



## Center for Advanced Multimodal Mobility Solutions and Education

### **Data Management Plan - Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)**

*Creators: David Weggel, Wei Fan, Miguel Pando, Matthew Cantrell*  
*Affiliation: the University of North Carolina at Charlotte (UNC Charlotte)*  
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CAMMSE is a Tier I University Transportation Center (“the Center”) that is a consortium of five universities: the University of North Carolina at Charlotte (lead), the University of Texas at Austin, the University of Connecticut, Washington State University – Pullman, and Texas Southern University. CAMMSE will address the FAST Act research priority area of “*Improving Mobility of People and Goods*” by conducting and supporting related research, education, and technology transfer activities. As such, this Data Management Plan (DMP) will broadly cover all data acquired by CAMMSE activities but will evolve, as necessary, to accommodate unanticipated data types and related management requirements arising from future work.

#### **Data Description**

CAMMSE activities will produce several types of data related to advanced (computing, smartphones, communication) mobility research projects, educational activities, and technology transfer. Much of the data will be accessible from the CAMMSE website (<http://cammse.uncc.edu/>) by the public at large; however, very large datasets or some other sensitive data may only be accessible to authorized personnel via secured (password protected) ftp site, or may not be made accessible to the public under some special situations.

#### *Research*

- Manual collection of field data (samples). Examples include surveys of the movement of people and goods; real-time vehicle monitoring/counting; waiting times at intersections, between modes, etc.
- Automated real-time collection of field data (samples). Examples include using smartphones and communications to acquire behavioral data, movement of people, movement of goods, etc.
- Algorithms and software (original and commercial source code) to model multimodal mobility systems (or components) and the resulting data from these models. Examples include multimodal planning options; strategies of using historical and real-time data to increase system resilience; assessment and improvement of access to services/activities; systems operations; reducing congestion, etc.

#### *Education*

Educational activities will support undergraduate and graduate student research, courses and course modules in higher education, and K-12 outreach. Data will be generated to support:

- courses/course modules
- educational software



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- educational videos (including recordings of seminars, featured speakers, and other events)
- continuing education and other curriculum materials

### *Technology Transfer*

- Technical documentation (journal papers, conference papers, reports) written by CAMMSE collaborators
- Technical documentation written by others
- Instructional videos (seminars/training sessions, webinars, featured speakers, and other events)

Collection of videos and image data and the generation of animations will support various research, educational, and technology transfer pursuits. Finally, CAMMSE performance metrics for research, education, and technology transfer activities will be tracked, recorded, and posted on the CAMMSE website.

Individual project PIs and member institutions, in communication with the Center Director or Assistant Directors, will ensure adherence to this DMP and will suggest changes to it as necessary. The William States Lee College of Engineering at UNC Charlotte maintains a dedicated IT Staff (MOSAIC), which will facilitate the storage and archiving of data at the discretion and direction of the Center Director (project PI) and the requirements set forth within the scope of work of CAMMSE. When necessary, MOSAIC will coordinate with UNC Charlotte's Department of Information Technology Services (ITS). Furthermore, due to the multi-institutional nature of the CAMMSE, each consortium member university is responsible for data storage and archiving commensurate with the established data management procedures and file specifications of that institution. Data management and enforcement of data management expectations among Center members will be coordinated through this general DMP, email correspondence, and subordinate Data Security Plans, if necessary. All CAMMSE consortium members have reviewed and agreed to this DMP.

### **Data Standards, Format, and Facilities**

Technical papers, text sequences, and other documents will be produced in Microsoft Word and saved as Word or pdf documents. Software will be written in C, C++, MatLab, Excel, or another readily-available programming language/platform. Raw and processed data from original (in-house) or commercially-available software or from field collection efforts will be saved in spreadsheet (Microsoft Excel), ASCII, binary, or MatLab formats. Presentations, seminar materials, and instructional documentation will be created and saved in Microsoft PowerPoint, pdf, or Word formats.

UNC Charlotte's university systems will be used for data storage, depending upon the nature of the data, which include centrally-managed web servers, dedicated content management systems, cloud-based archival services, and potentially other systems managed by either MOSAIC or ITS, the central technology services group for UNC Charlotte.



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### **Access Policies**

It is anticipated that, except for possible short embargo periods for certain datasets, data generated by CAMMSE collaborators will be readily accessible to the public via the CAMMSE website.

UNC Charlotte uses a federated login system to tie most systems together using a single credential that will be used to authenticate all individuals working with the data. The William States Lee College of Engineering maintains a separate, parallel authentication system using another set of login credentials and appropriate access control mechanisms to address the needs of specific research requirements within the College. Both ITS and the College of Engineering regularly review appropriate access to systems and resources within their domain.

### **Re-Use, Redistribution, and Derivative Products Policies**

No access restrictions to the vast majority of data generated by CAMMSE collaborators are anticipated. Exceptions may apply from time to time, as per UNC Charlotte Patent and Copyright Policies and those of consortium member universities.

The policy of UNC Charlotte is “to carry out its scholarly work [research, teaching, and service] in an open and free atmosphere and to publish results obtained there from freely. Research done primarily in anticipation of profit is incompatible with the aims of the University. The University recognizes, however, that patentable inventions sometimes arise in the course of research conducted by its employees and students using University facilities. The Board of Governors of the University of North Carolina has determined that patenting and licensing of inventions resulting from the work of University personnel, including students, is consistent with the purposes and mission of the University.”

### **Archiving and Preservation Plans**

During Center activity, the College uses an online archival system to provide daily, weekly, and monthly access to archival backups. After the termination of the Center as a whole, Center-generated data is transferred to tape backups and stored for a minimum of 2 years and then overwritten as part of traditional backup policies. ITS will maintain the Center’s website for the duration of the Center’s funding period (5 years) and, after this period, data will be transferred to tape backups for a minimum of 2 years. During this 7-year period, all or part of CAMMSE-generated data will be made available to USDOT upon request and/or transferred to a repository of its choosing.