completed (18)
☐ Unavailable (5)

Public Access

☐ No (41)
☐ Yes (29)

Data Source

☐ Annual Refresh (41)
☐ TRB RUP (29)

Performer

☐ Carnegie Mellon University (3)
☐ Center for Safety Equity in Transportation (2)
☐ Morgan State University (2)
☐ Purdue University (2)
☐ SAIC (2)
☐ Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE) (2)
☐ University of California, Berkeley (2)
☐ University of California, Los Angeles (2)
☐ University of Connecticut, Storrs (2)
☐ University of Missouri, St. Louis (2)
[Show More](#)

Location (State)

☐ CA (6)
☐ NY (4)

Search Results:

- Enhancing Fundamentals of Engineering Program under the COVID-19 Situation**
The objective of the proposed project is to continuously enhance fundamentals of engineering program under the COVID-19 situation for fostering workforce development through promoting, recruitment, retention and development of engineering students based on outcomes from year 2. This effort will support the Statler College of Engineering and Mineral Resources program on its critical mission and the mission of the Center on education and technology transfer.
OST, USD 11,261.00, **Active**
- Air quality implications of COVID-19 in California**
The COVID-19 pandemic has caused enormous adverse impacts on human health and the economy. To combat the virus spread, many regional and national governments have issued the stay-at-home orders in order to improve social distancing and minimize person-to-person contact. The implementation of such practices (including telecommuting), however, have led to notable improvements in air quality. Several studies have assessed the impacts of the stay-at-home orders on air quality.
OST, USD 2,639.00, **Completed**
- Accessing Opportunities for Household Provisioning Post-COVID-19**
The acquisition of food and household necessities has been dramatically impacted by the COVID-19 pandemic as people are asked to minimize travel to avoid exposure, supply chains are disrupted, transit services are reduced, and stores and restaurants have closed or modified operations. Aided by technology, online retailers and delivery services are filling some gaps left by the disruption. However, the ability to access goods and services varies substantially across the country.
OST, USD 309,093.00, **Active**
- The Effect of COVID-19 on Mobility and Equity: A Case Study on Transit Users in Baltimore, Maryland**
This research investigates the effect of the COVID-19 pandemic on public transit riders and operators in the Baltimore Metropolitan Area. The research team will send a survey questionnaire to transit riders and a survey to transit operators to investigate safety perceptions and adjustments made during the pandemic. Using General Transit Feed Specification (GTFS) schedule data and agency ridership data before and during the COVID-19 outbreak, the team will analyze the impact of the pandemic on transit users and operators.
OST, USD 150,000.00, **Active**

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

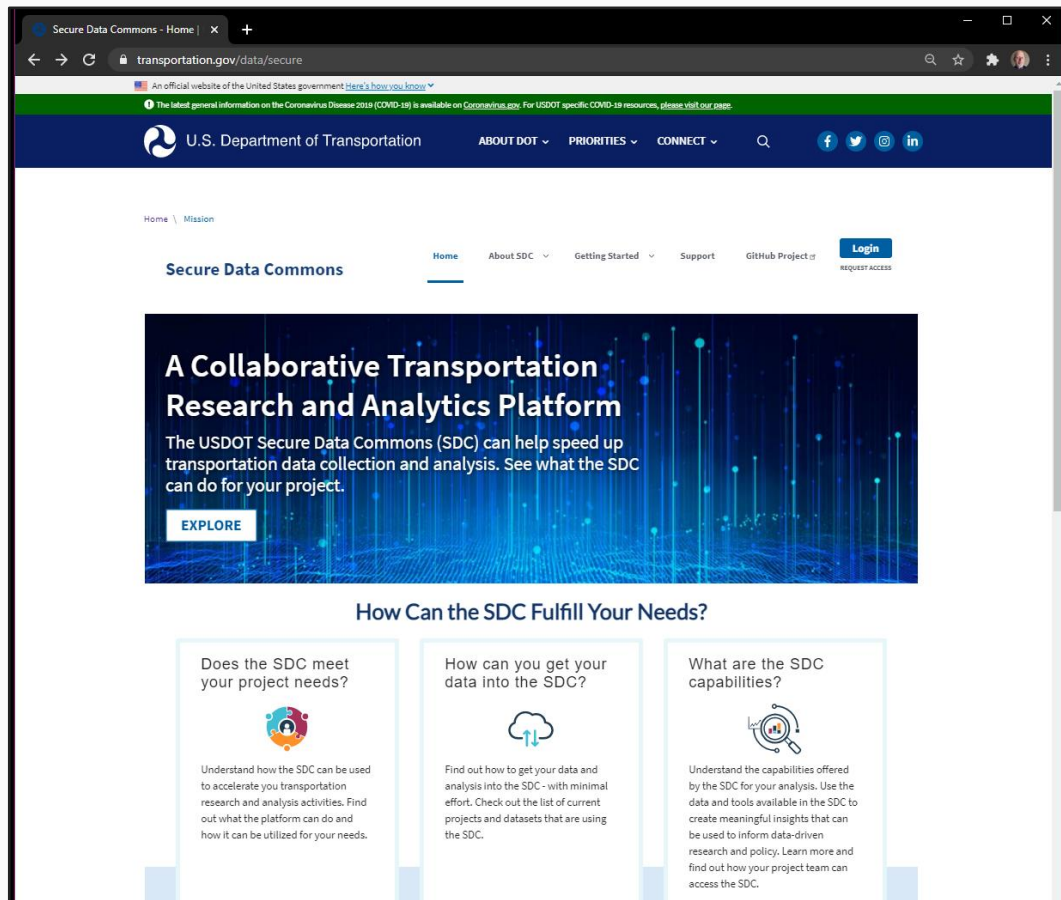
Grassroots, collaborative development of open-source ITS software



