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Scaling Up: Predicting the Safety Impacts of Intelligent Speed Adaptation

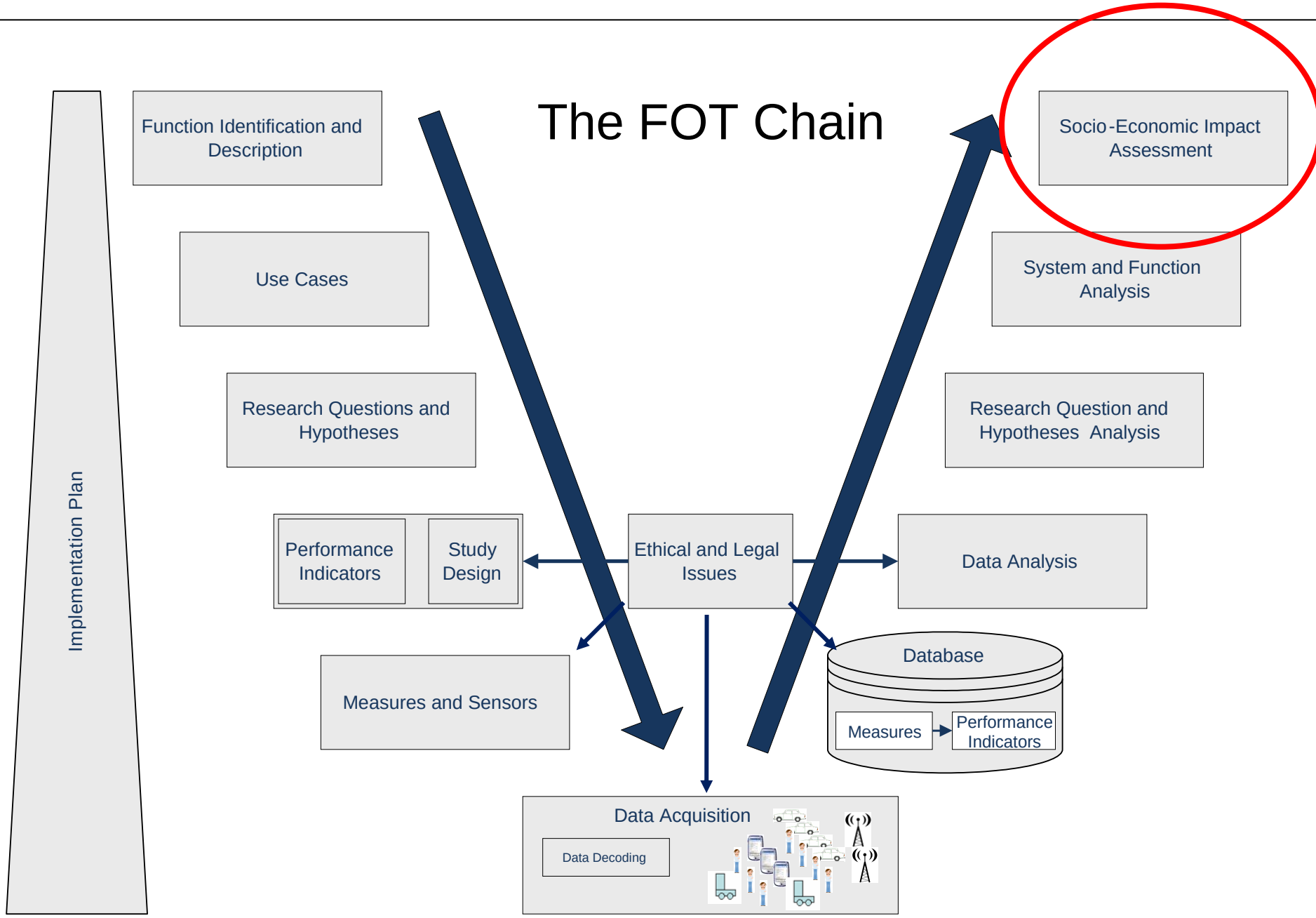
Oliver Carsten

ITS

University of Leeds

SEVENTH FRAMEWORK PROGRAMME

The FOT Chain



Two projects

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ISA-UK (2000-2006)


isa - UK
intelligent speed adaptation

Final Report

June 2008

Oliver Carsten, Mark Fowkes, Frank Lai, Kathryn Chorlton, Samantha Jamson, Fergus Tate and Bob Simpkin

