Delivery Report for

MeBeSafe

Measures for behaving safely in traffic

Deliverable Title	App to induce behavioral change
Deliverable	D4.4
WP	WP4 Driver coaching
Task	Task 4.3 Design of coaching schemes

This project (MeBeSafe) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723430.

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Grant Agreement No.	723430
Project Start Date	01/05/2017
Project End Date	31/10/2020
Duration of the Project	42 months
Deliverable Number	D4.4
Deliverable Leader (according to GA)	Shell
WP Leader	Saskia **de Craen**, Shell
Deliverable Leader(s)/ (Editor(s))	Saskia **de Craen**, Shell
Dissemination Level (Confidentiality)	CO: Confidential, only for members of the consortium (including the Commission Services)
Nature	Report: CO App: PU: Public
Status	Final
Due Date	M28 (August 2019)
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Please refer to this deliverable as follows:

Varlamov et al. (2019). App to induce behavioral change (Deliverable 4.4).

Abstract

This deliverable is a short description of the DriveMate app that was developed within WP4 of the MeBeSafe project. The app supports the coaching scheme developed for Heavy Good Vehicle (HGV) drivers (see *D4.3 – Final coaching scheme*).

Version	Date	Comment
1	24 June 2019	Draft for WP4 partners
2	09 July 2019	After English check
3	12 July 2019	Final version for review
4	19 July 2019	Reviewed document with comments
5	23 August 2019	Reworked version for reviewer
6	29 August 2019	Final version with okay from reviewer
7	29 August 2019	1st formal review ika
8	29 July 2020	Deliverable released for revision by the EC
9	29 September 2020	Final version after release for revision by the EC

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Acronyms

Coaching	The social/educational interaction between two or more individuals with the aim of improving the coachee's performance in some area of endeavour
DriveMate	The name given to the MeBeSafe truck driver coaching app
Offline coaching	The term used in the MeBeSafe proposal for human interaction for improved driver behaviour
Onboarding	The prepatory information about coaching techniques given to the drivers in the DriveMate app before the actual coaching sessions are started
Online coaching	The term used in the MeBeSafe proposal for the actions of the Drivemate app and Volvo's in-car driver support
Safety topic	A traffic safety theme (like fatigue in driving) for discussion in the truck driver coaching session, suggested by the app to the drivers. Also, the phrase is used for the information contained in the app which is used by the drivers as a basis for discussion
V0	The first version of the DriveMate app delivered to the truck drivers, where no coaching sessions are undertaken. Measurements are made and data gathered, but no information or feedback is given. So-called on-boarding sessions are delivered approximately every two days, eighteen times. Onboarding is in this case short texts about coaching techniques
V1	The first version of the app where coaching is introduced
V2	A more advanced version of the app, with control for road complexity in the feedback and more coaching functions, and possibly with the inclusion of video in various forms

1 Contribution by each Partner

The app was developed and delivered by Shell through its key application suppliers. All other partners in WP4 contributed by providing input, content and helped to ensure the solution design and implementation fits the wider vision of the MeBeSafe program. More specifically, Cranfield University provided the coaching content and coaching approach algorithms (see separate deliverable *D4.3 – Final coaching scheme*). VIF contributed with the development of "driving competencies surveys", which will be incorporated in a next version of the app. Feedback from Cygnify was included for potential inclusion of video capabilities in the future app versions.

All partners fulfilled their tasks in satisfactory time and quality.

2 Introduction

This deliverable describes the content of the DriveMate app that "provides retrospective feedback to professional HGV drivers based on real-time measured driving behaviour". The main idea and vision behind the DriveMate app is to increase road safety through enabling more driver's awareness about their driving behavior and providing a platform for peer-to-peer coaching.

Currently a first version (V1) of the app has been programmed and delivered. A next version, which will include more features and will fix unforeseen technical flaws. This version will be delivered as soon as possible (dependent on a pending amendment).

