

OSCCAR: FUTURE OCCUPANT SAFETY FOR CRASHES IN CARS



Data Management Plan

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1 EXECUTIVE SUMMARY

This deliverable is the first version of the Data Management Plan (DMP) for OSCCAR project. OSCCAR project participates in the H2020 Open Research Data Pilot (ORDP) [1], which means that an open access to research data is provided. The data management within OSCCAR project follows the data protection and privacy issues in digital communication which are governed by two EU directives. The 95/46/EC directive [3] protects individuals regarding personal data (processing) and on the free movement of such data. The 2002/58/EC [4] directive specifies the requirements on data protection and privacy in digital communications.

The deliverable follows the guidelines for F.A.I.R Data Management set by the EC H2020 [2], to submit a first version of OSCCAR Data Management Plan (DMP) within the first 6 months of the project. Management of datasets containing personal information will be compliant with the General Data Protection Regulation (GDPR) [13].

The deliverable presents how research data is collected or generated to reach the project goals, how data is stored, made openly accessible and re-usable. It clarifies the responsibilities for data management and presents details on data security.

It is encouraged to make existing data available for research within OSCCAR project. This data will be generated and collected especially in WP1 Determination of future accident scenarios, WP2 Development of advanced occupant protection principles and WP3 Human Body Models for assessment of new safety systems in future vehicles which are described in detail.

The DMP is a living document and will be updated continuously, whenever significant changes arise. However, an updated version will be available in month 16 as deliverable “D7.4 Data Management update”.

Keywords: Data Management Plan, FAIR data, Data security, Data re-use

2 DESCRIPTION OF WORK

2.1 Data Summary

Data being further processed in the OSCCAR project will not contain personal or commercially sensitive information. The final results, like future accident research data from WP1 e.g, the user study and sled tests in WP2, data on tissue and volunteer tests in WP3 and in the stakeholder group in WP6, may contain references to practices in the OSCCAR system database, the demonstrator evaluation and validation. These data will be processed at a high level of abstraction, devoid of any personal or commercially-sensitive data before sharing within the consortium and publishing.

The management of knowledge, research data, data access and intellectual property rights are delicate issues, especially in close-to-market R&D projects with a large number of OEMs and suppliers working closely together. The handling with this sensitive data is regulated in the OSCCAR Consortium Agreement [5] and Grant Agreement [9]. Some issues regarding data protection, access and security of data have also already been part of the OSCCAR Grant Agreement, Description of Action (DoA) [9].

For reasons of competition (competition law), detailed data on cost and sales prices of specific components and systems WILL NOT be shared.

In Table 1 an overview is presented of the data that will be generated in the project, the standards that will be used, how this data will be exploited and/or shared/made accessible for verification and re-use and how this data will be curated and preserved.

Generated data	Way of exploitation of data and/or sharing/making accessible of data for verification and re-use	Way of curation and/or preservation of data
openPASS simulation software modules, configuration artefacts and simulation results	Develop procedures and documentation of accident scenario simulation methodology based on openPASS; the aim is to provide the relevant software modules in the openPASS environment, i. e. git repositories of Eclipse, so data might be re-generated by re-using the modules.	Deliverables describing scenarios and simulation based assessment publicly available on the OSCCAR website; open source code and OSCCAR specific configuration artefacts (scenario models) generated in OSCCAR committed e.g. to Eclipse git repositories
OpenSCENARIO format descriptions	Description of approach how to use OpenSCENARIO in the OSCCAR toolchain (link between openPASS and CAE tools); provide examples of scenarios	Publicly available (on the OSCCAR website) ; Communication with XOSC project to incorporate changes/additions

Generated data	Way of exploitation of data and/or sharing/making accessible of data for verification and re-use	Way of curation and/or preservation of data
Procedures for hardware testing for component and sled testing	Convey enhanced testing procedures with respect to new components related to future interior concepts to the international standardization community.	Communication with standardization agencies + Publicly available on the OSCCAR website.
Data generated within the WP2 user study	Generation of knowledge in respect to user opinion and input for selection of testcases to be persued within OSCCAR	Publication of main results
Biomechanical data analysis within WP3	Development and enhancement of HBMs characteristics. Description and publication of implementation methods	Validation data and methods to be published. Respective deliverables publicly available on the OSCCAR website
Simulation and assessment procedures for HBM application	Convey adapted procedures for virtual testing to the international standardization community.	Communication with standardization agencies + Publicly available on the OSCCAR website

Table 1 Overview of data generated in the project

In the Consortium Agreement [1] signed by all partners the following aspects regarding data management are addressed and regulated: Background, Results, Access Rights, Publications.

