Adaptive ADAS to support incapacitated drivers Mitigate Effectively risks through tailor made HMI under automation

Deliverable 10.5 – *Data Management Plan – Update*

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Version History

Date	Version	Comments
20/11/18	1	DPIA and final data descriptions' templates were circulated to UC leaders
05/03/19	2.1	Completed templates from all UC leaders were aggregated
08/03/19	2.3	Draft was sent for internal peer review
14/03/19	2.4	Comments were integrated to final version
15/03/19	2.5	Final version was submitted to EC

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Glossary

ADAS	Advanced Driver Assistance Systems
ADAS&ME	Adaptive ADAS to support incapacitated drivers Mitigate Effectively risks through tailor made HMI under automation
API	Application Programming Interface
AVI	Audio Video Interleave
BFI-10	Big Five Inventory - 10
CAN	Controller Area Network
CDB	Central Database
CSV	Comma Separated Values
D	Deliverable
DSMS	Driver State Monitoring Subsystem
DMP	Data Management Plan
DPIA	Data Privacy Impact Assessment
DOI	Digital Object Identifier
DSS	Decision Support System
DPO	Data Protection Officer
EC	European Commission
ECG	Electrocardiography
EEA	European Economic Area
EMG	Electromyography
EOG	Electrooculography
ESAS	Environmental Situation Awareness Subsystem
EU	European Union
EV	Electric Vehicle
GDPR	General Data Protection Regulation
GEW	Geneva Emotional Wheel
GUI	Graphical User Interface
GSR	Galvanic Skin Response
HMI	Human Machine Interface
HR	Heart Rate
IDF	International DOI Foundation
IR	Internal Report
km	kilometres
KSS	Karolinska Sleepiness Scale
kW	kilowatt
kWh	kilowatt per hour
LAN	Local Area Network
M	Month
MoU	Memorandum of Understanding
OEM	Original Equipment Manufacturer
ORPD	Open Research Data Pilot
PIA	Privacy Impact Assessment
PMT	Project Management Team
PTW	Power Two-Wheeler
RR intervals	Intervals between successive heartbeats
RTMAps	Real-Time Multisensor applications
SS	Sensor Subsystem
SUS	System Usability Scale

TAP-M	Test of Attentional Performance – Mobility version
UC	Use Case
UCD	User-Centered Design
VAS	Vehicle Automation Subsystem
VR	Virtual Reality
V2X	Vehicle to everything
WAV	Waveform Audio File Format
WP	Work Package

Executive Summary

This Deliverable is the second update of Deliverable 10.2 'Data Management Plan' and the new additions in relation to the previous versions are introduced in **Chapter 1**.

Chapter 2 presents the implementation of GDPR to the project and the aspects affected or potentially affected because of the new Directive.

Chapter 3 includes the Data Privacy Impact Assessments (DPIAs) carried out separately by each UC team in order to identify if any issues or risks exist because of data collection. No risks were identified in any of the Use Cases because partners have already taken the necessary steps to anonymize data even before GDPR was implemented.

Chapter 4 briefly presents the different data clusters and introduces the consolidated data table that is an elaborate and in-depth account of all data collected across UCs as well as an update of the ADAS&ME data privacy (section 4.1) that was included in the first version of this Deliverable (submitted M6). Partners have decided data to remain available only within Consortium. The reasons are discussed in section 4.2. In addition, sections 4.3 and 4.4 shortly addressed the open access publications and where they will be available after the end of the project. The Deliverable concludes with **Chapter 5**, where the main outcomes of this version are summarized considering potential lessons learnt from the implementation of GDPR half-way through the project.

The adjustment of the existing informed consent form template in order to be GDPR compliant is added in **Annex 1**.

The Data Privacy Impact Assessment (DPIA) template can be found in **Annex 2** that was distributed to partners to be completed and the results are presented in Chapter 3. The latter will be circulated and completed two times by the end of the project. The first assessment is included in the final version of the Deliverable (M30) and the final version in the final technical report, if any changes or additions are expected.
The updated data privacy policy has been added in **Annex 3**. The update considers the GDPR requirements and is written in a format to address the participants in UC Pilots (i.e. whole duration of testing period) and user tests (i.e. individual user testing session).
Finally, partners updated the existing data collection template for data collected until this project period. The consolidated table including data for UCs can be found in **Annex 4**.

1 Introduction

This document is the third update of the deliverable; the other two versions were submitted in M6 and M24, respectively. The Data Management Plan aims to define the processes of data handling during and after the end of the project.

In the first version of this Deliverable, data generated by sensors and devices were gathered and annexed, the standards and methodologies were presented, and the data privacy protection procedure and policy were defined and established along with guidelines on how data can be openly shared in order to comply with ORDP requirements with regards to their storage, curation and preservation.

The second version included information about all the data types collected for the test requirements of each Use Case (UC) and this information was used to update the existing table of all gathered data during user testing across UCs and sites. A description of the ADAS&ME repository and its functionalities was included (Georgoulas & Gavrilis, 2018).

This table has been continuously updated because there are two complexity factors that define the data clusters and their treatment: a) data collected are UC-specific (i.e. data collected for creating the physical fatigue algorithms may be different from the ones collected during the investigation of distraction and sleepiness) and b) testing objectives are different across phases (i.e. in the first phase, data are collected for developing/refining the affective states' algorithms and in the second phase, data are collected to select the preferred HMI configurations for each affective state and in the final stage the systems will be tested in real (like) life conditions). The data table annexed in this document refers to the data collected during the first two these phases.

However, the data collected during the final stage will include much less data than the first two phases, but data will be from the categories already addressed and thus not an update to this table is necessary.

The reason for the addition of a third version of this document is the fact that GDPR was implemented long after the beginning of the project and thus the processes relevant to the new regulation were applied after this date to the project and are reported in this version.

As this is a UC-based project, the objectives and data collection are performed at UC level, therefore separate Data Private Impact assessment (DPIA) reports were prepared per UC.

The following table presents the content enrichment across the three separate updates.

Table 1. D10.2 content per version

First version (preliminary; M6)	First update (intermediate; M24)	Second update (final; M30)
• Data processes. • Data sharing. • Initial data policy. • First data collection table was included in Annex I. • Relevant legislation and guidelines.	• Data collection per UC pilots, as presented within D7.1 (Cocron et al., 2018; submitted M18). Types of data along information about privacy, confidentiality, and other characteristics are presented in Table 3 (Annex 4), following the same format with the table annexed in the	• Results of GDPR implementation in the project: – Data Privacy Impact assessment (DPIA). • GDPR compliant consent form. • Final datasets collected and

First version (preliminary; M6)	First update (intermediate; M24)	Second update (final; M30)
	first version of this deliverable. • A short description of the ADAS&ME data repository, based on D4.1, submitted in M18.	decision about their openness. • Open access publications current status and future availability.

2 Implementation of GDPR in ADAS&ME

GDPR was implemented in the middle of the project's lifetime and the following steps were taken:

1) Defined a GDPR compliant informed consent form template with clear reference to subject's rights to access, retrieve, and delete their data post-testing (Annex 1).
2) Assessed the potential data privacy issues at UC level by the teams involved in each Use Case (Chapter 3). As the data collection was not big and it was on pilot level, then a DPO was available were it was already appointed. These partners were advised to discuss any data privacy issues with their DPOs, if one was appointed. However, no such issues and risks were identified due to data anonymity and restricted access.
3) Defined who the data controllers and data processors are in the project as well as the duration of data preservation period after the end of the project.

3 Data Privacy Impact assessment (DPIA)

A data privacy impact assessment process was initiated as soon as the GDPR was implemented. As the project's work started long before GDPR, this impact assessment was not applied before data collection and processing.

A template was prepared based on the GDPR requirements (as defined within Art. 35) and was circulated to UC leaders to discuss and complete in communication and agreement with the pilot sites' controllers and processors. Assisting and guiding questions were included in each section of the template to help UC teams in completing it with relevant information harmoniously across UCs. The circulate template have been annexed in this update (Annex 2).

Data controllers and processors were the following organizations: SCANIA, VEDECOM, VALEO, VTI, DUCATI, CERTH/HIT, DLR, FORD, FhG, Autoliv, uPatras. The latter is perceived as both controller and processor because is the partner who created the database and therefore acts as a data manager of the project as well as was involved in the development of algorithms across affective states.

Only data processors were the following partners: RWTH Aachen, EPFL, OVG, Continental, and SmartEye.

Sections 3.1-3.5 present the results of each separate UC DPIA. Some parts of the text are similar in different UCs and validate the harmonious data procedure and policy implemented across the project. An overview of these reports is discussed in the last section of this Chapter.

3.1 Use Case A: Automation behaviour

A DPIA was performed because participants are asked to provide feedback and data that could be identified as personal will be collected but participants remain anonymous.

3.1.1 Aims

- Development and evaluation of a system to detect driver's sleepiness;
- Development and evaluation of a system to detect driver's visual distraction;
- Development and evaluation of a system to detect driver's resting;
- Development and evaluation of a system to detect driver's frustration;
- Development and evaluation of HMI elements and their combinations to inform and warn riders when they are sleepy, visually distracted, frustrated, or resting.

3.1.2 The need

The need for a PIA is based on the fact that data collected may be anonymous but some of the data collected maybe classified in the 'sensitive data category' (e.g. heart rate).

