

Electronic driver support systems: opportunities and pitfalls

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Introduction

There are a number of reasons why in recent years electronic driving support systems were and still are developed and implemented at an increasing rate and speed. The first and foremost reason is safety (i.e. the unacceptable number of accidents), but also economic principles (time is money, among others) are a compelling drive, while bringing comfort to the driver population is obviously a good sales argument. Finally, environmental arguments play a role of growing importance.

Safety is primarily a 'human factors' case. Driver impairment is the first cause of accidents on (European) motorways. Based on a literature survey, Smiley and Brookhuis (1987) stated that about 90% of all traffic accidents are to be attributed to human failure, for instance, through fatigue, inattention or drowsiness at the wheel. According to Vallet (1991) it is generally a loss of alertness, which is the principal cause of fatal accidents (34%), while fatigue as "single factor" is estimated to be responsible for 7-10% of all accidents (Tunbridge et al., 2000). The costs of road traffic accidents for society are enormous in terms of both human suffering and economical loss. In Europe alone around 50.000 people are killed in traffic accidents each year, while more than 1.500.000 are injured. Traffic congestion, i.e. the regular ones and those following traffic accidents, is a daily nuisance, predominantly present in the economically most sensitive places. At least 70 Billion Euros are spent each year on medical treatment of injured people, the cost of congestion is many times that amount, and many thousands of person-years of work are lost.

Of course, the consequences of accidents in terms of seriousness of injuries can and must be further reduced by new developments with respect to secondary, protective measures, i.e. once an accident happens, by the car manufacturing industry. But the accident rate itself needs to be decreased drastically too, by means of primary measures, to avoid accidents in the first place. The prevention or reduction of traffic accidents requires countermeasures that have to be devised and introduced to prevent those behaviours contributing to accidents. In Europe, the USA and Japan, combined ergonomic and engineering approaches to both hazard assessment and the indication of drivers' performance limits have developed into research and development of new and relevant (primary) safety measures. Brookhuis & Brown (1992) argue that an ergonomic approach to behavioural change via engineering measures, in the form of