

**Urban Mobility & Equity Center
(UMEC) Data Management Plan**

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Urban Mobility & Equity Center Data Management Plan

Research Purpose of Center

Morgan State University (MSU) leads the federally funded Urban Mobility & Equity Tier 1 Center (UMEC) through its National Transportation Center in cooperation with the Virginia Tech Transportation Institute and University of Maryland Department of Civil Engineering. UMEC focuses on research to improve urban mobility of people and goods in a safe, environmentally sustainable, and equitable manner.

In keeping with UMEC's research themes, the research program will focus on: increasing access to opportunities, smart cities, novel modes of transport, systems integration, analytical tools to optimize movement, and regional planning.

This data management plan (DMP) describes how UMEC will comply with the U.S. Department of Transportation (USDOT) policy on the archiving, dissemination and sharing of research results.

Data Description

Data utilized by UMEC researchers will consist of secondary data derived from "published" sources and primary data from original sources. Secondary data sources typically would be U.S. Census, existing state transportation planning models and transit operations data collected by state and local DOT agencies. Primary data would come from surveys of individuals with questionnaires; various traffic counts and measures from sensors, loop detectors and probes; simulation software and tests on the Smart Road at Virginia Tech; and observations by research project team members.

Primary data gathered by UMEC researchers from human subjects will consist of distributed survey questionnaires and driving simulator routines. The research protocols will be reviewed and approved by each partner university's Institutional Review Board and amended as appropriate over time. Participation in all surveys/routines is voluntary, and there is usually no risk associated with participating. Participants are free to discontinue a survey/routine at any time. Participants must be at least 18 years old, unless the survey is of young drivers or transit service users; then additional safeguards, including parental consent, are implemented.

UMEC researchers will collect survey and other primary data, aggregate the data and analyze results. The identification of individual respondents will not be shared with the public, state or federal agencies or private organizations. The individual responses without identifiers, compiled and aggregated responses, and analyzed data will be archived for public access.

UMEC research team members would analyze data using multivariate statistical analysis packages, such as SPSS and SAS. Even Google docs has techniques for tabulating survey data into tables and charts. All of these data bases and analysis results would be stored in the repository upon project completion.

Several research projects are anticipated over the next few years, including:

1. Research on new technologies that improve transit information systems, communications, and signal systems would generate data on transit systems' performance measures.

Developing technological innovations that increase transit network operational efficiency is an important element to improving urban mobility in an equitable manner.

2. Research on planning and operating integrated multi-modal public transportation systems that are implementable in realistic urban networks would focus on incorporating various mixes of para-transit and shared-ride services, so data on para-transit performance measures would be gathered.
3. Based on traffic modeling conducted in cooperation with the City of Baltimore, Connected Vehicle (CV) and Automated Vehicle (AV)-based collaborative delivery networks will be designed and the potential economic and social benefits to the city will be estimated. Data would consist of traffic model data already used by the Baltimore City Department of Transportation.
4. The introduction of CV, AV and electric vehicles will change the traffic mix on urban roads and highways, but there are various possible scenarios of vehicles' penetration and traffic flow. The research will test drivers in different socio-economic and age groups utilizing driving simulators and a traffic simulator to detect reactions to various traffic mixes. The results would be used to calibrate models for planning future transportation networks that serve all urban communities.
5. In Baltimore City a large number of people rely on transit and hacks (informal, extra-legal taxis) when going to grocery stores. In order to determine access to healthy food options, this study would analyze transportation options, including various shared-ride services, for households living in food deserts. Data would be generated from interviews of city residents and service users.
6. UMEC affiliated faculty and staff at MSU will meet with community residents periodically to discuss concerns. Faculty and students would conduct public interest research with residents' cooperation in order to reach solutions. Data would be generated from interviews of city residents.

Users of the data generated by UMEC researchers would be interested members of the public, policy makers, and other university researchers wishing to build on UMEC research or replicate research during subsequent time periods or elsewhere for sake of comparison. UMEC staff will work with principal investigators to ensure that final technical reports and data are archived according to this DMP.

Data Formats and Retention

Maryland Shared Open Access Repository (MD-SOAR) is a shared digital repository platform for eleven colleges and universities in Maryland (<https://mdsoar.org/>). It currently is funded entirely by the University System of Maryland and Affiliated Institutions (USMAI) Library Consortium (usmai.org), but also includes other collaborating partner institutions, including Morgan State University. MD-SOAR is jointly governed by all participating libraries, which have agreed to share policies and practices that are necessary and appropriate for the shared platform. Within this broad framework, each library provides customized repository services and collections that meet local institutional needs.

MD-SOAR is provided through the USMAI consortium as a centrally managed underlying platform, on which participant institutions can build and deliver local library-based institutional repository services.

- MD-SOAR serves as a platform for openly discoverable and publicly accessible digital content (default condition).
- Participant libraries may use MD-SOAR as a discovery and access platform for digital objects and metadata uploaded directly into the system, or for uploaded metadata that describes and links to digital objects stored and accessible via other networked locations.
- Digital objects ingested into or discoverable through MD-SOAR would be created or co-created by current or former faculty, staff, students, or academic and administrative units of the participating college or university; or would be materials held in the library's collection or closely related to the library collection where the library has permissions to distribute electronically.
- When necessary, participating libraries will require the appropriate permissions from copyright holders for items deposited in MD-SOAR, or otherwise be able to verify that such works can be made accessible via the library's institutional repository. For items that do not require the library to obtain permission, participating libraries must adhere to generally accepted library best practices regarding copyright and intellectual property rights.
- Resources discoverable through MD-SOAR would be completed, not works-in-progress, unless the work will never be completed. Pre-prints are considered completed works.
- MD-SOAR runs on the DSpace technical platform. DSpace can ingest and retrieve a wide range of digital file formats or "bitstreams."

Multiple files can be uploaded with each submission, but for technical reasons the submission form will not accept individual files over 2GB. Zipped, tarred, or other archive files can be submitted. Delimited or fixed-width files for tabular or 'ASCII' data (e.g., txt, csv, tab, tsv), Excel, Access, and MATLAB files are acceptable. Any non-proprietary file format can be accommodated.

Supplemental materials associated with a report or an article would include a citation to the report. There is a field in the submission form for this information. Data would be accompanied by a 'readme' file, data dictionary, codebook, or similar metadata document.

Access Policies

Research products from projects will be archived at MD-SOAR, <https://mdsoar.org/>, the long-term, open-access repository managed and maintained by the USMAI consortium. Once data are transferred, they will be made publicly available. Final reports can be copyrightable, but USDOT and thus the public-at-large will have a nonexclusive copyright license to all information in the final research reports. Researchers and the general public can download data and code files, associated metadata and documentation, and any guidelines for re-use. All records are assigned a persistent Digital Object Identifier (e.g., URL) to support consistent discovery and citation. The

records will be automatically indexed in Google and Google Scholar to facilitate search and allow global discovery. Whenever necessary, digital curation specialists in the university libraries will work with researchers to document and format materials for long-term access.

Archiving and Preservation

MD-SOAR provides tools for long-term data management and permits permanent storage options. The UMEC research products archived in MD-SOAR will be available in perpetuity. The MD-SOAR repository is built on DSpace software, a widely used, reliable digital repository platform. MD-SOAR performs nightly bit-level integrity tests on all files, and all contents are regularly copied to back-up storage. MD-SOAR has built-in contingencies for disaster recovery, including redundancies and recovery plans. MD-SOAR conforms to the digital preservation principles outlined in the USMAI Libraries' Digital Preservation Policy.