3.1.3 Data treatment process

Data is being collected for two purposes; (1) data to support development of driver state detection algorithms, (2) data to support HMI development.

Data are collected anonymously through sensors and questionnaire completion. Identifying information afforded from provision of consent to participate, is stored separately to all other data collected from the participant. All paper data are anonymous and stored in a locked cabinet.

Data were collected to support the development of the driver state detection algorithms (Sleepiness, Visual Distraction, Frustration, and Rest) were collected (WP4). As per the informed consent obtained from the participant (and as was approved by the Stockholm Region Ethical Board), the only source of data in which the participant could be identified (raw camera data used for developing the Sleepy and Visual Distraction algorithms) was shared with three partners (the data owner, Scania, Smart Eye, and EPFL). These data were collected prior GDPR implementation; however, anonymity was protected. This digital information is stored on an isolated data storage device and is not connected to the Scania network. Other camera data not required for algorithm development is stored on an isolated data storage device and is not shared with other partners. All other non-identifying data will be shared with project partners via a secure data repository. Only pre-specified contributors can access the data that is needed for that partner (i.e. data compartmentalization).

Additionally, data were collected to support the development of the Human Machine Interaction (HMI; WP5). No data collected from this work is shared with other partners. Identifiable digital information (from eye trackers) will be stored on an isolated data storage device that is not connected to the Scania network. Non-identifiable driver information is stored on a shared director accessible by all Scania project contributors.

Digital and paper data will be destroyed five years after the completion of the project.

3.1.4 Data sources

As shown above, data sources are sensors and questionnaire data. For a complete list, please

refer to the data collection spreadsheet completed for UC A (Annex 4).

3.1.5 Data sharing

In addition to the identifiable raw video camera data explained above, anonymized raw data was shared with VTI for generation of the Rest algorithm. Identifiable driver data (raw camera data from eye tracking cameras): stored on isolated memory storage device. Shared with two additional partners (consistent with approved participant consent, and Stockholm region ethics board), beyond the data owner (Scania).

Non-identifiable (digital) participant data (e.g. heart rate) were stored on Project hosted data repository and available to specific partners requiring access to the data for algorithm development. No high-risk data processing was involved.

3.1.6 Data clusters

No special categories of data are included. The main data clusters are the following and include fata collected for algorithm training:

- Demographics Questionnaire
- Background Sleep Questionnaire
- Sleep Diary
- Alertness & Sustained Attention (TAP-M) task performance
- Lane Change Test & N-Back Task Performance
- Physical Ergonomics Measurements
- Karolinska Sleepiness Scale
- Stress Scale
- VITAPORT II: EOG, ECG, GSR, EMG
- CAN data (steering wheel, levels, and Instrument Panel buttons and Switches)
- Eye Tracker (x 3)
- Optical Cameras (x 3):
- Hypnodyne: EEG data
- Bitium sensor: Heart rate parameters
- Data collected for HMI development includes:
- Performance associated with handovers/takeovers of control between the participant and the automated vehicle
- Geneva Emotion Wheel
- Human Trust in Automation Scale
- System Usability Scale (SUS)
- AATT
- 10-grade Scania scale
- Open interview questions

Data have been so far collected in two stages with ten drivers participating for two days in Stage I and 13 drivers participating for two hours each in Stage II. All data collected were used (i.e. data minimization principle was followed). Separate HMI driving simulator study will be conducted with two hours participation for each user and aiming again to use all collected data.

Two rounds of data collection to support algorithm training were conducted. One round of simulator driving testing was conducted. Anonymous datasets will be stored for five years after the end of the project. Individuals are not affected because data collection and storage are anonymous.

The identifiable eye tracker camera information that was shared between three partners is from 23 participants. It covers participants in the Stockholm County (län).

3.1.7 Context of processing

All participants are Scania (or Scania subsidiary) employees. Drivers participated voluntarily and were free to stop and leave whenever they wanted and if they wanted their data to be deleted and not stored, they were informed they could ask for it. They were informed about data being treated anonymously and used for research purposes and publications. No concerns existed because data collection is anonymous. Data collection was not novel. Children or other vulnerable groups were not involved. All data collected was done so using off-the-shelve technologies. There were no issues related to public concerns. Data collection for algorithm development was approved by the Stockholm region ethics board.

3.1.8 Purposes of processing

As described previously, some data are used for development driver state detection algorithms. Other data is used as input to the HMI. No indented effect is anticipated on the person. This process ensures a user-defined and accepted system, as it is being developed during the lifetime of the project and, as whole, it did not pre-exist. In addition, it ensures the system is safe, reliable, accurate, valid and usable.

3.1.9 Consultation process

Participants' views will be collected through self-reports and standardized questionnaires. For HMI development, no one else but the local (Scania) project team will be involved in the data collection process. The team member names have been added in both the ethics application and the informed consent form. Data collected from Stage I and Stage II testing has been made available to the relevant partners (see previous description). Information about data security was received internally from the project.

3.1.10 Necessity and proportionality

Data processing is performed within the framework of the European project ADAS&ME and is part of our contractual obligations. The data processing achieves its goal because it is based on careful and considerate experimental planning, as it is described in D7.1 of the ADAS&ME project. There was no other way or method in order to achieve this outcome and especially if the same level of system performance is required/requested. Function creep is prevented by the fact that the system and its respective functions cannot be used for another purpose. The end-product will be a prototype that will not be used by people outside the consortium. Further development and improvements can be made but they will not involve usage of data collected at this stage for different applications. Further exploitation of the products generated within this project will not require any further access to participant data. Data quality is ensured because of technical verification and pre-testing sessions taking place before any actual testing. Certain

indices were set for technical performance with regards accuracy, validity, sensitivity and reliability. Data treatment and minimization was controlled by trained data scientists. All participants completed an informed consent form. Stage I and Stage II testing has been completed and was GDPR compliant, even though parts of them were performed before GDPR was implemented.

Users receive information about data treatment and storage, anonymization process, their own rights during testing, a copy of the informed consent form, testing duration, description of the project and contact points.

All data are anonymous, and processors have no access to any information about the participants (except as mentioned for the identifiable camera data). Participants have agreed for those data to be shared within the consortium.

Identifiable video data were transferred by a wired local connection from one encrypted data storage device to another encrypted data storage device. Non-identifiable data was transferred to a project hosted data repository.

3.1.11 Identified, assessed and mitigated risks

No data related risks are envisaged and were encountered during the tests already completed or are scheduled to be carried out. Simulator sickness was a potential risk for test conduction, not related to data privacy, that would result in immediate cessation of the test session. Participants were informed beforehand of this possibility through the informed consent process.

3.2 UC B – Range anxiety (VALEO)

3.2.1 Aims

To help drivers mitigate their range-related anxiety and increase the acceptability of electric vehicles, tests were conducted to determine whether we can reliably provoke and detect anxiety and other emotions in electric vehicle drivers. Additionally, these tests aimed to determine which part the HMI is responsible for the anxiety and stress of the driver of an electric car, and to see whether it is indeed possible – that is whether the intra-individual variability of the person's behaviour and physiological condition is detected and interpreted reliably and correctly enough - to develop an adaptive approach to the HMI; whereby a vehicle would progressively amass data and learn to behave in the most appropriate way towards its driver.

Research Hypotheses:

- Spontaneously experienced positive and range anxiety can be induced while driving an electric car;
- A discrimination of experienced positive and range anxiety during driving is possible based on video recordings of the face;
- A discrimination of experienced positive and range anxiety during driving is possible based on speech data;
- To identify the electrical vehicle range anxiety among other emotions;
- To evaluate the efficacy of the various parts of the test plan for reliably provoking emotional responses.

3.2.2 The need

Over the last year, we did three data collections to fulfil the needs of data for Audio anxiety, video anxiety and HR/RR anxiety algorithms. The audio algorithm is developed by OVGU, a

University partner within the Consortium. The video algorithm is developed by EPFL and the HR/RR by Valeo.

After the data collections, each partner trained their algorithm on anonymized data to build a robust algorithm.

3.2.3 Data treatment process

Three data collection took place within 2018. All of them were on open roads in the vehicle demonstrator of VEDECOM. The last stages (II and III) were conducted after GDPR and a confidentiality and release form was additionally signed.

1. **Stage I:** During April 2018 with 5 subjects in France, around Paris.
    a. Objective: CAN Vehicle, Audio and face video.
    b. Subjective: BFI-10, GEW, KSS, Stress and Gagge scales.
    c. Audio-visual capture agreement

2. **Stage II:** During September 2018 with 20 subjects in France, around Paris.
    a. Objective: CAN Vehicle, Audio, face video, HR/RR signals and the road.
    b. Subjective: Personality, Attrakdiff, Feedback on the test and HMI.
    c. Audio-visual capture agreement
    d. Confidential agreement

3. **Stage III:** During November 2018 with 20 subjects in France, around Paris.
    a. Objective: CAN Vehicle, Audio, face video, HR/RR signals and the road.
    b. Subjective: Personality, Attrakdiff and Feedback on the test.
    c. Audio-visual capture agreement
    d. Confidential agreement

3.2.4 Data sources

In terms of Go, we had an average of 200Go for the Stage II and 670Go for the Stage III. In terms of time, we had an average of 60mins per participant for the Stage II & III. Each partner used all exploitable data to build their algorithm. Some of these collected data as the scene camera and the cockpit camera are used for Ground Truth annotating. The headset microphone and the BioHarness belt are used for Ground truth development. The data collected are recorded only once per participant. The recorded data are safely kept till the end of the European project. In total, 45 users participated that live in Paris and suburbs.