2.1.1 Data types and formats

The type and format research data are created depending on how researchers choose to collect and analyse data and depends on discipline-specific-standards and customs. Ensuring long-term usability of the OSCCAR data requires consideration of the most appropriate type and file formats.

Within research activities of OSCCAR project it is intended to use different types and formats of data. To reach the project goals an intensive review and coordinated analysis of past and newly available volunteer tests data will be necessary. These data sets are from different formats and types:

- Photos, videos, spreadsheets, mechanicals measurement data (force, displacement, trajectories etc), electromyography (EMG) measurement data (muscle activity,),

For the data exchange of research results:

- Word documents, Excel documents, PowerPoint documents, pdf, documents containing simulation code, datasets

For the documentation of results:

- Deliverables (Word documents)
- Publications (pdf)

Personal data:

- Contact list (internal use only)
- Personal data for user study. Dataset on empirical sample describing ergonomic aspects of user behavior in a simulated automated driving situation. The handling of the data is regulated in the information sheet, the consent informed form and the form for withdrawal of participation. No sensitive data will be collected. In the consent informed form volunteers for the study get informed about what data will be collected (e.g. audio/visual/text/survey). In the information sheet the assurance of anonymity and confidentiality is defined. Besides it details how the data collected will be used, what happens to data and results at the end of the research [14].

The following rules are followed:

- Data will be stored under pseudonym. Data will be stored electronically and on paper. Only researchers authorized by a signed form, has access to data. The data could be accessed by any third part only in an anonymous way.
- ID – related information will be kept in separate databases from other information types in order to ensure that no personal data can be obtained without the proper authorization.
- No sensitive data will be collected.
- The personal data will be stored for the duration of the project only, if collected at all.
- De-identified data will be deposited or submitted to an open source online research data repository at the end of the study. This data may be used for future research.

2.1.2 Re-use of existing data

It is encouraged to make existing data available for research within OSCCAR project. This data will be generated and collected especially in WP3 Human Body Models (HBM) for assessment of new safety systems in future vehicles. An overview of the data in the according tasks is shown below:

- Task 3.1.1 Existing experimental data from (CHALM; DAI and LMU)
- Task 3.1.2 Existing data: Chalmers/JARI will contribute with MRI (Magnet Resonance Imaging) data of seated volunteers. Such data will be used to further understand the position of the pelvis and adjacent inner organs.
- Task 3.1.3 Additional data on pelvis to seat interaction will be made available and will enable the use of HBMs to predict human in-crash response in future sitting positions. Existing PMHS neck response data have been identified and plans for data exchange established.

- Task 3.2.1 Project partners will provide additional volunteer data: Task 3.2.1b. These are among other parts of the OM4IS¹ (Occupant Models for Integrated Safety project) test series, the AHBM 2 (Active Human Body Model Project) test series, AHBM 3 test series and parts of the Precooni¹ data. To make this data available and to enable validation of morphed active HBMs, i.e. models made to be representative of the population diversity, additional data analysis is required.

Intensive review and coordinated analysis of past and newly available volunteer tests will be used.

- OM4IS ½ (Improved Predictability research project) tests results/manoeuvres incl. previously unpublished female volunteer data to be made available in detail. These are braking, lane change and combined manoeuvres.
- Precooni (K2 research project) data & results to be made available in detail. This is a small, low-g sled test series with volunteers under laboratory conditions.
- SAFER (SAFER Consortium) data: AHBM 2: Response corridors for vehicle kinematics, muscle activation, interactions forces, and volunteer kinematics will be provided. AHBM3: Response corridors for vehicle kinematics, muscle activation, interactions forces, seat pressure and volunteer kinematics will be provided. Analysis of female data and data for volunteers when in the driver's seat are just to be started.
- Daimler Driving Study to be made available in detail (Unpublished volunteer test – Focus on driver: steering, braking, combined manoeuvre – male & female)
- Published and soon to be published data from TME data to be made available in detail (owned together with IFSTAR Institute- (Institut français des sciences et technologies des transports, de l'aménagement et des reseaux)
- Existing volunteer data owned by TASS/ Siemens company will be provided.
- Analysis of PRISM (EU Project- Proposed reduction of car crash injuries through improved smart restraint development technologies project) data (standard seating posture/driver).

