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# ROADART

H2020 -636565

*Research On Alternative Diversity Aspects foR Trucks*

## DATA MANAGEMENT PLAN

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# 1 Types of Data

For the project following types of data will be generated and used:

- 1) Measurement data
- 2) Design descriptions
- 3) Input data/models for simulations
- 4) Data from numerical simulations
- 5) Computer code
- 6) Text based data: Reports, newsletter, research presentations, protocols

These are described in the following sections.

## 1.1 Measurement data

As part of the project, measurements will be performed and the results will be stored; Measurements conducted during the course of the project include i) EM far field measurements and S-parameters of antennas, ii) Radio Channel Characterization measurements. The size of data measured will not be huge (Megabyte range), as far as case (i) is concerned, and can be handled using conventional formats. Occasionally, measurement data between partners will be shared. The data will be stored, but are potentially of no use outside the project. For case (ii), the measured data is of medium size (less than 10 Terabytes). Radio Channel Measurement data includes calibration data, raw data (as acquired by the measurement campaign), as well as processed data (after the application of calibration and radio channel extraction algorithms). Radio Channel measurement data will be used to support scientific publications and, occasionally, data will be shared between partners. For validation and dissemination purposes, selected parts of processed data may be publicly available with the consent and agreement of all partners. Due to the importance of radio vehicular measurements for the scientific community, the data will be stored to exploit possibility of reuse in other relevant research activities.

## 1.2 Design descriptions

Occasionally, components such as antennas and antenna arrays on PCB and other technologies will have to be designed. This may be done in collaboration with partners, so design plans may be shared between partners. The size of data created is small (Megabyte range). The data will underpin scientific publications. The data will be stored and are potentially of use to interested parties outside the project. Publication of the data will depend on whether this is possible under existing NDAs with partners.

## 1.3 Input data/models for simulations

The project has a large simulation component for IMST, TNO and UPRC (EMPIRE XPU); perform simulations for antennas inside of truck models provided by MAN and perform simulations of CACC by TNO. A representative set of designs will be stored. The size of data created is of medium size (Gigabyte range). The data will underpin scientific publications. The data will be stored and are potentially of use to interested parties outside the project, except from the truck models. Publication of the data will depend on whether this is possible under existing NDAs with partners. Moreover, UPRC will perform extended simulations using in-house developed simulation engines (in MATLAB/OCTAVE) for the performance evaluation of transmission and diversity

schemes under standardized radio networks using channel models. Input data/models for the simulation includes i) measurements conducted within the project, ii) radio protocol standards and iii) state-of-the art radio channel models available in the literature. The size of data created is of medium size (Gigabyte range) and will underpin scientific publications. The data will be stored and are potentially of use to interested parties outside the project.

#### **1.4 Data from numerical simulations**

As part of the project EM numerical simulations will be performed and the results will be stored; occasionally, numerical data will be shared between partners. The size of data created is potentially huge (Terabyte range). The data will underpin scientific publications. The data will be stored, but may have limited use outside the project.

#### **1.5 Computer code**

Work in this project includes the development of several software components for various objectives of the project. With the partners' agreement, UPRC intends to publicly distribute source form the implementation of the radio channel model, after its validation through scientifically-reviewed publications as part of dissemination activities, in order to be used by interested parties outside the project. The size of data is small (Megabyte range). In addition, during the integration activities, UPRC will exchange developed computer software (either in source or executable form) with other project partners for the scope of developing the diversity-enabled radio modem and an improved GNSS localization system. The size of data is small (Megabyte range). The specific software will not be publicly available and data sharing will be managed by existing NDAs among partners.

#### **1.6 Text based data: Reports, newsletter, research presentations, protocols**

These data re produced for communication within the project; some of it will be made public on the web-page or through conference presentations, other parts are only for internal use. The data size is moderate (Mega-Gigabyte range).

## **2 Data collection / generation**

### **2.1 Methodologies for data collection / generation**

Data can be stored on servers and dedicated memory repositories, stationed across the partners' premises, all connected to the LAN. Some data can also be stored locally on PC hard discs. The main project data will be stored on a special project repository that will host all the data from the project. This will only be accessible for certain work groups of partner employees and researchers. The project repository is backed up on a regular basis.

### **2.2 Data quality and standards**

There are existing standards from ETSI, which describe the design and functionality of the ITS G5 stack. For the data exchange between our partners we use the Data Distribution Service (DDS). This is a standard defined by the Object Management Group (OMG). In this case we exchange our data in real-time, defined for system-relevant-messages.

Each stored and shared data set should be accompanied by metadata files that (if applicable) should include details for the scope, origin and conditions/circumstances related with the data. Metadata should include: i) time stamp for the creation date of the data set, ii) time stamp and revision for each modification of the data set, iii) generation source (simulation or data), iv) description of the data set, v) (for antenna measurements) antenna configurations, vi) (for measurement data) measurement location, vii) (for mobile measurements) GPS stamp of the measurements, viii) (for code sharing) code revision and revision notes, ix) author and developer names, affiliation and contact data. The manager, creator or developer of each data set is responsible to generate and include the metadata in a text descriptor or an open-standard format of choice (e.g. UML, JSON etc.).

### **3 Data management, documentation and curation**

#### **3.1 Managing, storing and curating data**

The main project data will be stored on a special project repository that will host all the data from the project. This is dedicated to data of all ongoing Work Packages and is only accessible for certain categories and work groups of partner employees and researchers. The project repository is backed up on a regular basis.

#### **3.2 Metadata standards and data documentation**

Data sets will contain metadata that will contain information specific to origins of the data (e.g. through measurement or simulation). As the sources of data vary significantly and to ensure that they can be subsequently manipulated at a later date, this level of metadata will remain intact and further details will be provided within a text descriptor or an open-standard format of choice that also holds a unique link to the data on the project server. Outline of metadata for data sets relevant to this project is presented in 2.2.

#### **3.3 Data preservation strategy and standards**

Data identified as requiring long term preservation (i.e. publications or machine code) will be compressed and archived on mechanical hard drives which will be held locally. An estimation of relevant storage costs for this specific project is not possible to give because the long term storage units are shared house wide for all our projects and it is not possible to break down these costs. Also, it is quite unclear at this point in the project how much data will be stored in the end.

Sufficient storage is already in place to cover the short term and due to the low cost of suitable storage media the additional storage can easily be met through currently available budgets.