3.2.5 Data sharing

Personal data handling was and will be performed strictly according to EU regulations which have been laid out to and agreed by the cooperating partners and participants in advance.
The consent form signed by all the participants of the study, allows the sharing of the audio, video and physiological raw data among all relevant driver-state emotions partners (OVGU, VEDECOM, EPFL, SEYE, VALEO). Further, no personalized data may be distributed among other partners. Anonymized data, like extracted features and markers, may be distributed to other partners.
Data will be made available to the partners using the repository system provided by WP4. Audio and physiological recordings can be downloaded only by the corresponding partners. The video recordings are distributed by SEYE on request only to involved partners.

3.2.6 Data clusters

The nature of the data are videos (.avi), audio (.wav) and other data (i.e. subjective measures) are stored in to Excel files (.csv).

3.2.7 Context of processing

Experienced drivers participated once in a driving session (e.g. at least five years since they obtained their driving license). Each of them had a full control on the possibility to perform the test or not. They were no constraints during driving, however, directions about which road to choose, were given. Participants completed a separate audio-visual agreement and they were fully aware about the data usage, storage, processing and sharing.

3.2.8 Purposes of processing

Range anxiety (or range paradox) is a concept emerged in the late 90s which is the concern of not reaching to the destination or to the next charging spot while traveling in an EV (Nilsson, 2011). This is a stressful experience of a present or anticipated range situation, where the range resources and personal resources are in fact available to effectively manage the situation; however, they are perceived to be insufficient.

Studies show that electric vehicle drivers usually need around 160 km of autonomy per charge. Nevertheless, they often prefer vehicles with considerably higher available range (around 350 km). This demand (which seems to be avertable) comes from the worry of experiencing such a situation in the future or present, worry of what will happen if such a situation emerges, worry of not being able to find a solution to the situation and further worry of being stranded in this uncomfortable situation (Nguyen, Cahour, Forzy, & Licoppe, 2011).

If the manufacturers cannot lower range anxiety, electric vehicles will not be able to compete with gasoline and diesel cars. The four important physical parameters that will make a difference in range anxiety level are the following: the battery size (kWh), the energy consumption (this parameter is mostly affected by the weight of the car) (kWh/km), the charging speed (kW) and the minimum state of charge (%). Despite the fact that each one of these parameters could be optimized individually, their effects are inversely proportional. As an example, implementing a bigger battery will increase the range but all the same the weight of the vehicle (so the energy consumption) and the charging time will increase. Therefore, the range anxiety cannot be eliminated by purely quantitative means, and this is the motivation behind the Use Case of the project.

Current vehicles do not address this issue whether through intelligent vehicle power management system or whether through a routing and traffic analysis and mitigation.

The ADAS&ME approach is to create a driver monitoring system to reliably detect driver emotional and physiological state, in order to detect and mitigate the range anxiety through both the means of adapting the vehicle HMI to the situation at hand, and managing the vehicle's operational parameters, as to reliably and safely provide a technical solution, when the remaining range is truly insufficient for the driver to reach the destination.

The aim is the creation of a system able to reliably understand and discriminate between different types of emotional states.

3.2.9 Consultation process

Not relevant to testing conducted so far.

3.2.10 Necessity and proportionality

VEDECOM applied to respective Ethics committee and ensured that every part of testing complied with French legislation and relevant Directives. The research team succeeded in observing real range anxiety during the Stage II & III. Detecting actual range anxiety during a controlled driving test is very complex because the participant knows that everything is under control (expectation and testing bias) and, thus, an electrical breakdown has lower probability to happen. So, the other way to proceed would be to record driver during every day driving experience where an electrical breakdown can happen. Through RTMaps, records, status trackers were set per sensor type to ensure quality of data was not affected. Following the data minimization principle, only the necessary data were recorded and shared. Private servers are used to safeguard data and data sets' structure and storage ensures deletion of data upon participant's request.

3.2.11 Identified, assessed and mitigated risks

No risks identified that are relevant to user data privacy. All necessary steps were taken beforehand to ensure and safeguard data anonymity.

3.3 Use Case C (DLR – automation to manual) & Use Case D (Fraunhofer – during manual driving & DLR – during automation)

3.3.1 Aims

- Development and evaluation of a system to detect drivers stress;
- Development and evaluation of a system to detect drivers' emotions;
- Development and evaluation of a system to detect visual distraction in drivers;
- Development and evaluation of HMI elements and their combinations to inform and warn drivers of an upcoming transition of control.

3.3.2 The need

Project includes information about the participants that might be perceived as personal data.

The use case C and D of the ADAS&ME project focuses on a safe and smooth transition between automated and manual driving. Therefore, different driver's states need to be considered to provide the best possible support to human driver. To achieve this goal, personal data as physiological data need to be collected and processed to monitor the driver state.

Since different project partners are responsible for different driver states, use case C/D needed to collect and share date with involved project partners. This includes sharing personal data with internal project partners involved in use case C/D. The overarching purpose is to provide the internal project partners with enough data to develop algorithms for the driver state assessment. The benefits of collecting and processing the personal information is to have a robust driver state monitoring which makes it possible to tailor HMI and automated functions to the needs of the driver.

Therefore, DLR collects -in two data collection phases- demographic data, audio data, video

data for face recognition, physiological data and driving behaviour data and shares them with SmartEye, RWTH Aachen, Ford, Continental, EPFL and UPatras.

Further, different use case partner collected data in HMI studies (DLR, Frauenhofer). Ford collected physiological data and shared it with RWTH Aachen. The work performed is described in the following document that is confidential to Consortium (i.e. D5.1 'HMI and Automated Functions'), where the Interaction/ Transition framework was fully developed and all basic HMI elements were selected. The need for a PIA is based on the fact that data collected maybe anonymous but some of the data collected maybe classified in the 'sensitive data' category (e.g. heart rate, gaze data, facial recognition).

3.3.3 Data treatment process

Data collected in Use Case C/D are mainly collected in "Data collection phases" and in HMI studies. In both types of studies personal data from the participants are collected. The data collections focus more on sensor data (ECG, Voice, Gaze behaviour) while HMI studies are focusing on the behaviour of the participants.

All data is shared at the ADAS&ME repository in an anonymized format. Data from participants who consent for video recordings (e.g. face recognition) can only be accessed by a limited number of project partners and results are used only for scientific purposes, in an anonymised manner.

3.3.4 Data sources

As shown above, data sources are sensors and questionnaire data. For a complete list, please refer to the data collection spreadsheet completed for UCs C and D (included in the overall data sheet in Annex 4).

3.3.5 Data sharing

Anonymized raw data from data collection are shared internally -in Use Case C/D- with the related use case partners. Data is stored on local servers with restricted access only to DLR employees. Gaze data is stored on a hard-disk and sent to SmartEye. Anonymization is not possible by the latter data. Data resulting from tests conducted by Ford can be accessed by all project partners, as no high-risk data processing is involved.

3.3.6 Data clusters

No special categories of data are included. The main data clusters are the following:

- Facial recognition data
- Gaze data
- Voice data
- Heart rate
- GSR
- Driver behavioural parameters (steering, braking, acceleration/deceleration, pedal pressure, steering pressure)
- Questionnaire and scale data
- Background data

DLR collected data from 42 participants in two data collection phases. Ford collected data from 24 participants in March 2018. Both DLR's data collections were conducted in controlled experimental conditions in 2018. Anonymous datasets will be stored for five years after the end of the project. Individuals are not affected because data collection and storage are anonymous. Testing geographically covers participants in the area of Braunschweig, Germany (DLR employees and externals). Participants of the Ford study were recruited within NRW, Germany.

3.3.7 Context of processing

In the first data collection participants were citizens of Braunschweig. In the second data collection all participants were DLR employees. Participants of the Ford study were recruited by an external company. All the informed consent procedures were carried out by Ford. Drivers participated voluntarily and were free to stop and leave whenever they wanted. Further participants were informed that their data will be stored and used for scientific purposes. All participants agreed that their data can be stored and used for further scientific analysis. They were informed about data being treated anonymously and used for research purposes and publications. No children or other vulnerable groups were involved in the data collections or HMI studies. No concerns existed because data collection is anonymous. Experimental setup was novel and for this reason a security driver was present in the second data collection. But data collection was not novel.

The real time processing of physiological data is not new and was already done in some series produced cars (sleepiness detection). Nevertheless, new sensors are used in the current project. All data will only be processed and analyzed in the vehicle and no communication of these data is performed. Similar systems exist in respective market for most of the in-house builds. No public related concerns are relevant or anticipated for the remaining pilot activities.

3.3.8 Purposes of processing

The goal of the processing is to have a robust driver state assessment in automated vehicles. With the knowledge of the driver state, new tailored interaction strategies can be performed by the vehicle to achieve the maximum level of driver support, when it is needed.

Ford Stress study: 1.To gather data that will be used for algorithm development in order to determine the driver's state. 2.To identify methods by which periods and intensity of certain driver states can be detected in a minimally obtrusive way.