During the course of the project, the OSCCAR team may gain access to data that was collected before the start of the project and by an organisation that is not a member of the consortium. In this event, the OSCCAR partner who receives this data must ensure that there is no information contained in it, which could be used to identify individual citizens. Further, the OSCCAR partner must be mindful of the risks of linking this data, or conclusions resulting from this data with data or conclusions from other data sources. Informed consent must be obtained when acquiring pre-existing data from external sources. [9]

2.1.3 Origin of data

Suitable datasets to being used for validation/tuning for human body models come from OSCCAR partners and from initiatives and projects in which the needed data has been collected, see [7]. Data sets provided to OSCCAR will be assessed a-priori for their suitability by the respective partner. Only technically and legally suitable data will be used within OSCCAR.

¹ COMET K" funded projects like OM4IS and Precooni provides data about the occupant kinematic in low-g driving and pre-crash maneuvers

2.1.4 Expected size of data

To be evaluated during the course of the project. The expected size to be handled depends on the extent and the nature of the data that are made available. Datasets including high resolution and or high speed video tend to be relatively large, as are simulation datasets that include full vehicles and HBMs in pre- and in-crash simulation. Several GBs of data can be expected for a single set. Therefore only stripped sets will be made available.

2.1.5 Data utility

- Automotive Industry
- OSCCAR consortium
- OSCCAR associated/ international research partners
- All Industry and the large research community dealing with virtual testing and or biomechanics.
- European Commission services and European Agencies
- Austrian institutions and bodies of the EU
- The general public including the broader scientific community

2.2 FAIR data

2.2.1 Making data findable

With respect to the guidelines on FAIR Data Management in Horizon 2020 [11] research data should be “FAIR” that is findable, accessible, interoperable and re-usable. OSCCAR project will undertake all necessary action to make its data FAIR.

The primary responsibility for storing and making data findable lies with the data creator. However, all data created within OSCCAR project will be stored in one central archive – OSCCAR Projectplace [10].

2.2.2 Naming conventions

A structured data storage is essential for proper and secure storage of data files and records. For any file-based storage this includes clear and unambiguous file naming, the use of proper versioning, clear and intuitive folder structure.

The naming conventions within OSCCAR project are described in the Project Handbook [8]. The following conventions are foreseen for all project documents (presentations, meeting minutes, deliverables, reports...)

- DATE (only if required)
 - date of creation (format: yyyyymmdd)
- TITLE
 - Short description of the document, please use 7-bit ASCII characters (a..z, 0..9, _, -) only (DO NOT use special characters, e.g. “:”)

- VERSION (only if required)
 - vX-Y ... use position X for a major release, and position Y for a minor release (e.g. v0-1, v0-2, v1-0, v1-1, v2-0 ...)
 - Avoid uploading files with version numbers in their name on Projectplace – use the versioning system instead.
- FILEEXTENSION
 - according to the type of the file (docx, pdf, ...)

2.2.2.1 Presentations

{DATE_}OSCCAR_TITLE{_VERSION}.FILEEXTENSION

e.g. 20150623_OSCCAR_WP3_Overview_v1-0.ppt

e.g. OSCCAR_Overview.pdf

2.2.2.2 Meeting minutes

DATE_OSCCAR_MoM_TITLE{_VERSION}.FILEEXTENSION

e.g. 20140323_OSCCAR_MoM_CoreTeamWebex.pdf

e.g. 20140323_OSCCAR_MoM_CoreTeamWebex_v1-0.doc

2.2.2.3 Deliverables

These naming conventions are relevant for the deliverable creation and deliverable review process. The submission of deliverables to the European Commission is exclusively handled by the co-ordinator.

- OSCCAR_D_DELIVERABLENUMBER.FILEEXTENSION
 - e.g. OSCCAR_D_6.1.doc
 - e.g. OSCCAR_D_6.2.pdf

2.2.3 Search keywords for re-use

In each deliverable keywords to describe the main content have to be included within the Executive Summary. It is possible to search for documents on Projectplace with a search function. All documents, files and folders in which the searchword appears are displayed.