Project Partners:
The University of Leeds and MIRA Ltd

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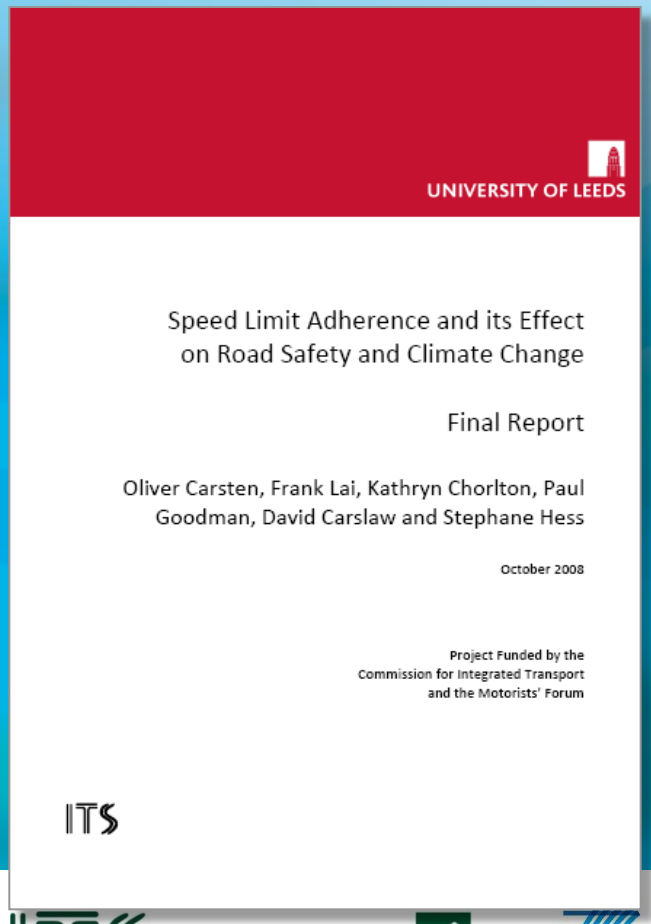
Project Funded by the
Transport Technology and Standards Division
Department for Transport

CfIT ISA (2007-2008)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Speed Limit Adherence and its Effect on Road Safety and Climate Change

Final Report

Oliver Carsten, Frank Lai, Kathryn Chorlton, Paul Goodman, David Carslaw and Stephane Hess

October 2008

Project Funded by the
Commission for Integrated Transport
and the Motorists' Forum