Phase I: Collect voice data from participants in different emotional states. This data is used to develop a robust algorithm for driver state detection.

Phase II: Collect ECG data from participants in different stress states. Further gaze data was collected for the distraction algorithm. This data is used to develop a robust algorithm for driver state detection.

Ford Stress study: The goal was to induce stress.

Phase I: Different emotional states (happiness, anxiety, neutral, sad) were induced in a controlled environment.

Phase II: Stress and distraction were induced in controlled environment while driving in

manual or automated mode on a test track. A safety driver was always present.

Ensures a user-defined and accepted system, as it is being developed during the lifetime of the project and, as whole, it did not pre-exist.

All drivers will benefit from this, since they will get the right level of system support, if they need it. Due to this, the safety of the driver and his driving environment can be achieved.

3.3.9 Consultation process

Through self-reports and standardized questionnaire comprising mostly close-ended questions. Only the research team have access to these data. The team member names have been added in both the ethics application and the informed consent form. The same organization is the data collector and data processor. However, the algorithms are developed by UPatras that has access to anonymised data only and manages the data storage on the central project repository, as it is described in WP4-IR –MS7 document.

3.3.10 Necessity and proportionality

Data processing is performed within the framework of the European project ADAS&ME and is part of our contractual obligations. Yes, it is based on careful and considerate experimental planning, as it is described in D7.1 of the ADAS&ME project. Participant data collection is mandatory for a UCD approach when designing a user-specific safety system. The system and its respective functions cannot be used for another purpose. The end-product will be a prototype that will not be used by people outside the Consortium. Further development and improvements can be made but they will not involve usage of data collected at this stage for different applications. Data quality is ensured because of technical verification and pre-testing sessions taking place before any actual testing. Certain indices were set for technical performance with regards accuracy, validity, sensitivity and reliability Data treatment and minimization was controlled by trained data scientists. All participants completed an informed consent form. Both data collections are completed, and the informed consent form was GDPR compliant. Users receive information about data treatment and storage, anonymization process, their own rights during testing, a copy of the informed consent form, testing duration, description of the project and contact points. All data are anonymous, and processors have no access to any information about the participants. In addition, data processors are all informed about GDPR new guidelines and their responsibilities.

All date shall be handled in accordance to the ADAS& ME Ethics Manual D10.3 (Jansson et al., 2017). This manual refers to the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons about the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (The General Data Protection Regulation, GDPR). Thus, GDPR restricts transfers of personal data outside the EEA unless the rights of the individuals in respect of their personal data is protected in another way. In any case, no transfer of personal data is foreseen in the ADAS&ME project.

3.3.11 Identified, assessed and mitigated risks

Identified risks were included in the performed risk analysis (e.g. part of ethical approval of DLR stress study) about potential accidents during driving at DLR campus (Phase I) and with

test vehicle while automated driving on test track (Phase II). These issues were mitigated by conducting tests only in times without heavy traffic and the safety driver was always able to brake (Phase I) and no other traffic on closed test track and safety driver always on board (Phase II). However, these aspects are related to ethical conduction of user testing and not related to data privacy issues. Therefore, no data privacy related issues and risks have been identified.

3.4 UCs E & F – Physical fatigue and fainting (DUCATI & CERTH/HIT)

3.4.1 Aims

- Development and evaluation of a system to detect rider's stress;
- Development and evaluation of a system to detect physical and thermal fatigue;
- Development and evaluation of a system to detect visual distraction in riders;
- Development and evaluation of HMI elements and their combinations to inform and warn riders when they are fatigued and distracted.

3.4.2 The need

The need for a PIA is based on the fact that data collected maybe anonymous but some of the data collected maybe classified in the 'sensitive data category (e.g. heart rate).

3.4.3 Data treatment process

Data are collected anonymously through sensors and questionnaire completion. Data are stored only in CERTH offline storage and will be deleted five years after the end of the project.

As shown above, data sources are sensors and questionnaire data. For a complete list, please refer to the data collection spreadsheet completed for UCs E and F (included in the consolidated data collection table that can be found in Annex 4).

Anonymized raw data were shared with UPatras for algorithms creation and data repository management, who is the data manager of the project.

The data flow is presented in the following diagram (Figure 1).

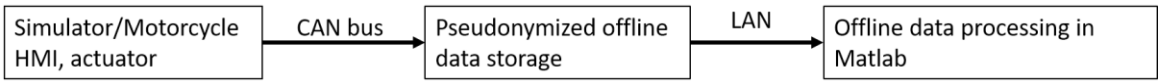

Figure 1. Use case E/F HMI data management

No high-risk data processing is involved.

3.4.4 Data sources

No special categories of data are included. The main data clusters are the following:

- Heart rate
- Galvanic skin response (GSR)
- Internal and external temperature
- External humidity

- Rider behavioural parameters (steering, braking, acceleration/deceleration, pedal pressure, steering pressure, body stature)
- Questionnaire and scale data
- Background data

Data from 22 participants were collected across 2 phases. Data were collected in controlled experimental and simulated conditions for both phases. Experiments conducted during Phase I aimed to the collection of data for the development of physical fatigue and visual distraction algorithms (conduction 2017/2018). Phase II tests were aiming to evaluation the HMI configurations developed within the project in order to detect and inform/warn riders when visual distraction or physical fatigue was detected (conduction 2019). Some riders participated in both phases and they were in their majority CERTH employees, all naïve to the project and testing objectives.

Anonymous datasets will be stored for five years after the end of the project. Individuals are not affected because data collection and storage are anonymous. It covers participants that are residents in Thessaloniki, Greece.

3.4.5 Data sharing

Anonymous data are shared only with UPatras for data management (i.e. storing in data repository) and development of algorithms for distraction and physical fatigue. Data sharing is anonymous. Pseudonimization was handled offline and related documents were deleted after the end of respective testing phase (i.e. Pilot). This means that during the Pilot, personal details were kept only for organizational reasons (e.g. arranging appointments) and destroyed after the end of the testing period.

3.4.6 Data clusters

Data are clustered into three main categories: a) self-reported/perceived questionnaires, b) physiological measures (e.g. ECG, GSR) and c) riding behaviour/performance indicators (e.g. braking behaviour, acceleration/deceleration).

3.4.7 Context of processing

Riders participated voluntarily and were free to stop and leave whenever they wanted and if they wanted their data to be deleted and not stored, they were informed they could ask for it. Participants were informed about data being treated anonymously and used for research purposes and publications. No children or vulnerable groups were involved and/or recruited and explicit inclusion and exclusion criteria were set. No concerns existed because data collection is anonymous. Experimental setup was novel and for this reason a medical practitioner was always present during the thermal fatigue experiments in phase 1. But data collection was not novel. Similar systems exist in respective market for most of the in-house builds. No data privacy concerns exist or were envisaged.

3.4.8 Purposes of processing

The objectives are different per Phase:

- **Phase I:** Create algorithms to detect rider's acute stress, visual (acute) distraction and thermal fatigue. Thermal fatigue, stress and distraction were induced in controlled environment with a medical practitioner always being present. Participants to understand the HMI role and select the ones (or their combinations) they preferred.

- **Phase II:** Select the most appropriate and accepted HMI elements for informing riders when they are distracted and when they are physically tired (3 levels: information, warning, critical and activation of recovery and then stabilization modes). This approach ensures a user-defined and accepted system, as it is being developed during the lifetime of the project and, as whole, it did not pre-exist as well as that they system is safe, reliable, accurate, valid and usable.

3.4.9 Consultation process

Direct subjective feedback is collected by participants through self-reports and standardized questionnaire comprising mostly close-ended questions. Only CERTH research team had access to subjective data. The team member names have been added in both the ethics application and the informed consent form.

The same organization is the data collector and data processor. However, UPatras was involved in the development of the algorithms and therefore has access to anonymised data only and manages the data storage on the central project repository, as it is described in WP4-IR –MS7 document.

3.4.10 Necessity and proportionality

Data processing is performed within the framework of the European project ADAS&ME and is part of our contractual obligations. Data collection is based on careful and considerate experimental planning, as it is described in D7.1 of the ADAS&ME project.

Participant data collection is mandatory for a UCD approach when designing a user-specific safety system. The system and its respective functions cannot be used for another purpose. The end-product will be a prototype that will not be used by people outside the Consortium. Further development and improvements can be made but they will not involve usage of data collected at this stage for different applications.

Data quality is ensured because of technical verification and pre-testing sessions taking place before any actual testing. Certain indices were set for technical performance with regards accuracy, validity, sensitivity and reliability Data treatment and minimization was controlled by trained data scientists.

All participants completed an informed consent form. Phase I was conducted before implementation of GDPR and the informed consent form was not GDPR compliant. For the second phase of user testing (Phase II), the informed consent form was further adapted to be GDPR compliant. Users receive information about data treatment and storage, anonymization process, their own rights during testing, a copy of the informed consent form, testing duration, description of the project and contact points. An update informed consent and release form can be found in Annex 1. The release form can be used in case the research teams wish to collect audio, video and photographs. Updated versions of these forms were primarily annexed in this deliverable because of the final real-life tests that remain to be conducted within WP7.1 at IDIADA, as the material that can be collected during these tests can be used for demonstration of the results of the ADAS&ME project.

