**Project Title: The Intelligent Mobility Meter – Portable Fine-Grained Data Collection and Analysis of Pedestrian, Cyclist, and Motor Vehicle Traffic**

Principal Investigator: Bernardo Pires, PhD

**Data Management Plan**

**1. Data Description**

The purpose of the research is to collect fine-grained statistics on pedestrian, cyclist and vehicular traffic. To this end, the project shall collect data in the form of: 1) video recordings; and 2) annotations, corresponding to the image locations at certain timestamps and periodic counts, of vehicles, bicycles, and pedestrian. The video data shall be collected using a custom video recording device. The annotations shall be generated automatically and verified manually. No audio information shall be recorded.

Data collection is expected to occur during the first six months of the period of performance. The annotations shall be compiled during the last six months of the period of performance. (One year project.) No updates to the data are expected. Project will not use pre-existing data.

Potential users of the data include local and federal governments, advocacy groups, or other stakeholders, who may use the data to make infrastructure decisions or policy recommendations. This use case shows the value of the data in the near term. Additionally the data will have significant impact in the long term as it is expected that computer vision researchers will use the data to create and/or test methodologies for the automatic detection of motor vehicles, bicycles, and pedestrians.

All data shall be made public. The data will be managed by the PI, Dr. Pires, who will check for adherence to this Data Management Plan.

**2. Data format and metadata standards**

All data submitted will use open standards. The videos shall be submitted in the mp4 format using widely available video codecs. Most media players shall be able to play the video files. The annotations shall be submitted in txt files. No special software shall be required to view the annotation data, as any text editor shall be able to read the data. Because it is not expected that the data will be updated, there will be a single version of each file, which shall be made public.

The video files shall require no documentation beyond the metadata. The annotation file shall include a data dictionary to insure the data can be understood by other researchers in the field. Quality of the video files shall be ensured by careful verification of the camera position and orientation using the ‘preview’ function on the custom recording device. Annotation quality shall be ensured by manual verification of all annotations.

Metadata shall be recorded following the schema of the Federal Highway Administration’s Traffic Monitoring Guide, which is one of the standards for the description of vehicle, bicycle and pedestrian traffic. The metadata shall be stored with the associated data.

**3. Policies for Access and Sharing**

Data shall be freely available to the public and no restrictions shall be placed on data or metadata distribution. All data recording shall be of public places, ensuring that no private or confidential data can be recorded. Sharing of the data is not expected to raise any ethical, privacy or confidentiality concerns. The camera position at the time of recording makes it unlikely that individuals recorded could be identified. Past projects using a similar system have been determined by CMU’s IRB not to involve human subjects.

**4. Policies for re-use, redistribution, derivatives**

A copy of all data created by the project, as well as its corresponding metadata, shall be submitted to Mobility21 University Transportation Center to be deposited to Zenodo for access and data sharing (see more details below). Carnegie Mellon University will hold the IP and copyright for data and other materials created by the project. The PI of the project agrees, upon deposit of their data, to the non-exclusive licensing agreement of Zenodo and the CMU data archive. The data shall be released in an open license for reuse, redistribution and derivative products which will be based upon the open licenses and provided by Zenodo and the CMU data archive.

**5. Plans for Archiving and Preservation**

The Mobility21 UTC will archive all data on Zenodo, https://zenodo.org/, which is an approved data repository by USDOT. The PI agres to archive all project data with Zenodo within 60 days of the submission of the project final report. The PI will maintain the data until it is uploaded to Zenodo.

Data security (back-up, redundancy, disaster recovery) shall be maintained by recording all data and metadata to two external hard drives, kept at separate locations, as well as a private cloud copy on Amazon Web Services. Integrity of the data (protection from accidental or malicious modification or deletion prior to receipt by the archive) shall be insured by compilation of cryptographic hashes of all project files, which shall be maintained and verified periodically by the PI.