ITS

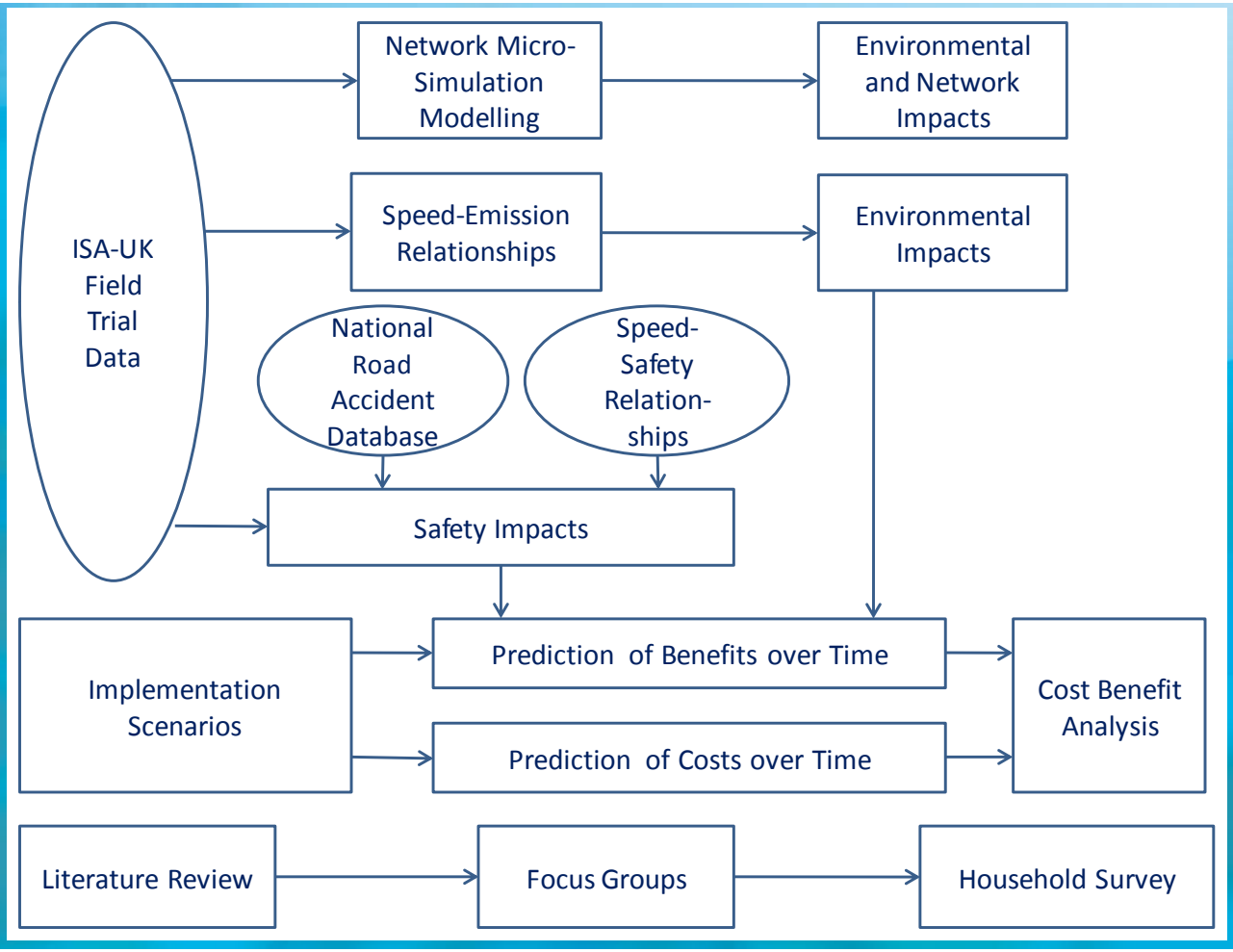
Major tasks of project:

- Four FOTs to investigate long-term behaviour with ISA in everyday driving
- Build and obtain feedback on one motorcycle and one large truck
- Experimental work on the Leeds driving simulator to investigate overtaking behaviour
- ***Implementation scenarios — predict future penetration, predict accident savings, calculate costs and benefits***

CfIT ISA

- Funded by the Commission for Integrated Transport and the Motorists' Forum — two advisory bodies to the Minister of Transport
- Objectives:
  - Estimate the impact on the number of people killed or injured from raising adherence to speed limits through the voluntary introduction of ISA
  - Estimate the impact on carbon emissions, other pollutants (including noise) and fuel consumption
  - Identify and estimate other benefits and disbenefits, e.g. journey time reliability
  - Perform cost-benefit analyses on introducing and operating ISA
  - Estimate the critical mass at which benefits increase rapidly as compared to the numbers of vehicles fitted with ISA
  - Advise how a greater take-up and usage of ISA on a voluntary basis can be encouraged
  - Identify any disbenefits of ISA and to advise how these can be overcome

CfIT ISA methods



Accident prediction and cost-benefit analysis (latest version)

"Recipe":

- Predict traffic growth (DfT advice)
- Predict accident trends without ISA
- Predict additional safety impact of ISA (via observed change in speed patterns)
  - Depends on ISA type and road type
- Analyse costs and benefits over 60 years from 2010