All data are anonymous, and processors have no access to any information about the participants. In addition, data processors are all informed about GDPR new guidelines and their responsibilities. One day training seminar by a counselling firm was held at CERTH and data collection and PIA was discussed with CERTH's DPO. There are no international transfers of data.

3.4.11 Identified, assessed and mitigated risks

No risks related to data privacy were identified and thus no data related mitigation strategy is necessary. The only identified risk is related to participants falling from the riding simulator during testing. This potential risk was mitigated by adding padded surfaces around the riding simulator to ensure participants are not hurt in case of fall.

3.5 Use Case G – Automating approaching at and departing of bus stops (VTI)

A DPIA was performed because participants are asked to provide feedback and data that could be identified as personal were collected but participants remain anonymous.

3.5.1 Aims

The aim was to collect data on stress, sleepiness and fatigue of bus drivers in relation to repeated tasks like approaching at a bus station and departing from it. Tasks that can be automated and thus alleviate bus driver's fatigue and stress. These data were used for tuning the algorithms on sleepiness and inattention. In addition, the aim was to test the setting of the final evaluation and to make sure that integration of sensors and the connection to the HMI is working, but also that the design of the study supports the results needed for the final evaluation.

3.5.2 The need

The need for a PIA is based on the fact that data collected may be anonymous but some of the data collected maybe classified in the 'sensitive data category'.

3.5.3 Data treatment process

Data is being collected for two purposes; (1) data to support development of driver state detection algorithms, (2) data to support HMI development.

Data are collected anonymously through sensors and questionnaire completion. Identifying information afforded from provision of consent to participate, is stored separately to all other data collected from the participant. All paper data is stored in a locked cabinet.

Data was collected to support the development of the driver state detection algorithms was collected (WP4). Only pre-specified contributors can access the data that is needed for that partner.

Data is being collected to support the development of the Human Machine Interaction (HMI; WP5). No data collected from this work is shared with other partners. Identifiable digital information will be stored on an isolated data storage device that is not connected to the online network. Non-identifiable driver information is stored on a shared director accessible by all Scania project contributors.

Digital and paper data will be destroyed five years after the completion of the project.

3.5.4 Data sources

As shown above, data sources are sensors and questionnaire data. For a complete list, please refer to the data collection spreadsheet completed for UC G (see Annex 4).

3.5.5 Data sharing

Non-identifiable (digital) participant data are stored on Project hosted data repository and available to specific partners requiring access to the data for algorithm development. No high-risk data processing is involved.

3.5.6 Data clusters

No special categories of data are included. The main data clusters are the following and include fata collected for algorithm training:

- Demographics Questionnaire
- Background Sleep Questionnaire
- Karolinska Sleepiness Scale (KSS)
- Subjective Stress (SUS)
- ECG, Heart Rate / Variability
- Blink duration, EOG
- Respiratory rate
- Kinematic data of moving base simulator (i.e. velocity/acceleration)
- Closed and Open question items

3.5.7 Context of processing

At this stage, three testing steps were taken. The first step was an exploratory study with the aim to understand bus drivers working conditions and problems. The second step was a Virtual Reality (VR) simulation study with 10 bus drivers in which a first HMI concept was evaluated. The outcome of the VR study was then modified and integrated in a moving-base driving simulator were also driver state algorithm for distraction and hands on steering wheel (except Sleepiness) were integrated and evaluations. Algorithms for sleepiness will be added to the final driver state detection system. In total 6 bus drivers (some of them also used in the VR data collection) were invited to drive at two different occasions; one time in an alert condition and one time in a supposedly fatigued condition. The HMI evaluation was based on a questionnaire that was filled in after the fatigue driving session. This study followed the data collection conducted before GDPR compliance that aimed on the affective state algorithms.

3.5.8 Purposes of processing

As described previously, some data is used for development driver state detection algorithms. Other data is used as input to the HMI. No indented effect is anticipated on the person. Ensures a user-defined and accepted system, as it is being developed during the lifetime of the project and, as whole, it did not pre-exist. In addition, it ensures that the system is safe, reliable, accurate, valid and usable.

3.5.9 Consultation process

Participants' views will be collected through self-reports and standardized questionnaire. For HMI development. Information about data security was received internally from the project.

3.5.10 Necessity and proportionality

Data processing is performed within the framework of the European project ADAS&ME and is part of our contractual obligations. The data processing achieves its goal because it is based on careful and considerate experimental planning, as it is described in D7.1 of the ADAS&ME project. There was no other way or method in order to achieve this outcome and especially if

the same level of system performance is required/requested. Function creep is prevented by the fact that the system and its respective functions cannot be used for another purpose. The end-product will be a prototype that will not be used by people outside the consortium. Further development and improvements can be made but they will not involve usage of data collected at this stage for different applications. Further exploitation of the products generated within this project will not require any further access to participant data. Data quality is ensured because of technical verification and pre-testing sessions taking place before any actual testing. Certain indices were set for technical performance with regards accuracy, validity, sensitivity and reliability Data treatment and minimization was controlled by trained data scientists. All participants completed an informed consent form. Stage I and Stage II testing has been completed and all data collection was GDPR compliant regardless if data collection was performed before its implementation.

Users receive information about data treatment and storage, anonymization process, their own rights during testing, a copy of the informed consent form, testing duration, description of the project and contact points.

All data are anonymous, and processors have no access to any information about the participants.

3.5.11 Identified, assessed and mitigated risks

No data related risks are envisaged and were encountered during the tests already completed or are scheduled to be carried out. Simulator sickness was a potential risk for test conduction, not related to data privacy that would result in immediate cessation of the test session. Participants were informed beforehand of this possibility through the informed consent process.

3.5.12 Overview of privacy assessment

As it is obvious from each separate UC data privacy assessment, no major privacy risks were identified as data collection was largely anonymized and data sharing was at a required basis and only of anonymized data. Data collection of audio and video data was stripped of any personal data, stored safely and shared only on need basis and isolated by the other collected data. In addition, in all cases, participants have agreed in writing these data to be collected, stored and shared with the Consortium.

No recognition was possible and informed consent was obtained across all stages of testing. The UC leading teams conducting each assessment stated that they are now aware and ready of all steps required for implementing GDPR, as completing this template was a valuable experience to be utilized and re-used in other projects they are currently working or will be involved in the near future.

The most important lesson learnt from this experience is that a DPIA is a time-consuming process and thus it is necessary to be organized early in the project. In addition, roles should be assigned very early in order to ensure that ‘privacy by design’ is a necessity and will be evident in the architecture, the data repositories as well as the data flows. Within ADAS&ME, because of the addressed data clusters, this process was inherent (i.e. utilization of data like heart rate, blink rates, etc.). This is not the case for other transport (or not) oriented project and the three aspects mentioned above must be addressed at the beginning of the project along with the data privacy policy that will be based on again these three aspects.

Moreover, the relation between the Ethics and data privacy policy also needs to be addressed early in the project by the collaboration of both responsible teams within a project that will be reported in the respective Deliverables. This process will ensure that the policies are agreeable

and complementary.

As GDPR was not adopted from the beginning of the project, then certain procedures and documents had to be updated and roles to be assigned that did not exist beforehand. However, as involved partners are experienced in this field, the positive outcome was that most considerations and requirements were fulfilled even before GDPR implementation.

4 Data descriptions and updated policy

4.1 Updated data privacy policy

The initial ADAS&ME data privacy policy is included in the first version of this Deliverable submitted in M6. An update of this data privacy is prepared for two reasons:

a) GDPR compliance requires an elaborate description of related processes and actions;

b) Written in a format to be shared by partners conducted tests or other activities required to get in contact with people/users outside the Consortium.

The updated policy governs the collection of information (private or not) during the Pilots (i.e. whole testing period duration) and user tests (i.e. dedicated user testing session) and can be found in Annex 4.

4.2 Final datasets per UC

The datasets collected per UC were updated based on the current evaluation stage. The complete dataset is annexed in this final version of this report, but the table below provides a summary of the qualitative and quantitative characteristics of the data collected during testing within the project. Overall, 141 data categories have been identified across all UCs in the project. It is important to note that for the data collected so far (stages I and II) are included in this file. Data collection during the final evaluation activities, as they have been planned within WP7 will utilize data sources from phases I and II and additional subjective (perceived) scales.

Table 2. Data description categories and explanatory text

ASPECT	CATEGORY	Explanatory text
DATA	**Collected/Created**	Collected/created
	Name	Name of the data/ metadata/ exploitable result
	Description	Description of the data/ metadata
	Category	FW/SW/ Algorithm/Raw data/ Dissemination material/etc.
	Type	Document/video/images/Source code/etc.
	Format	File extention/ prototype
	Size	size in MB/GB
	Owner	Partner name/ Consortium/ external stakeholder
	Privacy level	Public/ consortium/ partner/etc.