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>

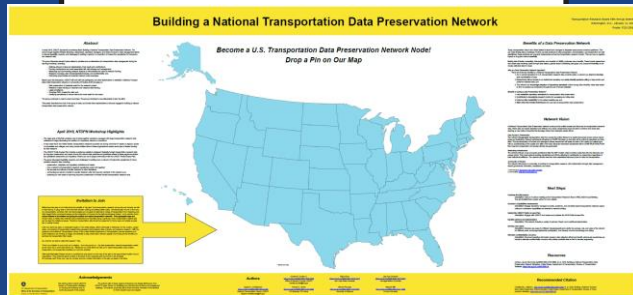


National Transportation Data Preservation Network (NTDPN)

Building a National Transportation Data Preservation Network Workshop

Detailed Proceedings

May 2019



U.S. Department of Transportation
John A. Volpe National Transportation Systems Center

Volpe

Initial Meeting: Building a National Transportation Data Perseveration Network Held at RDA's 13th Plenary, Philadelphia, PA, April 2019

Key Goals:

- To help searchers find transportation-related data in the numerous organizational and institutional repositories and archives where it now resides.
- Help researchers find reliable homes for the digital data if their organization does not have a repository of its own.

Building a National Transportation Data Preservation Network Workshop Notes <https://doi.org/10.21949/1506118>

- Includes notes and summaries from Workshop 1 (April 2019) and Workshop 2 (January 2020)

Building a National Transportation Data Preservation Network Workshop [poster] <https://doi.org/10.21949/1506103>

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?ProjectID=4062>
 - 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

Links to resources

United States. Government Publishing Office (GPO). (2021). Washington, D.C. <https://www.gpo.gov/>

United States. Government Publishing Office (GPO). (2021). *GPO Style Manual*. Washington, D.C. <https://www.govinfo.gov/content/pkg/GPO-STYLEMANUAL-2016/pdf/GPO-STYLEMANUAL-2016.pdf>

United States. National Technical Information Service (NTIS). (2021). Washington, D.C. <https://www.ntis.gov/>

United States. National Technical Information Service (NTIS). (2021). *National Technical Reports Library (NTRL)*. Washington, D.C. <https://ntrl.ntis.gov/NTRL/>

United State. Department of Transportation. Federal Highway Administration. (1976). *Freeway Data for Incident and Nonincident Conditions – Vol. 1: Traffic Data Sets from Widely Spaced Detectors*. Washington, D.C. <https://doi.org/10.21949/1520658>