2.2.4 Version numbers

The version control for documents will be performed on Projectplace. It uses version numbers in the format of x.y. Here, x is the major version and y the minor version number. Once the document is checked in after finishing the modifications, the version number is automatically updated. The version number within the document must also be updated. This has to be done manually.

In case a new version is created by checking in a document on Projectplace, it is required to attach a comment which describes what has changed within the new version.

The following guidelines apply for using major and minor versions:

- Minor version: incremented for changes to draft versions of a document (prior to release).

- Major version: incremented when a reviewed version of the document is released. A released version will always have a version of the form x.0. The major version number of a draft document may also be incremented if there are very significant changes.

If possible, version numbers should NOT be used in the filename. Instead, the versioning system of Projectplace should be used. (see [8])

2.2.5 Metadata

Currently it is not foreseen to create new metadata within OSCCAR. In case metadata will be needed later on, it will be outlined here what type of metadata will be created and how.

2.3 Open access data

2.3.1 Open available data

Following the guidelines of the H2020 regulations defined for the Open Research Data Pilot (ORDP) [1], all data collected or produced within the OSCCAR project consortium will be by default open. Some sensitive data may be shared only under restrictions (e.g. within the consortium only).

To share data with the OSCCAR consortium, a repository has been set up: OSCCAR Projectplace [10]. It provides access to project data and is also a platform to view and share files easily. The access to data can be restricted individually.

This repository is hosted by the project coordinator (VIF), who aims to reach the highest level of General Data Protection Regulation (GDPR) [6] compliancy amongst others by:

- Applying strict policy in granting and revoking access to the data
- Logging of user identity during data access, download and upload, including version control. This enables to restore the availability and access to the data in a timely manner in the event of a physical or technical incident

Deliverables with the distribution level “Public” as well as open access publications will be uploaded on OSCCAR Website [12] where open access is granted for all interested parties. Other open access data will be accessible through open access repositories.

2.3.2 Accessibility of data

To share data and make it accessible with OSCCAR consortium partners, a project repository has been set-up by VIF and is available [6]. As described above public deliverables and publications will be available on OSCCAR Website as well as in according repositories.

According to H2020 ORDP [1] open access to scientific publication is obligatory, as well as open access to research data, where opt-outs are possible. Beneficiaries will therefore deposit an electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publication – this ensures a long-term preservation. After that beneficiaries must ensure open access to those publication via the chosen repository. They can choose a repository but must ensure open access for most 6 months.

As described in the ORDP research data generated in the project will be as open as possible and as closed as necessary. Open accessible research data will be stored in a research data

repository. As far as possible measures to enable third parties to access, mine, exploit, reproduce and disseminate (free of charge for any user) research data will be taken [1] [17].

2.3.3 Deposition of data

As regulated in the ORDP beneficiaries will also provide open access, through the repository, to the bibliographic metadata that identify the deposited publication [1] [17]. As suggested by the EC OpenAIRE [18] / Zenodo [19] have been chosen as such depositories.

Arrangements with the certified repository for open access data will be done as soon as appropriate data is available.

2.3.4 Restrictions on use

The access to the OSCCAR repository will be provided by the project coordinator VIF. Access is only granted to project members. Restrictions to any folders are possible. Restrictions on use are defined in the Grant Agreement [9] and in the Consortium Agreement [5].

Open available data (public deliverables, publications, research results) will be available on OSCCAR Website [12] and on according depositories like described in section 2.3.2 .

2.3.5 Data access committee

There is no need for a data access committee.

2.3.6 Conditions for access

As suggested by ORDP within OSCCAR project authors are encouraged to retain their copyright and grant adequate licenses to publishers [1] [17].

2.3.7 Access management

Data on an open access depository like openAIRE manage access to the respective data.

In Projectplace, logging of user identity during data access, download and upload, including version control. This enables to restore the availability and access to the data in a timely manner in the event of a physical or technical incident.

2.4 Data interoperability

OSCCAR project knows that common data and metadata standards and formats are a key aspect for data operability. Standardisation makes data discoverable and this way promotes international and interdisciplinary access to, and use of, research data. To ensure correct and proper use of the OSCCAR data by the owners and re- users, the use of standardized vocabularies and ontologies is also necessary.