ASPECT	CATEGORY	Explanatory text
	Metadata	Any metadata that are linked to these data and/or describe this data type.
	Relevant standards and legislation	Any standards or laws that need to apply that are relevant to the systems that produce these data.
DATA SHARING	**Repository during the project (for private/public access)**	BAL.PM or other Open access repository/ partner storage (private cloud/private drop box)/etc.
	Data sharing	**Open:** Open for public disposal **Embargo:** It will become public when the embargo period applied by the publisher is over. In case it is categorized as embargo the end date of the embargo period must be written in DD/MM/YYYY format. **Restricted:** Only for project internal use. Each data set must have its distribution license. Provide information about personal data and mention if the data is anonymized or not. Tell if the dataset entails personal data and how this issue is taken into account.
	Back-up frequency	daily/ monthly/ yearly/once
	Destroyed at the end of the project?	NO (1)/No (2)/NO (3)/ Yes / Unnecessary
	Duration of preservation (in years)	number of years
	Repository after the project (open/embargo or never open)	BAL.PM or other Open access repository/ partner storage (private cloud/private drop box), etc.
GDPR	**GDPR compliance (Yes/No/In process)**	State if you have completed/initiated a process to be compliant with the new Directive.
	Data role	Please state if you are a data controller, processor or both within the framework of the project. For further information about these roles you may find here: https://www.gdpreu.org/the-regulation/key-concepts/data-controllers-and-processors/

ASPECT	CATEGORY	Explanatory text
	DPO	Present/have discussed project with/ not appointed yet
Open publications	**Publications**	Please add any papers you have already submitted/ presented in open-access journals and/or ones you are planning to submit by the end of the project. In addition, please add any publications to journals that are not open, but you are planning/ or have already paid to make them open.

Therefore, any data privacy issues have been covered already in all the versions of the Data Management Plan reported so far in the project. The following table presents an overview of the data clusters across UCs based on the consolidated information that can be found in the aggregated table in Annex 4.

Physiological measures (related mostly to algorithms' development/refinement): heart rate/variability, eye gaze/blinking, Galvanic skin response (GSR), blood pressure, etc.

Vehicle performance/behaviour measures (related to both algorithms creation and HMI testing): lateral position, acceleration/deceleration, braking, steering angle, etc.

Self-reported/perceived questionnaires/interviews: relevant to all testing taking place within the project.

4.3 Decision about data openness

Due to the nature of data collected, no datasets will be open to the public, but findings will be presented in conferences and peer-reviewed journals. This result is evident by the decision per data type on embargo period, as reported by the UC leaders in the consolidated data pool (Annex 4).

4.4 Open access publications

So far, two open-access publications are available by VTI (they are available in the Excel spreadsheet in Annex 4). The open access publications will be made available via the website and potentially Zenodo (https://zenodo.org/) by the end of the project.

5 Conclusions

The final version of the Data Management Plan accommodates for the efforts put by UC teams and leaders to ensure that GDPR guidelines are implemented and involved partners are getting familiarized with the process of data privacy impact assessment.

Overall, identified risks were more relevant to actual testing conduction (e.g. participant falling from motorcycle) rather than actual privacy leaks or user profile loss/revealing.

The related mechanisms were in place in dedicated pilot sites and anonymized files with no recognition potential were shared among partners and only within the project.

However, setting a data privacy impact assessment methodology early in the project, facilitates the 'data privacy by design' concept actualization very early in the project and allows for harmonization of activities with less iterations and changes.

The final testing phase will be conducted after the submission of this Deliverable and therefore the results of the final round of DPIA per UC will be reported in the final technical report only if the results are different from the ones already reported in this document and if changes in the data privacy policy are necessary as well as if the data collection table considerably changes.

References

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Nilsson, M. (2011). Electric vehicles: The phenomenon of range anxiety. Report for the ELVIRE Project (FP7 PROJECT ID: ICT-2009.6. 1).

Annex 1. GDPR compliant informed consent form and release form: Example from the UCE & F Pilot

INFORMED CONSENT & RELEASE FORMS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688900

INFORMATION SHEET

Pilot name: _____ (the "Pilot")

Researching entity: _____

Researching entity's address:_____

Study Title: The investigation of distraction and physical fatigue information and warning HMI elements and configurations in real-life and simulated conditions.

[Who is conducting the Pilot?]
Researchers: NAMES of RESEARCHERS

In brackets the information you need to include in the informed consent form in order to be GDPR compliant.

By signing the Consent Form below, you agree to participate in the Pilot, as named at the top of this page and detailed below.

[Who we are and what is the ADAS&ME project]

You are being invited to take part in a research study. The study is conducted as part of the project ADAS&ME funded by the EU HORIZON2020 Research and Innovation programme.

ADAS&ME aims to develop Advanced Driver Assistance Systems (ADAS) that incorporate driver/rider state, situational/ environmental context and adaptive interaction, to automatically transfer control between vehicle and driver/rider and thus ensure safer and more efficient road usage for all vehicle types (conventional and electric car, truck, bus, motorcycle). For further information you may visit the project's website: http://www.adasandme.com/

Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

[What is the purpose of this Pilot?]
The study will be realized with target to investigate the acceptance and usefulness of certain HMI elements and their combinations in informing riders when there are tired and when they are distracted. These elements are known as Human Machine Interface (HMI) elements.

As you are an experienced rider, you are invited to take part in this motorcycle study. *If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.*

[What will my participation in the Pilot involve and what is the duration of the Pilot?]
You will ride a motorcycle simulator at CERTH/HIT premises, where you will receive different combinations of visual, auditory and haptic information through the dashboard, the gloves and the helmet you will be wearing. You will be asked to complete a questionnaire before and after the end of each ride. You will complete in total 5 rides. The whole duration of the session is one hour.

Your participation will help select the most appropriate and useful HMI configurations for informing and warning riders about being fatigued and distracted. Your participation in this project is voluntary. Even after you sign the informed consent document, you may decide to leave the study at any time without penalty or loss of benefits to which you may otherwise be entitled. You may skip or refuse to

answer any questions without affecting your participation or, if you wish to do so, any future participation in CERTH/HIT's studies.

This project is deemed as no more than minimal risk. Riding in real conditions is organized in a safe road with low traffic volume but still on risk related to real riding do exist. Riders are insured by the existing motorcycle licensing scheme. The study team does not foresee or anticipate any risk greater than that encountered in your routine daily riding activities.

[Information collected during the course of the pilot]
We will your feedback through questionnaires about your opinions on the different HMI configurations you will test. All information collected about you will be kept strictly confidential (subject to legal limitations) confidentiality, privacy and anonymity will be ensured in the collection, storage and publication of research material.

[What will happen to any information I give you and how will it be stored?]
Data generated by the study will be retained in accordance with International, European and National legislation, regulations and Guidelines about ethical conduct with participants and Data Privacy. The data of the experiment are anonymized and stored in encrypted form in the data centre of Centre for Research & Technology Hellas (CERTH) for five years. CERTH/HIT is the appointed data collector and processor of your data. Your anonymized data will be shared only with research organizations within the Consortium of ADAS&ME. Password-protected data access is given only to RESEARCHER's NAME and only in CERTH/HIT. As data collection is anonymous, there is no way to relate these data with any participant.
[Who will my personal information be shared with?]
No personal information will be shared with anyone outside CERTH. You raw but anonymized data will only be shared with the University of Patras (an ADAS&ME Consortium Partner) solely for research purposes and to satisfy dedicated tasks of the project.

[How long will you store my personal information for?]
We will only keep your personal information for as long as is necessary to assist us in the purposes of our research and for no longer than 5 years. Data storage during this period will comply to our data privacy policy.
[Will the data possibly be commercially exploited?]
Data collected during the pilot will not be commercially exploited.

[What will happen to the results of the Pilot?]

The results of this Pilot will be anonymised. You will not be identifiable by these results. These anonymised results will be used by us and shared with the European Commission and the Innovation and Networks Executive Agency, at national and international conferences and exhibitions and published in peer-reviewed scientific and academic journals; with a focus on open-access journals.

[Photographs]

During the course of your participation in the Pilot, we would like to photograph parts of the user testing session in which you participate in as part of the Pilot, for ADAS&ME research, publications, conferences, exhibitions and ADAS&ME social media activities. For example, we would like to include photographs to accompany related ADAS&ME social media posts and publicised research. We will only take your photograph if you consent to us doing so by ticking the corresponding box in the Participant Consent Form. We will also ask you to review and sign a separate consent and release form at your testing session. If you do not consent, you can still take part in the Pilot but we will not take your photograph.

If you do consent to us taking your photograph, you may withdraw this consent at any time. Photographs are securely stored securely and separately of all testing data, as described in *[What will happen to any*

information I give you and how will it be stored?] section of this information sheet.

[My rights]
You can withdraw from the experiment at any time and without having to give a reason for withdrawing. You may gain access to your recorded data, request a correction to your personal data record, or withdraw from the research study by contacting RESEARCHER's NAME at (contact phone number: NUMBER and email: XXXXX@certh.gr).

[Who should I contact in relation to the Pilot?]
For more information concerning the experiment you can contact RESEARCHER'S NAME at the Institute of Transport at CERTH during office hours or by email to XXXX@certh.gr and telephone XXXX.

Please tell the researchers if you have any injuries or other problems related to your participation in the study. CERTH may be able to assist you with obtaining emergency treatment, if appropriate, but you or your insurance company will be responsible for the cost. By signing this form, you do not give up your right to seek payment if you are harmed as a result of being in this study.