Estimating accident reductions with ISA

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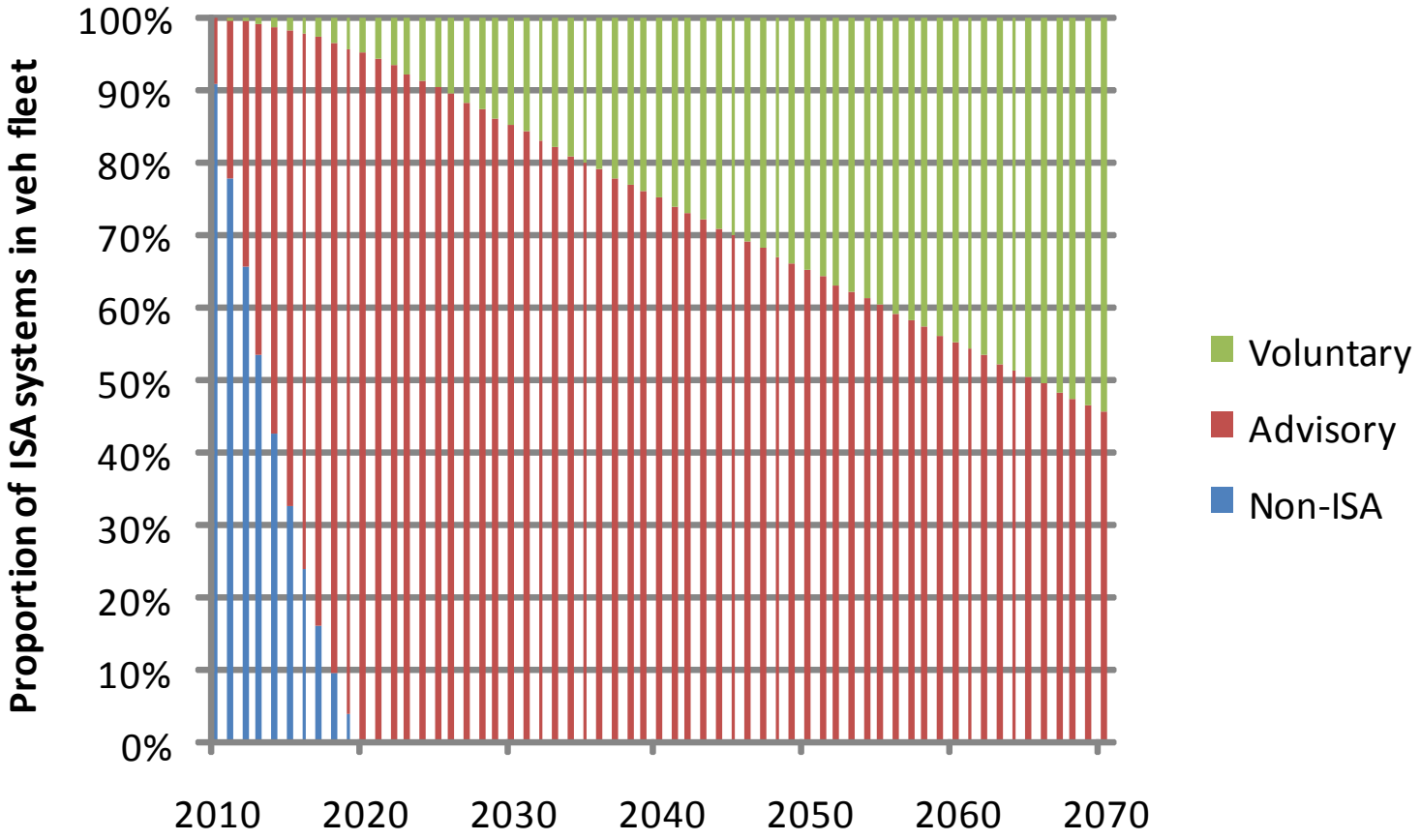
- Based on models from the literature of relationships between speed and crash risk
- These models have been calculated from real-world data
- *They are not drawn from the police reported contributory factors for accidents*