Data exchange and re-use (between researchers, institutions, organisations, countries) is provided for publications and research data in open access repositories like claimed in ORDP.

2.4.1 Data and metadata vocabularies, standards or methodologies

Standardisation on data level will be performed by applying community-based standards as used in peer reviewed publications and conferences and ISO standards, like ESV, Journal of Crashworthiness, Ircobi, etc.

Standard and common vocabularies will be used in all types of data to be published by OSCCAR. Where additional explanation is necessary, it will be provided.

2.4.2 Licensing

Currently data or software licencing is foreseen to be of FOSS (free open source software) type to be published accordingly. (e.g. GPL v3).

2.4.3 Reusability of data

As soon as data and results are ready to be made available, they will be published and / or uploaded for open access. This section will be detailed throughout the course of the project.

2.4.4 Useability of data by third parties after the end of the project?

In Table 1 an overview of the data generated in the project, how this data will be exploited and/or shared/made accessible for verification and re-use and how this data will be curated and preserved. Project results and outputs will be published on OSCCAR website [12] and open repositories accessible for verification and re-use (see [9], section 2.2.4). The website will remain online at least until five years after project end.

OSCCAR project supports the concept of FAIR data, and will work toward making research data FAIR. The decision about long-term provision will be taken as the data are stored: open access data (e.g. public deliverables, publications) will be made FAIR as long as possible.

Most research data of OSCCAR project will be open access as soon as the research has been completed and published. There are no plans to end provision of OSCCAR data, and they will therefore be available for re-use as long as the archives exists. The data produced in the course of OSCCAR project will be re-usable for as long as the information they contain are relevant.

2.4.5 Data quality assurance processes

An initial quality control is needed at the local level and early in the collection process. The initial control of the data, during data collection, is the primary responsibility of the data creator/owner, who must ensure that the data reflect the actual facts, responses, observations and events. The consortium agreement details the publication quality control process, that is also applied to ensure data quality.

In deliverable D8.2 [15] the data protection management system from the coordinator VIF is described. To ensure the protection of personal data, the data protection management system of the coordinator VIF or where required of the data collecting partner organization will be applied.

2.5 Allocation of resources

2.5.1 Costs for making data FAIR

Costs for establishing and maintaining the OSCCAR data repository are covered by the coordinator, VIF. While the repository will not be maintained after the end of the project, all files stored in the repository shall be stored after the project to meet the requirements of good scientific practice. A strategy for storage of the files after the project is being developed and will be included in the follow-up DMP in month 16.

Resources for long-term preservation of datasets will be ensured by its storage in the repositories. The costs for storing data will be born locally. The costs for making publications open access can vary from 500 to 5000 euro, depending on the journal. This will be covered by the company/institution of the author(s). Some funding resources are already dedicated to this. (see other direct costs)

If eligible, and planned for, costs related to open access publication will be covered by the H2020 Grant.

2.5.2 Responsibilities of data management

The project coordinator has organized a well structured data repository on Projectplace [10].

As project coordinator VIF is responsible for:

- Initial set-up of the data repository and upgrading when needed
- Maintenance of the data repository: definition, creation, updating of the data repository structure, i.e.: structure of folders and subfolders, names, contents and access, upload, download rights
- Perform security assessment on a regular basis in order to guarantee the agreed security level
- Reporting and blocking any possible security threat, taking appropriate measures accordingly
- Collecting users requests for access to and download of data in the repository

VIF is not responsible of the interruption of the data repository services that are due to force majeure.

The quality control of the data, during data collection, is the primary responsibility of the OSCCAR partners (as data providers).

In general, the aim is to use European and international repositories. In addition to this, all OSCCAR data will also be stored on OSCCAR Projectplace [10].

The primary responsibility for back-up and recovery of the data also lies with the OSCCAR partners, and for the data stored on Projectplace this data lies with VIF.

- 'Data creation' refers to the act of creating new data or acquiring existing data which is new to the project (for example by obtaining existing datasets for use in the project).
- If a consortium partner is the creator of data (e.g. by performing data collection or tests), the partner is responsible for properly storing, processing and sharing that data, and ensuring that it does not contain personal data before being shared in the consortium.