If there are any concerns about the way the study is conducted you can contact the Ethics allocated representative, the HIT Director at abek@certh.gr. The research has been approved by the allocated Ethics representatives of CERTH to perform the experiment.
If you are interested to participate in this study, you can contact RESEARCHER'S NAME by email to XXXX@certh.gr. In addition, you may contact the researcher if after your participation you want to access your data or you decide you want your data to be deleted or retrieved by you.

Thank you for your interest and for your time in reading this document.

CONSENT FORM

		Please tick box
1	I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.	☐
2	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.	☐
3	I agree to take part in the above study.	☐

		Please tick box	
		Yes	**No**
4	I agree that my data gathered in this study may be stored (after they have been anonymised) in a specialist data centre and may be solely used for research and shared with the ADAS&ME Consortium	☐	☐

5	I have been informed that any photos taken and video recordings will be used solely for research purposes	☐	☐
6	I consent to my photograph being taken during the Pilot and for it to be used by ADAS&ME for ADAS&ME research, publications, conferences, exhibitions and ADAS&ME social media activities.	☐	☐

One copy of this document will be kept together with the research records of this study. Also, you will be given a copy to keep.

I hereby consent to participate in the study

Name of Participant	Date	Signature
Name of Researcher	Date	Signature

[Are there any risks?]

WHAT ARE THE RISKS OF PARTICIPATING IN THIS STUDY?

The risk to you is no more than you would normally incur while riding a simulator. All data collection equipment is mounted such that, to the greatest extent possible, it does not pose a hazard in any foreseeable way. None of the data collection equipment will interfere with any part of your normal field of view. The addition of the data collection will in no way affect the operating or handling characteristics of the riding simulator.

[What value can a participant bring to the ADAS&ME project?]

WHAT ARE THE BENEFITS OF PARTICIPATING IN THIS STUDY?

While there are no direct benefits to you from this research, you may find the experiment interesting. No promise or guarantee of benefits is being made to encourage participation. Participation will help to improve the body of knowledge regarding riding behaviour and ADAS&ME system development. Participation will also help us design a system that can assist and support riders in a way that is acceptable and comfortable for future participants.

Permission to use photographs release form

Name:[●] Date:[●]
Address:[●]
Researcher: [Pilot entity (the **ADAS&ME Pilot Entity)]**
For good and valuable consideration, sufficiency and receipt of which are hereby acknowledged, I consent to the members of the ADAS&ME consortium of which the ADAS&ME Pilot Entity is a member (the "**ADAS&ME Consortium Members"**) taking photographs of me (the "**Photographs**"), filming me (the "**Films**") and recording my voice, conversations and sounds (the "**Voice Recordings**") during the user testing session relating to the Pilot *(as defined in the Informed Consent Form, which I have signed and an unsigned copy of which is shown above)*; and:
I hereby irrevocably grant each ADAS&ME Consortium Member, jointly, together with each of their successors, assigns and licensees, all consents necessary, to all usage of the Photographs, Films and Voice Recordings, in perpetuity, on a royalty-free basis, throughout the world and at each ADAS&ME Consortium Member's discretion, to exhibit, edit, distribute, sell, lease and exploit the Photographs, Films and Voice Recordings, for use in the ADAS&ME Project (as defined in the Informed Consent Form) and related research, publications, presentations, exhibitions, conferences, marketing and advertising materials and for any publicity and promotions relating thereto and for any commercial or non-commercial purposes in all and any media (whether now existing or yet to be invented), including, without limitation, in each ADAS&ME Consortium Member's online and hard copy materials relating to the ADAS&ME Project (the "Purpose").
I waive any and all moral rights in the Photographs, Films and Voice Recordings, to which I might be entitled in any country and hereby assign with full title guarantee to each ADAS&ME Consortium Member, jointly, all present and future copyright and any other rights in the Photographs, Films and Voice Recordings, throughout the world, for the full period of copyright.
I agree and understand that the ADAS&ME Consortium Members are not obliged to take, use, keep or exploit the Photographs, Films or Voice Recordings, nor shall they be obliged to: (a) provide a credit or acknowledgment to me in any way when exploiting the Photographs, Films and/or Voice Recordings; or (b) submit the Photographs, Films, Voice Recordings or any other materials relating to the ADAS&ME Project to me for any approvals. None of the ADAS&ME Consortium Members shall be liable to me for any distortion or illusionary effect or adverse result to myself resulting from the publication or other use of the Photographs, Films and/or Voice Recordings.
I acknowledge that each ADAS&ME Consortium Member shall store copies of the Photographs, Films and Voice Recordings for the Purpose and/or store my contact details on their databases in case they need to contact me. Any such use of my personal information shall be in accordance with the terms of the ADAS&ME privacy policy [available at Annex 3 of this document].
I agree to do all reasonable further acts and execute all reasonable further documents as may be required by any ADAS&ME Consortium Member to vest in or further assure to each ADAS&ME Consortium Member the rights expressed to be granted to them under the terms of this release form. I further agree that no payment shall be due to me nor shall I make a claim for any payment against any or all of the ADAS&ME Consortium Members in respect of their exploitation of the rights granted to them in this release form.
This release form supersedes all previous communications between the parties regarding the Photographs, Films and Voice Recordings (whether written or oral) and shall be governed by and construed in accordance with the [Laws of country tests are conducted]. The parties hereby submit to the exclusive jurisdiction of the English courts. No purported variation of this release form shall be effective unless signed by or on behalf each of the parties in advance.

By: _____Date: _____

Your Signature

Annex 2. ADAS&ME DPIA template

A PIA will be required under Article 35 of the General Data Protection Regulation (EU) 2016/679. A PIA is a process which helps assess privacy risks to individuals in the collection, use and disclosure of information. PIAs help identify privacy risks, foresee problems and bring forward solutions.

This template is an example of how you can record your DPIA process and outcome. It follows the process set out in our DPIA guidance, and should be read alongside that guidance and the Criteria for an acceptable DPIA set out in European guidelines on DPIAs.

Why should I do a PIA?	**When should I start a PIA?**
• To identify privacy risks to individuals. • To identify privacy and data protection compliance liabilities for your organisation. • To protect your reputation. • To instil public trust and confidence in your project/product. • To avoid expensive, inadequate "bolt-on" solutions. • To inform your communications strategy.	PIAs are most effective when they are started at an early stage of a project, when: • the project is being designed; • you know what you want to do and how you're going to do it; • you know who else is involved. But ideally it should be started before: • decisions are set in stone; • you have procured systems; and • you have signed contracts/ MOUs/agreements.

Do I have to do a PIA?

Determining if you need to do a PIA - screening questions

*Answering yes to **any** of these questions indicates that a PIA is necessary.*

- Will the project involve the collection of new information about individuals?
- Will the project compel individuals to provide information about themselves?
- Will information about individuals be disclosed to organisations or people who have not previously had routine access to the information?
- Are you using information about individuals for a purpose it is not currently used for, or in a way it is not currently used?
- Does the project involve you using new technology which might be perceived as being privacy intrusive? For example, the use of biometrics or facial recognition.
- Will the project result in you making decisions or taking action against individuals in ways which can have a significant impact on them?

- Is the information about individuals of a kind particularly likely to raise privacy concerns or expectations? For example, health records, criminal records or other information that people would consider to be particularly private.
- Will the project require you to contact individuals in ways which they may find intrusive?

Carrying out a PIA

You should start to fill out the template about any part of your work involving the use of personal data, or if you are making a significant change to an existing process. The final outcomes should be integrated back into your project plan.

This template is an example of how you can record the PIA process and results. You can start to fill in details from the beginning of the project, after the screening questions have identified the need for a PIA. You can adapt the process and this template to produce something which allows your organisation to conduct effective PIAs integrated with your project management processes.

Step 1: Identify the need for a DPIA

Explain broadly what project *[HERE YOU WILL ADD THE WORK YOU ARE RESPONSIBLE WITHIN THE ADAS&ME AND INVOLVES DATA COLLECTION AND POTENTIALLY PRIVATE DATA COLLECTION AND/OR PROCESSING]* aims to achieve and what type of processing it involves. You may find it helpful to refer or link to other documents, such as relevant deliverables and other supportive documents that reside in SharePoint. Summarise why you identified the need for a DPIA.

Questions you answer by filling in this part:

1. Explain what the project aims to achieve, what the benefits will be to the organisation, to individuals and to other parties.
2. You may find it helpful to link to other relevant documents related to the project, for example a project proposal.
3. Also summarise why the need for a PIA was identified (this can draw on your answers to the screening questions).

Example

E.g. The project involves [X] sharing personal data with [X]. [X] will also share personal data about [X individuals] with [X] organisation. The overarching purpose is [XYZ]. The benefits of collecting and processing the personal information is [X].

The relationship between [X] and [X organisation] is [X] and [explain the role each party is playing and their responsibilities e.g. X organisation is delivering an IT system or [X] is providing research services].etc.