3 Solution functionality and use cases

The functionality of the DriveMate solution can be divided into three main use cases:

- Collecting the data
- Interpreting and visualizing collected data
- Enabling coaching for the drivers

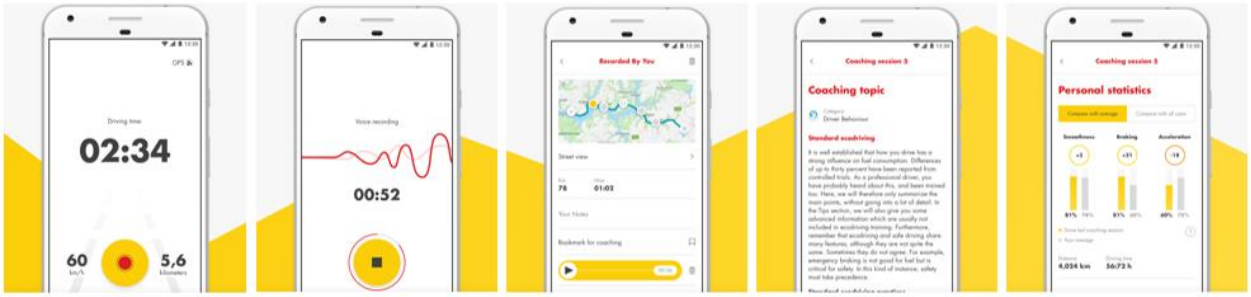

Figure 3.1. Screenshots from the DriveMate app: First, the screen during recording of a trip. Second, the event recording function. Third, a recorded event. Fourth, a safety topic from the coaching alert. Fifth, summary statistics of trips since the last coaching session.

The main beneficiaries of the DriveMate solution should be the truck drivers using the app from mobile device and researchers analyzing and interpreting anonymized data generated by the drivers and exported in form of reports.

3.1 Collecting the data

Collecting the data is achieved through the use of smartphone sensors, mainly GPS but also the accelerometer sensor. For this the DriveMate app needs tob e installed on a smartphone with Android 7.1.1 or above. Additionally, the phone has to be fixed in a cradle and stay there from the beginning till the end of the trip for accuracy of the measurements. Shell will provide support for the purchase and installation of this equipment.

A truck driver should start the app at the beginning of a trip and confirm the trip completion to cease the collection of drive data for that trip. During the trip the app is designed to provide as minimum possible distraction while still being relevant and possibly useful for the driver. The only interaction with the app in the driving mode is a possibility to record a geo-tagged voice memo. A driver can initiate this voice memo by tapping anywhere on the screen; after this the recording of the memo is voice controlled. It can be used later for coaching discussions or reviewing the specific place or situation where and when the memo was recorded.

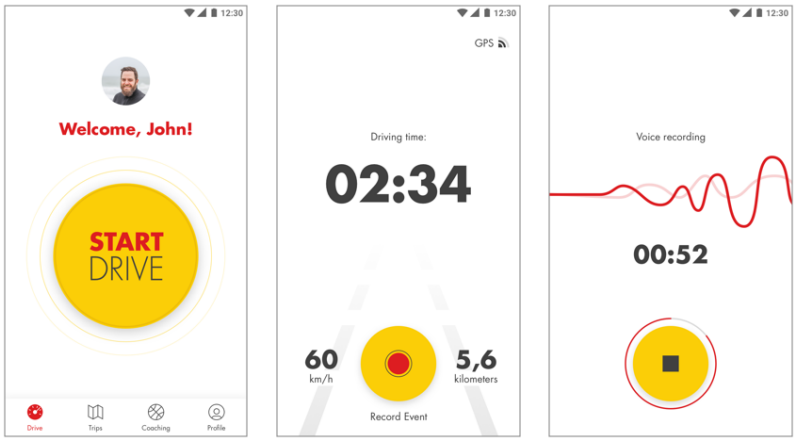

Figure 3.2. Screenshots of the app: the button to activate datacollection of the trip (1), during trip recording (2) and during an event recording (3).

From the researcher perspective the collected data can be downloaded in anonymized format, in bulk, per driver or per company.

