INTRODUCTION
Few new safety systems have been investigated as intensively as Intelligent Speed Adaptation. There have been real-world trials in Sweden, the Netherlands, Denmark, Belgium, Australia, Spain, Hungary, France and the UK. In addition, there has been a substantial effort invested in predicting the safety impact of various forms of ISA implementation and in calculating whether the social benefits outweigh the social costs. And yet, ISA is still not widely deployed and when it is available as a commercial product, as with the Speed Alert system in Australia, it is as the weakest form of ISA, i.e. a purely advisory system rather than the much stronger intervening ISA.

So what is preventing the take-up of ISA? Is it doubt about the effectiveness of ISA in curtailing speeding? Is it concern that users of ISA have not found the system acceptable? Is the technology not mature enough for large-scale deployment? Are there legitimate concerns about the public response in countries such as the UK to government encouragement or even mandating of system fitment? Is ISA not an effective instrument for accident reduction? Are the costs of ISA so high as to negate the benefits? This presentation will cover all of these issues.

BEHAVIOUR
The trials that we conducted in 2004 to 2006 on behalf of the UK Department for Transport revealed that a voluntary ISA system had a considerable effect on speeding [1]. The drivers were selected across a range of characteristics — gender, age, private or fleet and general intention to speed or not to speed. Driving with ISA produced virtually no change in speed choice below the limit, but had a marked impact on top-end speeds. In spite of the possibility to override the ISA at will, driving with ISA available reduced 85th percentile speed on 30 mph urban roads by approximately 2.5 mph and the proportion of distance travelled when driving over the speed limit declined from 40% to 35%. On 70 mph roads, 85th percentile speed fell by over 4 mph and the proportion of distance travelled when driving over the speed limit declined from 31% to 25%. These numbers may not appear to be very dramatic, but with ISA very large excess speeds became a rarity. It should also be noted that our ISA system allowed some limited speed excursion before it cut in.

On 30 mph urban roads, the effect of driving with ISA was to substantially curtail high speeds and there was no discernible effect of the system on the distribution of speed at the lower end. This shows that drivers were not on “autopilot”. Because the drivers were able to override the system, there was still some driving above the speed limit. In the after period, when the ISA system was withdrawn, behaviour reverted to that observed in the initial before-ISA phase.

The picture was rather similar for the 70 mph high-speed roads (mainly motorways). Again there was no real change at the low end, and again ISA curtailed very fast driving.

ACCEPTANCE
We also investigated acceptance of ISA. We used a scale that measures both “usefulness” (how good is it for the traffic system) and “satisfaction” (how much does it fulfil my goals). Usefulness was positive throughout. Satisfaction was mildly negative during early acquaintance with ISA, but after that became positive and was most positive after ISA was withdrawn. This indicates that the participants regretted losing ISA.

Figure 1 shows intention to speed over time. Phase 1 is the before period, Phase 2 is the with-ISA period and Phase 3 is the after period. ISA reduced not only the actual propensity to speed as discussed earlier but also intention to speed. In other words use if ISA acted as a kind of vaccination against wanting to speed, and the effect persisted into the after period.

Figure 1: Mean intention to speed in UK trials

TECHNOLOGY
The basic technology for ISA is robust. Indeed a primitive form of ISA is already available as an option on many car models in the form of the driver-set speed limiter. To turn that system into ISA, all that is needed is an enhanced satellite navigation system. Keeping that information system up-to-date is a practical and organisational problem rather than a technological problem.

PUBLIC ATTITUDES
It has to be admitted that in Britain the public is not yet convinced that ISA is a reasonable proposition. We conducted a set of focus groups as part of our recent project on behalf of the UK Commission for Integrated Transport (CfIT) and the Motorists’ Forum, looking at the potential benefits of ISA [2]. These revealed that there is substantial scepticism about or opposition to ISA. There is greater acceptance for the use of ISA on urban roads. Nevertheless,
the general view was that the most effective method to increase the market penetration of ISA would be through enforcement and legislation making fitment compulsory rather than through fiscal incentives — in other words if the government were to take the initiative, ISA would be accepted. The introduction of ISA was likened to that of seatbelts, with usage eventually becoming compulsory.

In the same project we conducted a national household survey on what incentives might be required to persuade people to adopt or use ISA. The survey showed that the British public is segmented into three major groups of roughly equal size. There were those who were extremely hostile to ISA and who declared that no amount of incentive would sway them to purchase or use ISA. The second group was the non-committed, who indicated that they would be persuaded by the right kind of incentives. The third group appreciated the safety potential of ISA and did not require any incentives to adopt it.

**EFFECTIVENESS**

ISA would have a very substantial impact in terms of accident reduction. In the CfIT project, we calculated that full compliance with the speed limits on British roads would result in a reduction of 29% in injury accidents. The reductions in serious and fatal accidents would be substantially greater — approximately 50% for fatal crashes [??]. Countries with greater problems of speeding than Great Britain would save even more.

**COST-BENEFIT ANALYSIS**

As part of the CfIT project, we carried out a cost-benefit analysis. We examined two scenarios. The first was a Market Driven scenario with relatively slow adoption of ISA and the ISA systems chosen generally tending to be the less effective advisory ones. The other scenario was an Authority Driven one, in which fitment of Voluntary ISA on new vehicles became required and in which, once virtually every vehicle had ISA, it became compulsory to use it.

The overall benefit to cost ratios (BCRs) calculated were 3.4 for the Market Driven scenario and 7.4 for the Authority Driven scenario. In both cases almost all the costs were attributable to the in-vehicle equipment. These BCRs mean that both of the alternative futures are fully justifiable in terms of social investment, but the more forceful scenario clearly has greater pay-off.

Thus it can be seen that both scenarios are “winners”, but benefits are tied very closely to the form of ISA and the rate of adoption. The harder the push for ISA and the “stronger” the system, the greater the benefits. It should be noted that ISA can potentially deliver far more than was considered in this analysis. For example, it was assumed that, apart from the introduction of ISA, there would be no fundamental changes in the speed management regime. But ISA could deliver 20 mph (30 km/h) zones for virtually no cost, since all that would be required would be an alteration in the speed limit map. There would be no need for all the costly infrastructure changes normally associated with 20 mph zones. ISA could also be employed dynamically, with the addition of a communications interface. This would enable dynamic speed management to be extended to the whole road network. In the long run, we might get away completely from having fixed speed limits.

And finally, it will not be long before ISA is virtually a no-cost system. Given the prevalence of satellite navigation systems and the growth of various driver assistance systems, ISA becomes one electronic feature among many on the car of the future.

**CONCLUSIONS**

The conclusion is that ISA is a system of demonstrated effectiveness, reasonable acceptance among users and has very large safety potential. The public remains to be convinced, but no real attempt has been made to win them over. It is now time for those politicians who profess to be committed to the most effective strategies for reducing deaths and injuries on the roads to step forward and take the lead in implementing ISA.

**REFERENCES**