Step 2: Describe the processing

Describe the nature of the processing:
Questions you answer by filling in this part: 1. *How are you collecting, using, storing and deleting data?* 2. *What is the source of the data?* 3. *Will you be sharing data with anyone?* 4. *You might find it useful to refer to a flow diagram or other way of describing data flows.* 5. *What types of processing identified as likely high risk are involved?*

Describe the scope of the processing:
Questions you answer by filling in this part: 1. *What is the nature of the data, and does it include special category or criminal offence data?* 2. *How much data will you be collecting and using?* 3. *How often?* 4. *How long will you keep it?* 5. *How many individuals are affected?* 6. *What geographical area does it cover?*

Describe the context of the processing:
Questions you answer by filling in this part: 1. *What is the nature of your relationship with the individuals?* 2. *How much control will they have?* 3. *Would they expect you to use their data in this way?* 4. *Do they include children or other vulnerable groups?* 5. *Are there prior concerns over this type of processing or security flaws?* 6. *Is it novel in any way?* 7. *What is the current state of technology in this area?* 8. *Are there any current issues of public concern that you should factor in?* 9. *Are you signed up to any approved code of conduct or certification scheme (once any have been approved)?*

Describe the purposes of the processing:
Questions you answer by filling in this part: 1. *What do you want to achieve?* 2. *What is the intended effect on individuals?* 3. *What are the benefits of the processing – for you, and more broadly?*

Step 3: Consultation process

Consider how to consult with relevant stakeholders:
Questions you answer by filling in this part: 1. *Describe when and how you will seek individuals' views – or justify why it's not appropriate to do so.* 2. *Who else do you need to involve within your organisation?* 3. *Do you need to ask your processors to assist?* 4. *Do you plan to consult information security experts, or any other experts?*

Step 4: Assess necessity and proportionality

Describe compliance and proportionality measures, in particular:
Questions you answer by filling in this part: 1. *What is your lawful basis for processing?* 2. *does the processing actually achieve your purpose?* 3. *Is there another way to achieve the same outcome?* 4. *how will you prevent function creep?* 5. *How will you ensure data quality and data minimisation?* 6. *What information will you give individuals?* 7. *How will you help to support their rights? What measures do you take to ensure processors comply?* 8. *How do you safeguard any international transfers?*

Step 5: Identify and assess risks

Describe source of risk and nature of potential impact on individuals. Include associated compliance and corporate risks as necessary.	**Likelihood of harm**	**Severity of harm**	**Overall risk**
	Remote, possible or probable	Minimal, significant or severe	Low, medium or high

Step 6: Identify measures to reduce risk

Identify additional measures you could take to reduce or eliminate risks identified as medium or high risk in step 5				
Risk	**Options to reduce or eliminate risk**	**Effect on risk**	**Residual risk**	**Measure approved**
		Eliminated reduced accepted	Low medium high	Yes/no

Annex 3. Updated data privacy policy

Overview – the key information you should be aware of

(A) Who we are

ADAS&ME is a research project funded by the European Commission with the aim of detecting, monitoring and predicting various affective states (sleepiness, anxiety, stress, fatigue) in different vehicle types (truck, bus, passenger car, motorcycle). ADAS&ME is a consortium which includes 30 partners (the "ADAS&ME Research Partners") ("we", "us", "our"). Several partners are data controllers [*as stated in Chapter 3 of D10.2]* of your information collected in accordance with this privacy policy.

(B) Our values and what this policy is for

We value your privacy and want to be *accountable* and *fair* to you as well as *transparent* with you in the way that we collect and use your information. We also want you to know *your rights* in relation to your information.

In line with these values, this privacy policy tells you what to expect when we collect and use information about you. We have tried to make it easy for you to navigate this privacy policy so you can find the information that is most relevant to you and our relationship with you.

We are always looking to improve the information we provide to our contacts so if you have any feedback on this privacy policy, please let us know using our contact details that can be found in the information sheet of your consent form documentation.

By participating to our Pilots and user tests and other project related events and by otherwise contacting us, you confirm that you have read and understood the entirety of this privacy policy.

This privacy policy was last updated on 13 March 2019.

(C) Who this policy applies to

This policy applies to:

1. ADAS&ME user tests' participants.

(D) Your rights to object

You have various rights in respect of our use of your information. Two of the fundamental rights to be aware of are that:

1. you may ask us to stop using your information for research related purposes. If you exercise this right, we will stop using your information for this purpose.
2. you may ask us to consider any valid objections which you have to our use of your information where we process your information on the basis of the project's legitimate research interests.

(E) What this policy contains

This privacy policy describes the following important topics relating to your information:

1. How we obtain your information
2. The information we collect about you
3. How we use your information and the lawful bases on which we rely
4. How we share your information
5. Security
6. How long we store your information for
7. Your rights
8. Changes to our privacy policy

1. How we obtain your information

You may provide us with information about yourself voluntarily or we may automatically collect information from you, as set out in this privacy policy, if you agree to participate in ADAS&ME Pilots and user tests.

2. The information we collect about you

If you are attending ADAS&ME Pilot and user tests, we will collect the following personal information from you:

(a) your name;

(b) your email address (optional);

(c) other information provided when you correspond with us;

(e) any updates to information provided to us;

(f) your telephone number;

(g) your photograph and event video footage, with your consent (we will give you further notice of this and request your consent for this at the relevant user testing session); and

The aforementioned pieces of information will be stored offline, safely and separately for the user data and will not be shared outside the premises of the organization conducting the Pilot and the user tests. These pieces of personal information will be destroyed after the end of the Pilots.
Our legitimate interests

We collect, use and store this personal information for our legitimate interests. For example, to deliver the user testing session, in order to improve or develop the ADAS&ME systems and technologies, for business administration, for compliance, insurance, safety, auditing and monitoring, research and development and quality assurance purposes, we will collect, use and store:

(a) your email address and phone number so that we can confirm your attendance at the relevant user testing session of the Pilot;

(b) your name and email address to request feedback relating to the ADAS&ME focus group or event which you attended, to assist in our research and development and to improve and develop ADAS&ME, its events and services;

All other information collected during the Pilots and user testing will be anonymous and you will not be identifiable from the information collected.

Consent
With your consent, we will use your personal information for the following purposes:

(a) your photograph taken at ADAS&ME user tests of the Pilots, for ADAS&ME-related dissemination activities on various social media platforms, to raise awareness of ADAS&ME, and for internal purposes. Where we use your photograph for these purposes, no other personal information will accompany the photograph, for example, we will not display your name or contact details with that photograph;

Participants who contact us with enquiries

We will collect, use and store the following information from you for our legitimate interests to deal with:

(a) any enquiries or issues you have about ADAS&ME;

(b) any questions you may have about how we collect, store and use your personal information; or

(c) any requests made by you for a copy of the information we hold about you.

If we rely on your consent for us to use your information in a particular way, but you later change your mind, you may withdraw your consent by contacting us at [XX@XX] and we will stop doing so.

3. How we share your personal information and who we share it with

Unless set out below, we will not disclose, your personal information.

4. International transfers

We do not transfer personal information we received about you outside the European Economic Area.

5. Security

We are committed to protecting information from loss, misuse, disclosure, alteration, unauthorised access, unavailability and destruction and takes all reasonable precautions to safeguard the confidentiality of personal information, including through use of appropriate organisational and technical measures.

6. How long we store your information for

We keep your information for no longer than necessary for the purposes for which the information is processed. The length of time for which we retain personal information depends on the purposes for which we collect and use it and/or as required to comply with applicable laws and to establish, exercise or defend our legal rights. We will not hold your l information for longer than five (5) years from the date it was provided to us or collected by us in accordance with the requirements of the European Commission, who is funding ADAS&ME.

7. Your rights

You have certain rights in relation to your information. If you would like further information in relation to these or would like to exercise any of them, please contact us via email at [XX@XX] at any time. You have the following rights:

(a) Right of access. You have a right of access to any information we hold about you. You can ask us for a copy of your information; confirmation as to whether your information is being used by us; and details about how and why it is being used.

(b) Right to update your information. You have a right to request an update to any of your personal information which is out of date or incorrect.

(c) Right to delete your information. You have a right to ask us to delete any information which we are holding about you in certain specific circumstances. You can ask us for further information on these specific circumstances by contacting us using the details in the information sheet of the consent form (Annex 1).

(d) Right to restrict use of your information: You have a right to ask us to restrict the way that we process your information in certain specific circumstances. You can ask us for further information on these specific circumstances by contacting us using the details in the information sheet of the consent form (Annex 1).

(g) Right to object. You have a right to ask us to consider any valid objections which you have to our use of your personal information where we process your personal information on the basis of our or another person's legitimate interest.

We will consider all such requests and provide our response within a reasonable period (and in any event within one month of your request unless we tell you we are entitled to a longer period under applicable law). Please note, certain personal information may be exempt from such requests in certain circumstances. For example, if we need to keep using the information to comply with our own legal obligations or to establish, exercise or defend legal claims.

If an exception applies, we will tell you this when responding to your request. We may request you provide us with information necessary to confirm your identity before responding to any request you make.

8. Changes to our privacy policy

We will update our privacy policy from time to time. Any changes we make to our privacy policy in the future will be shared with the informed consent form.

In accordance with Article 77 of the General Data Protection Regulation, you may also make a complaint to the Information Commissioner's Office, or the data protection regulator in the country where you usually live or work, or where an alleged infringement of the General Data Protection Regulation has taken place. Alternatively, you may seek a remedy through the courts if you believe your rights have been breached.

The practices described in this privacy policy statement are current as of 13 March 2019.

Annex 4. Updated data collection table (per UC)

This an updated DMP template for data collected per UC across pilot sites.

Table 3. Overall data descriptions

ADASME_DataTable
_UCs_ALL_Final.xlsx