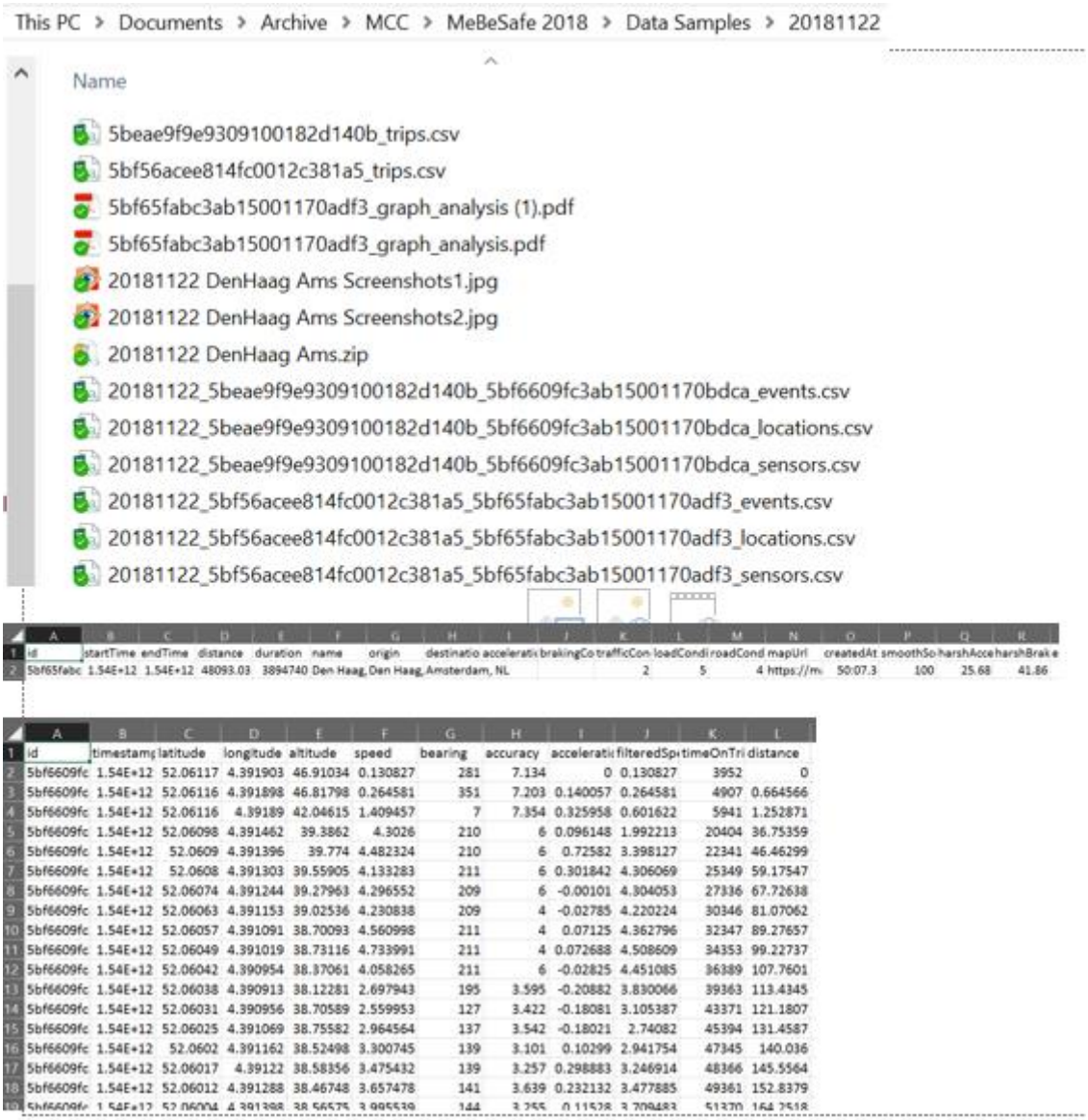

Figure 3.3. Examples of collected data

3.2 Interpreting and visualizing collected data

Proper visualization is an important part of providing insights to the drivers about their trips and their driving behaviours. After every trip completion, such insights become available to the drivers. It happens at the level of trip with statistics and overview for the entire trip. The next level is details per event: geolocation, time as well as notes

and visual representation through a Google Maps view. An event can be automatically created capturing harsh braking or acceleration or manually created by the driver.