Predicted accident reduction by type of ISA

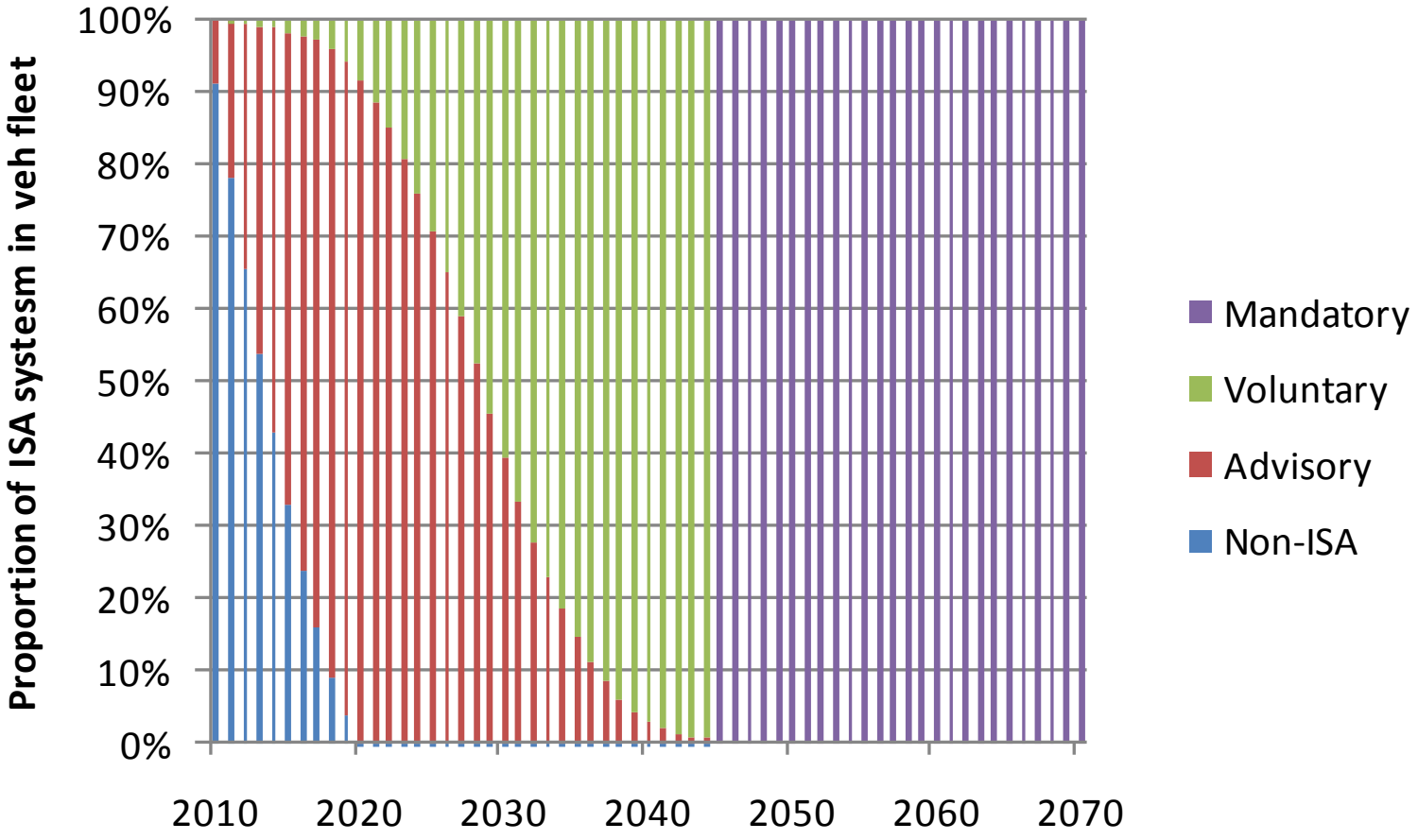
Reduction in Injury Accidents with ISA

ISA Variant	Overall Reduction
Advisory ISA	−2.7%
Voluntary (Overridable) ISA	−12.0%
Mandatory (Non-Overridable) ISA	−28.9%

