

## “Are you feeling safe on-board our autonomous shuttles?” – Results from the user experience survey at Terhills, Belgium

### Background and aim

With the emergence of autonomous vehicles, road safety faces many new challenges as well as opportunities. Apart from the objective road safety, subjective safety (i.e., how safe people are feeling in relation to autonomous vehicles) is an important topic as well. A high level of subjective safety will be of major importance for public acceptability of autonomous vehicles as well as their usage rate as a mode of transport. Empirical research on the topic, using real-world data, is largely missing.

Terhills is an extensive 365ha large old coal mine site in Belgium that is currently being redeveloped into a high-end leisure site, including a resort with 250 cottages, a four-star hotel, wellness center, cable park, shopping center,... Because the different facilities are located quite far away from each other, autonomous shuttles are implemented as a means of transportation. The shuttles have been operated since November 2022. Initially, the service started with an on-board safety steward. Over the next months, the role of the on-board stewards was gradually shifted to a remote control center. Since April 2023, the shuttles are operating fully autonomously without on-board stewards. The Terhills transport system is the first in Belgium and one of the first in Europe to achieve fully autonomous operation without on-board stewards.

### Method

An online survey is used to measure road users perceived safety of the transport system as well as their overall experience of the transport system. The survey is spontaneously completed by passengers of the transport system using QR-codes on-board the vehicles, as well as through interviews conducted at the shuttle stops where off-boarding passengers who have just completed a trip with the autonomous shuttles are asked about their experiences.

In addition, a randomized survey is conducted with non-users, asking for the reason(s) why they did not use the autonomous transport system and where safety concerns are one of the possible reasons.

### Preliminary results and next steps

The preliminary results of the surveys until end of April 2023 show very positive experiences overall. The system receives a ‘Net Promotor Score (NPS)’ of +74 (based on N=699 respondents). Since values of the NPS range from -100 to +100, this can be considered a very favourable value.

On a 5-point Likert-scale, users rate the system at 4.58 on average in terms of safety; i.e., very safe. In the non-users survey (N=125 respondents), not a single respondent indicated perceived safety as the reason (or one of the reasons) for them not to use the autonomous shuttles.

Furthermore, the preliminary results show the following variables that affect respondents’ evaluation of the transport system:

- Gender (higher score with women than men)
- Age (higher score with older respondents than with younger)

- Everyday transport modes used (respondents who use their car on a daily basis and respondents who use their bike on a daily basis give a higher score than non-daily car users and non-daily cyclists, respectively)

The data collection is ongoing, and we will continue to collect data of the fully autonomous (stewardless) phase that has recently been started. One of the main questions that we want to answer in the analysis is whether removing the steward from the autonomous shuttles has an impact on users' overall evaluation of the autonomous shuttles as well as on the perceived level of safety.

The preliminary results today do not cover a long enough period of fully automated (stewardless) operation to draw conclusions on the impact of removing the on-board stewards on respondents' subjective safety and overall experience. The results of these analyses will be available before the conference

The next phase of the project is to scale-up the service from 2 autonomous shuttles driving 8 hours per day to a fleet of 6 shuttles driving 13 hours per day. This should be finished by the end of the year. The impact on use experience will be monitored continuously.