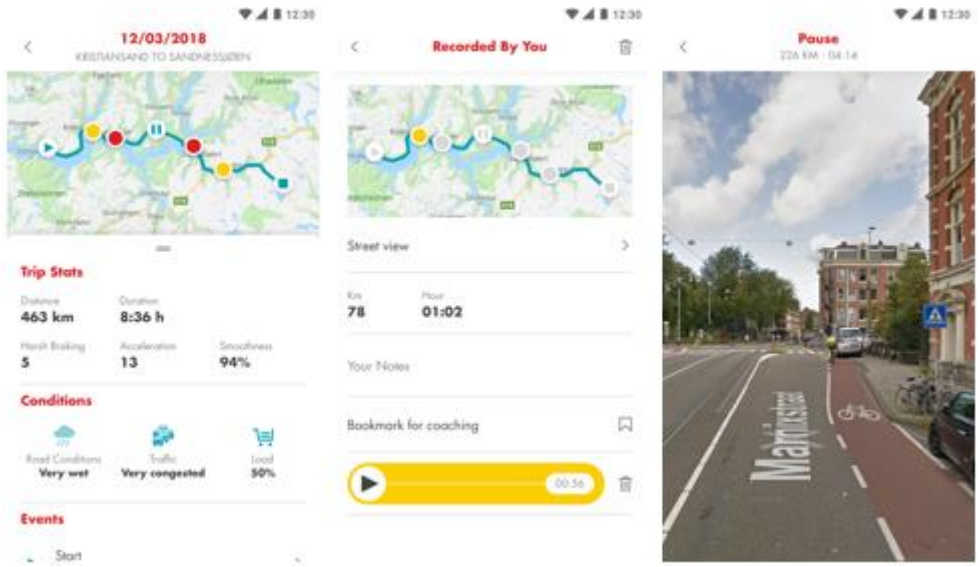

Figure 3.4. Example of a trip summary: Overalll statistics (1), the details of a driver-recorded event (2) and the streetview of the place where the event was recorded (3).

For researchers' purposes, interpreting and visualization takes a different meaning. Mainly it can be achieved by specialized tools and leveraging exported data. However, the DriveMate app and supplementary tooling also provide powerful visualization capabilities for key data metrics at the level of individual trips.

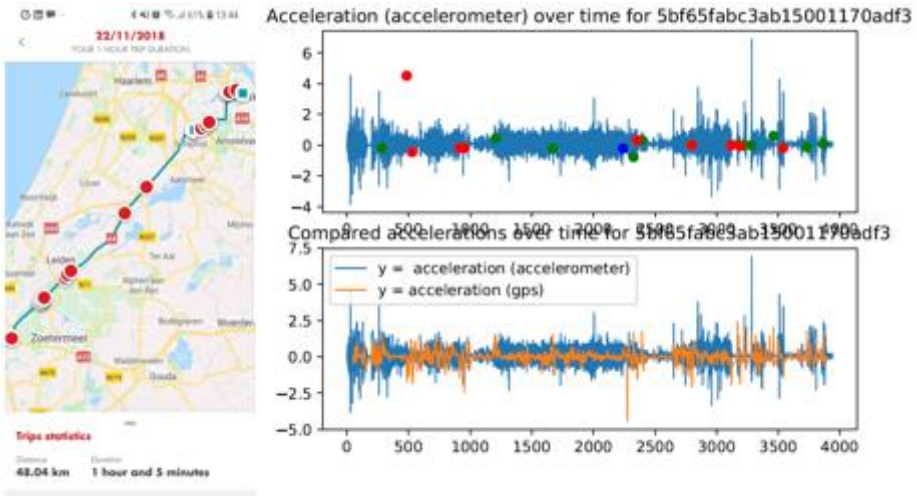

Figure 3.5. Example of a trip summary

3.3 Enabling coaching for the drivers

Coaching is one of the core offerings of the DriveMate solution. Four key parts of coaching include:

- Coaching scheduling mechanism – a set of 'onboarding' coaching sessions are followed up by full coaching sessions. Each is triggered by a set of rules like time passed, number of hours recorded, etc. and is facilitated by reminders shown to the driver
- Aggregated statistics – provide insight into driver's behaviors over time, compared to own average and other drivers
- Coaching theory – a number of topics on safe driving was developed and provided by Cranfield as a part of coaching sessions
- Reviewing your bookmarked events – any event can be saved for later use during a peer coaching moment