United State. Department of Transportation. Federal Highway Administration. (1977). *Freeway Data for Incident and Nonincident Conditions – Vol. 2: Traffic Data Sets from Closely Spaced Detectors*. Washington, D.C. <https://doi.org/10.21949/1520659>

United State. Department of Transportation. Federal Highway Administration. (1977). *Freeway Data for Incident and Nonincident Conditions – Vol. 3: FORTRAN Program Documentation for Analyzing Individual Data Sets*. Washington, D.C. <https://doi.org/10.21949/1520660>



Links to resources (continued)

United States. Office of Management and Budget (OMB). (2005). Memo M-06-02, “Improving Public Access to and Dissemination of Government Information and Using the Federal Enterprise Architecture Data Reference Model.”
<https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2006/m06-02.pdf>

United States. White House. (2009). “Transparency and Open Government.” [Memorandum].
<https://obamawhitehouse.archives.gov/the-press-office/transparency-and-open-government>

United States. Office of Management and Budget (OMB). (2009) Memo M-10-06, “Open Government Directive.”
<https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2010/m10-06.pdf>

United States. White House. Office of Science and Technology Policy (OSTP). (2013). “Increasing Access to the Results of Federally Funded Scientific Research.” [Memorandum.]
https://web.archive.org/web/20130308142014/https://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf

United States. Office of Management and Budget (OMB). (2013). Memo M-13-13, “Open Data Policy – Managing Information as an Asset.”
<https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2013/m-13-13.pdf>

United States. White House. (2013). Executive Order 13642, “Making Open and Machine Readable the New Default for Government Information.” <https://www.govinfo.gov/content/pkg/FR-2013-05-14/pdf/2013-11533.pdf>



Links to resources (continued)

United States. House of Representatives. (2017). H.R. 4174, “Foundations for Evidence-Based Policymaking Act of 2018.” <https://www.congress.gov/bill/115th-congress/house-bill/4174>

United States. Senate. (2017). S.760 - "Open, Public, Electronic, and Necessary Government Data Act." <https://www.congress.gov/bill/115th-congress/senate-bill/760/text>

United States. (2019). Public Law No. 115-435 “Foundations for Evidence-Based Policymaking Act of 2018.” <https://www.congress.gov/115/plaws/publ435/PLAW-115publ435.pdf>

United States. National Science and Technology Council. Interagency Working Group on Digital Data. (2009). *Harnessing the Power of Digital Data for Science and Society*. Washington, D.C. <https://www.nitrd.gov/Publications/PublicationDetail.aspx?pubid=25>

White House. Office of Science and Technology Policy (OSTP). (2020). <https://www.whitehouse.gov/ostp/>

United States. Department of Transportation. (2015). “Plan to Increase Public Access to the Results of Federally-Funded Scientific Research.” <https://doi.org/10.21949/1520559>

United States. General Services Administration. Technology Transformation Services. (2021). “Data.gov.” <https://www.data.gov/>

United States. General Services Administration. Technology Transformation Services. (2021). “Department of Transportation Data Catalog.” <https://catalog.data.gov/organization/dot-gov>

United States. Department of Transportation. (2021). “Data.transportation.gov.” <https://data.transportation.gov>



Links to resources (continued)

United States. Department of Transportation. Bureau of Transportation Statistics. National Transportation Library. (2021). “Repository & Open Science Access Portal (ROSA P).” <https://doi.org/10.21949/1398953>

United States. Department of Energy. Office of Scientific and Technical Information. (2021). “Science.gov.” <https://www.science.gov/>

United States. Department of Transportation. Office of the Assistant Secretary for Research and Technology. (2021). “Research Hub.” <https://researchhub.bts.gov/search>

United States. Department of Transportation. Bureau of Transportation Statistics. (2021). “COVID-19 Related Transportation Statistics.” <https://www.bts.dot.gov/covid-19>

United States. General Services Administration. Technology Transformation Services. (2021). “resources.data.gov.” <https://resources.data.gov/>

United States. Department of Health and Human Services. National Institutes of Health. (2020). “*The National Library of Medicine expands access to coronavirus literature through PubMed Central*.” <https://www.nih.gov/news-events/news-releases/national-library-medicine-expands-access-coronavirus-literature-through-pubmed-central>



Thank you!

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Bureau of Transportation Statistics