- If a consortium partner wishes to use information from a test, but is not the creator (e.g. by acquiring relevant datasets or relevant documentation), the partner is responsible for determining the source of the data, and assessing if the dataset contains personal or otherwise privacy- or commercial-compromising or sensitive data. If that is the case, it is the responsibility of the consortium partner to purge personal etc. data from that dataset and prepare it for further dissemination in a proper admissible form. [9]

2.5.3 Resources for long term preservation

The OSCCAR consortium, i.e. its partners and the Executive Board, board discusses all items related to publication of data, that also concerns details like time, timing, place and necessary resources if applicable.

2.6 Data security

2.6.1 Provisions for data security

All shared, processed and operational data will be stored in secure environments at the locations of consortium partners with access privileges restricted to the relevant project partners. If (processed) data is to be transferred from one partner to another, the transfer needs to be done securely, for example via a secure data channel, in an encrypted mode or via physical transfer. [9].

OSCCAR project will undertake all required efforts needed to protect the data, products and service against unauthorized use. The primary responsibility to take necessary measures to ensure data security lies with the partners, and once stored on the data repository OSCCAR Projectplace [10] the security provisions come from there.

OSCCAR project will undertake all efforts required to provide secure access to data. Where applicable, authentication systems are used, requesting log-in before providing access to secured data and information. Furthermore, OSCCAR project will take measure to be compliant with the EU regulations regarding the protection of personal data [13].

OSCCAR project promotes a culture of openness and sharing of data and will therefore stimulate the exchange of good practices in data access and sharing by liaising with existing European initiatives.

2.6.2 Repositories for long term preservation and curation

VIF provides a workspace (Projectplace) for the project users where necessary. The Projectplace environment is hosted in Stockholm, Sweden and ISO-27001 and SOC2/SSAE16 certified. [20]

As suggested by the EC OpenAIRE [18] and Zenodo [19] have been chosen as depositories for open access publications.

2.7 Ethical aspects

2.7.1 Ethical or legal issues on data sharing

This section is to be covered in the context of the ethics review, ethics section of DoA and ethic deliverables. Ethics and legal issues are covered within the OSCCAR Grant Agreement [9] and the OSCCAR Consortium Agreement [5]. Ethics is also covered in a separate deliverable D8.2 [15],

which describes principles of handling personal data and the data protection procedure within OSCCAR project. The aim of this deliverable was to outline a OSCCAR specific data protection procedure. It serves to document how the data protection requirements in OSCCAR are met. To ensure the protection of personal data, the Data Protection Management System of the coordinator VIF will be applied. The goals are the establishment and maintenance of the regulations from GDPR [6] and DSG 2018 [16]; decreasing the likelihood for potential data protection violations as well as the continuous improvement of the data security management system (DSMS)

Subsequently, all collected personal data and the corresponding work packages and activities are defined. It is described what personal data has been collected and how the collected data will be managed, protected, and preserved. No sensitive personal data, which is defined by EU GDPR [6], will be collected or will be necessary for the project. Even though there is no collection of sensitive personal data, the project still collects personal data.

There are no other ethical or legal issues that can have an impact on data sharing. Ethics and legal situation in general is constantly changing and therefor monitored. OSCCAR project wil adapt accordingly.

2.7.2 Informed consent for data sharing

A questionnaire that includes consent for data sharing and long-term preservation dealing with personal data is available in D8.1 [14]. Templates of the informed consent/assent forms and information sheets (in language and terms intelligible to the participants) will be kept on file and submitted on request. (see D8.1 [14])

2.8 Other issues

Currently no other issues of interest are identified. During the course of OSCCAR, additional aspects will be added here if necessary.

3 REFERENCES

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A. ABBREVIATIONS AND DEFINITIONS

Term	Definition
AHBM	Active Human Body Model Project
DMP	Data Management Plan
DoA	Description of Action
GDPR	General Data Protection Regulation
HAVs	Highly Automated Vehicles
HBM	Human Body Model
IFSTAR	Institut français des sciences et technologies des transports, de l'aménagement et des reseaux
MRI	Magnet Resonance Imaging
OM4IS 2	Improved Predictability research project
ORDP	Open Research Data Pilot
Precooni	Research project
PRISM	Proposed reduction of car crash injuries through improved smart restraint development technologies
VRUs	Vulnerable Road Users