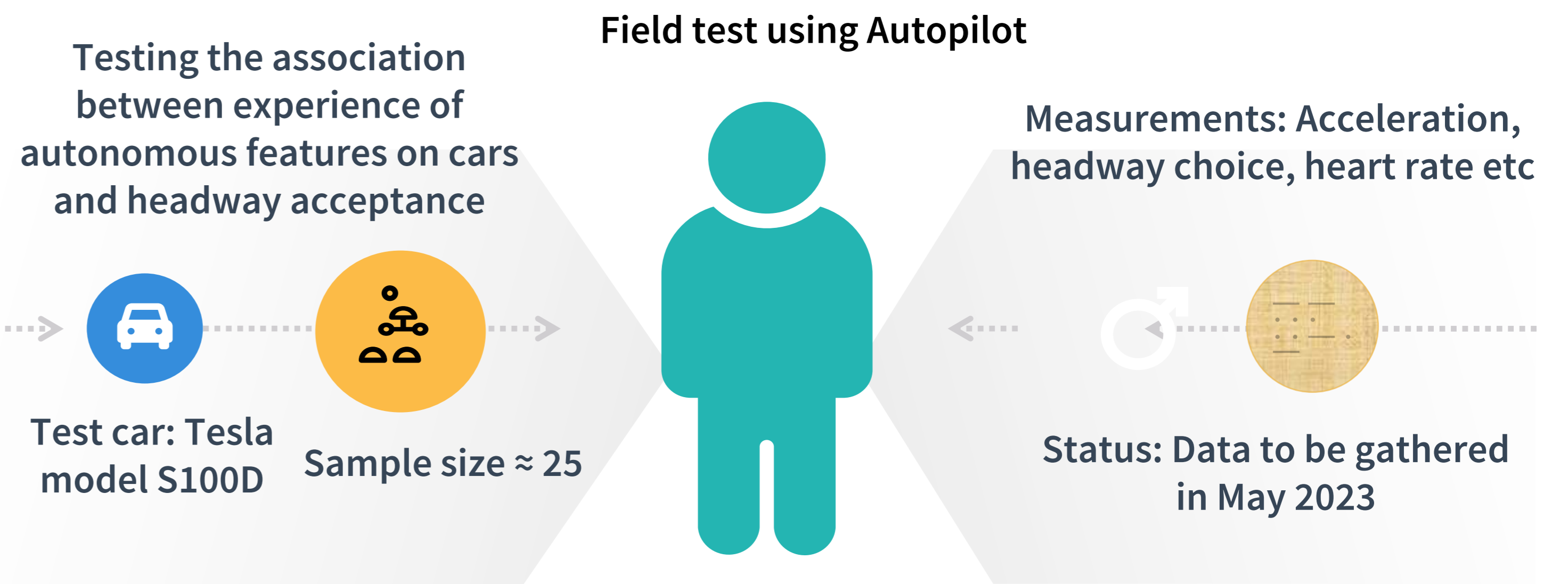


Autonomous Systems and Human Behaviour; Ongoing Studies

Cranfield University

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Field Study of Behavioural Adaptation to ACC



Meta-analysis of safety forecasts for vehicle automation

Safety is often predicted to increase by the use of automated features on vehicles – but how true are the forecasts claiming this? “Vehicle stability control could prevent or mitigate up to 20 and 11 percent of moderate-to-serious injury crashes and fatal crashes, respectively.” (Jermakian, 2012) Such claims are based upon several assumptions, such as no change in driver behaviour due to the system implementation. However, behavioural adaptation is always a possible threat to safety interventions, and have the potential to lessen the expected effect.



Studies: Effects for technological safety features on vehicles; forecasts versus reality in Australia (submitted)
Meta-analysis of forecasts and empirical investigations of technological safety devices for vehicles (in preparation)

Interaction with AS: Review of Research

- Aim: Comprehensive review of research on how humans interact with AS in relation to safety. This includes three parts; methodology, theory and empirical results. This is the basis for all other work.
- Study 1: Methodology. To enable an understanding of what empirical results in the human-AS research area means, the methods which have been used to gather the data must be understood in terms of their validities and biases.
- Study 2: Theory. A bewildering array of different theories and concepts are used in AS-Human interaction research. These are summarized under some different headings and critically evaluated.
- Study 3: Empirical results. A traditional survey of available findings.
- Status: All studies under continuous but slow development, due to the literature being vast and other work taking precedence.

Multi-purpose survey

Research questions	Method
1 Can anthropomorphism be primed and have an influence on survey responses?	Experimental manipulation by pictures of robots in two different versions of the survey
2 Can individual differences in trust be predicted by standard psychometric scales like Big Five personality?	Several different standard scales included, multiple regression analysis
3 Are there differences between active and passive acceptance of autonomous systems?	Items on passive acceptance (it's OK) and active acceptance (I will use) included. Comparisons of effect sizes of predictive scales.
4 Is intention to use AS predicted by Theory of Planned Behavior scales beyond what other scales included can predict?	Comparison of correlations and partial correlations between intention and TPB predictors, the latter with other scales held constant.
5 Is trust in AS predicted by general trust, i.e. a general tendency to trust other entities?	Correlations between different scales.

Distribution and responses so far

Groups targeted: TAS, Cranfield schools, LinkedIn, ResearchGate, Facebook, Reddit.
Total N responses in February 2023: ≈150

Papers

Determinants of stated trust in autonomous systems (submitted)
Single factor or single source in self-reported trust in automation data? (in preparation)

Self-driving buses in the field; exploration



Autonomous bus to be launched in Edinburgh in 2023



Autonomous shuttles running in public transport in two places in Sweden



Possible explorative research questions:
What are the duties and behaviours of the safety drivers?
How have they been trained?
What are their beliefs about the systems they oversee?

Simulator study at Cranfield; under development



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