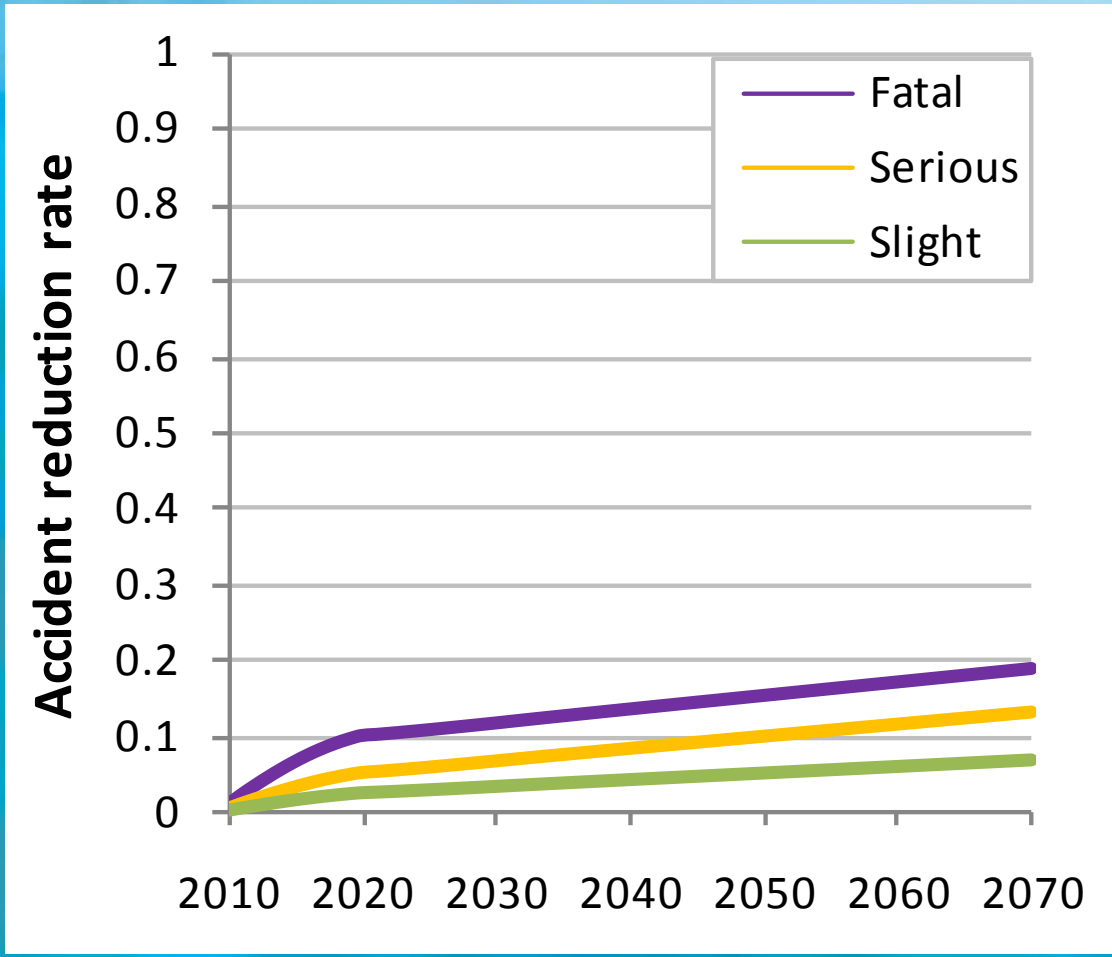
Predicted ISA penetration under the Market Driven scenario