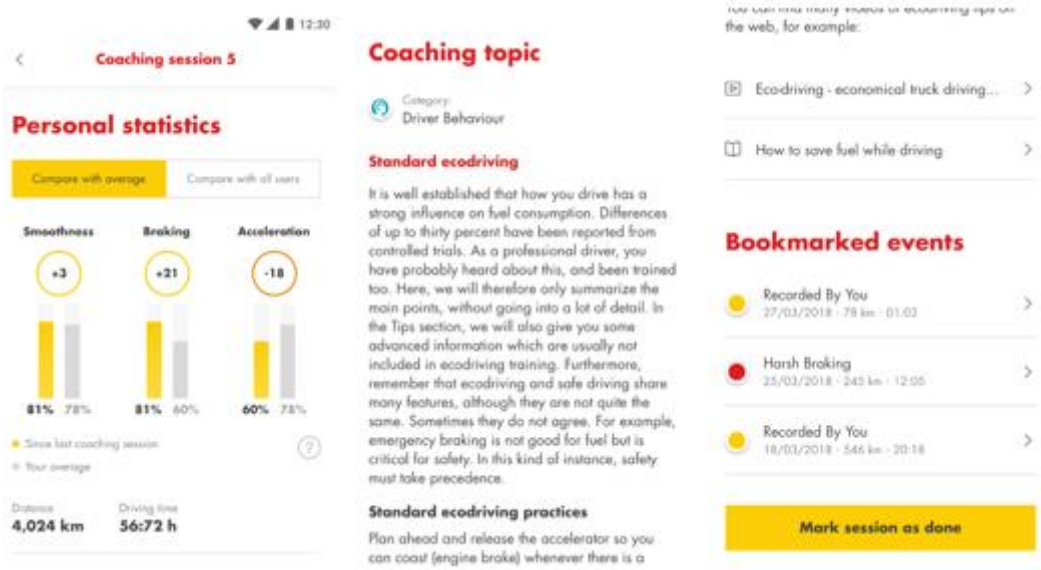

Figure 3.6. Example of a coaching alert

4 Technical components and solution use

Technically, the solution consists of a mobile app able to run on an Android phone, backend server component for storing and processing the collected data (run on MS Azure Cloud platform) and a couple of small utilities for data export and data visualization.

A number of technical requirements and pre-requisites are addressed in separate dedicated documentation. E.g. with regards to how to install a phone in the cabin, battery requirements, how to install the mobile app and configure it for the very first time.

5 Features in next version of the DriveMate app

The DriveMate app described in this deliverable is a first version of the app. The next version will have the following improvements and added features:

- Improved mechanism to access stored trip & event data from app backend server. With this improvement we can access and analyse the incoming data more easily;
- Survey function to give the drivers insight into driving competences and behavior (see deliverable 4.3 Section 4.5.13);
- Additional coaching functionalities, especially recording of when coaching sessions have been undertaken. This is necessary for evaluation; in order to seperate drivers who have completed much coaching sessions, from those with none or only a few sessions;
- Add company identification & comparison to company average. Because the data is collected anonymously we need a mechanism to identify the different companies in our data set;
- More sophisticated calculation of KPI variables, including normalization by route traffic complexity;
- Video capabilities of the app including the ability to deliver video content as a part of coaching and potentially capturing and processing video footage by the same smartphone installed in the cabin of a truck.

In addition to the added features, a next version of the app will include the correction of some technical flaws that we encountered in the current version. For example a problem in the algorithm that calculates the timing between coaching sessions or the unstability of the app resulting in occasionally not recording any trip data. Also see *D4.5 – Report on effective feedback.*

6 Deviations from Workplan

The current DriveMate app (version 1) meets the requirements of the Grant Agreement; it gives feedback on driver behaviour and supports the developed coaching scheme (see *D4.3 – Final coaching scheme*). However, this app does not reach its full potential. Further development is necessary to have an impact on / improve driver behaviour. See chapter 5 for the features that will be included in version 2 of the app.

7 Conclusion

The basic functionalities of the app have been programmed. We do need a next version of the app before the field trial. With the current (V1) version we expect to achieve possibly only a miniscule effect of online and offline coaching, which will be extremely hard to detect in the field trial.

References

Annexes