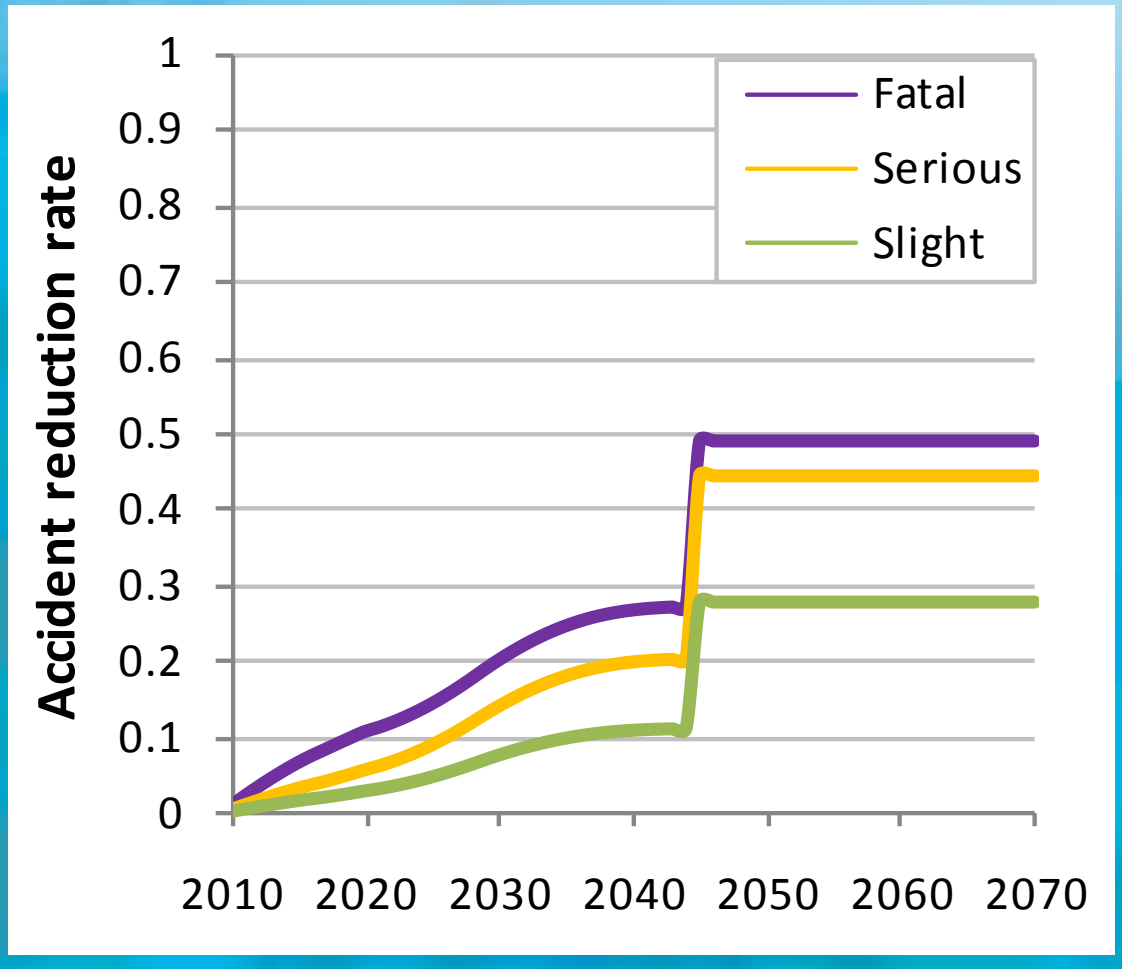
Predicted ISA penetration under the Authority Driven scenario



Crash reduction over time for Market Driven ISA



Crash reduction over time for Authority Driven ISA



Estimation of CO_2 effects from UK FOT speed profiles

Speed Limit (mph)	Change with Voluntary ISA	Change with Mandatory ISA
30	−0.4%	−0.4%
40	−1.2%	−1.2%
60	+0.3%	+0.3%
70	−3.4 %	−5.8%

Comparison of predicted outcomes

Crashes Saved 2010 to 2070

	Slight Crashes	Serious Crashes	Fatal Crashes
Market Driven	4%	8%	13%
Authority Driven	15%	25%	30%

- Benefit to cost ratios (accidents + fuel + CO_2):
  - Market Driven scenario 3.4
  - Authority Driven scenario 7.4

Conclusions

- In an FOT, the “scaling up” of the results is at least as important as the basic data collection and analysis
- The predictions on impacts and the CBA cause far more controversy than the attitudinal and behavioural results
- Politicians are very nervous creatures

More information

- http://www.dft.gov.uk/pgr/roads/vehicles/intelligentspeedadaptation/

and

- http://cfit.independent.gov.uk/mf/reports/isa08/index.htm

Thank you for your attention!

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More information or want to cooperate?

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