

Attempt to assess the impact of Telematics systems on the improvement of the accident situation

Basis: Data on German traffic accidents with injured persons and fatalities as of **2002**;
 Total number of traffic accidents with injured persons: **362,000**, total number of fatalities due to traffic accident: **6,842**.
 Source for accident data, if not mentioned otherwise: "Verkehrsunfälle 2002", Editor: Statistisches Bundesamt der Bundesrepublik Deutschland.

Assumption: Results on accident reduction due to ESP of 25% (source: DaimlerChrysler) applied to other technologies, if no more accurate estimation possible:
 Impacts are viewed for each system alone. No dynamic effects due to combination of different systems are taken into consideration.
 At the envisaged point in time it is assumed to have a penetration rate of 70% of the entire car fleet. This means, that in-car-equipment needed for systems is in place in 70% of all cars. In case of systems requiring vehicle to vehicle communication this penetration rate is applied for both vehicles.

Attention: The estimated accident reduction is a very rough guess due to lack of availability of secured data

Type of Function	Explanations	Estimated percentage of reduction for this specific type of accident	Overall impact on reduction of traffic accidents
1. Vehicle autonomous systems			
DCS = Dynamic Control Systems;	Corresponds to ESP; this could influence the group of veer-off accidents. (50%) of them due to speed (the remaining 50% by fatigue) Assumed efficiency: 25%; estimated reduction of accidents: 5,250 (30.000 x 25% x 70%)	17,5%	1,5%
RFT = runflat indicator	Effects identical with 'Tire Pressure Monitoring System'. This can influence the accident cause of "Technical deficiencies, maintenance deficiencies/tyre set-up". Number of accidents with personal injuries caused by "tyre set-up": 1,500. Assumed efficiency: 50%; estimated reduction: 625 (1,500 50% x 70%).	35%	0,15%

Vision Enhancement	Serves the improvement of obstacle identification at dark. A reduction can be achieved in the number of pedestrians in non-urban areas at dusk/dawn and dark. Number of pedestrians and cyclists with accidents at dusk/dawn and dark: 2,500. Assumed efficiency: 25%; estimated reduction: ca. 440 (2,500 x 25% x 70%)	17,5%	0,1%
AHL = Adaptive Head Lights	Turns with the steering while negotiating curves. May positively influence the number of cyclists and pedestrians with non-urban road accidents at night. Number of pedestrians and cyclists with accidents in non-urban areas at dusk/dawn and dark: 2,500. Assumed efficiency: 25%; estimated reduction: ca. 440 (2,500 x 25% x 70%)	17,5%	0,1%
AHA = Automatic Headlight Activation	Similarly unknown effects like driving with the headlights on. 'Italian' experiences of the effects are not yet available, however, major progress cannot be expected. Number of accidents with personal injuries caused by 'lighting (only cars)': some 100 Assumed efficiency: 25%; estimated reduction: 20 (100 x 25% x 70%)	17,5%	0,03%
Driver Condition Monitoring	It tracks fatigue, disturbances like distractions and lack of attention. Number of accidents with the accident cause of "fatigue": some 2,000, estimated number of unknown cases (50% of all accidents involving road veer-off) = some 30,000 accidents Assumed efficiency: 50%; estimated reduction: 10,500 (30,000 x 50% x 70%),	35%	2,9%
Alcohol Interlock	As an indirect blood alcohol analysis prevents vehicle start, if BAC is excessive. Number of accidents involving at least one intoxicated person: some 23,000 Assumed efficiency 25% (50% technical tolerance, 50% bypassing); estimated reduction: 4,025 (23,000 x 25% x 70%),	17,5%	1,1%
Traffic Sign Recognition and Alert	Points out traffic signs and warns against violations. Number of accidents with the accident cause of 'non-compliance of priority-controlling traffic signs': some 47,000 Assumed efficiency: 50%; application on black spots only; those count for 5% of all accidents; estimated reduction: 823 (47,000 x 50% x 5% x 70%),	1,75%	0,2%
Event Data Recorder or Black Box	is not directly suited for accident prevention. Knowing of the existence of this piece of equipment may have a disciplining influence on driver behaviour. expect no significant influence on accident figures	n/a	n/a
2. Vehicle autonomous systems with network potential			
Obstacle & Collision Warning	May help avoid accidents in longitudinal traffic. Number of accidents with personal injuries of the accident type 'accident in longitudinal traffic': Within urban areas: some 50,000; outside urban areas: some 40,000, i.e. some 90,000 accidents. Assumed efficiency: 25%; estimated reduction: ca.11,000 (90,000 x 25% x 70% x 70%)	12,25	3,1%

LDW = Local Danger Warning	To local dangers can lead to avoidance of accidents due to slippery roads, accidents by tyre hydroplaning or side wind and accidents on roads with low friction values. Yet, only accidents on slippery roads and caused by "side wind" are documented in the accident statistics. Number of accidents with personal injuries on slippery roads, road condition (slippery/slick lane, side wind): some 20,000. Assumed efficiency: 25%; estimated reduction: 2,450 (20.000 x 25% x 70% x 70%)	12,25%	0,7%
Adaptive Brake Lights	May have a reducing effect on the accident type 'of collision with a preceding or waiting vehicle'. Out of the 40,000 non-urban accidents with personal injuries of the accident type 'collision with a preceding or waiting vehicle" 20,000 occur in 'moving traffic'. Assumed degree of efficiency: 25% for moving traffic and 15% for the others; estimated reduction: 3,500 + 2,100 = 5,700 (20,000 x 25% x 70% + 20,000 x 15% x 70%)	14%	1,5%
Urban Drive Assistant	Could influence the accident cause of 'non-compliance with priority-controlling traffic signs'. Number of accidents with personal injuries due to the accident cause of 'con-compliance with priority-controlling traffic signs' in urban areas: some 35,000. If UDA predicts accident-prone situations by means of a filter issuing warnings only then: assumed efficiency: 25%; estimated reduction: 6,100 (35,000 x 25% x 70%)	17,5%	1,7%
Extended environmental information	May call attention to the danger of accidents due to slippery roads and fog. Number of accidents with personal injuries due to slippery road conditions: slippery/slick lane or side wind: some 20,000 Assumed efficiency: 25%; estimated reduction: 2,450 (20.000 x 25% x 70% x 70%)	12,25%	0,7
3. Aggregate information in the vehicle with vehicle to vehicle, vehicle to infrastructure or infrastructure to vehicle			
High quality Congestion / Traffic Information Systems	Can prevent collisions with rear-end of traffic jams on vision-obstructed routes. There are however no statistical results. Number of accidents with personal injuries of the accident type of "accidents with fewer than 2 parties involved" as rear-end collisions (consecutive accidents): some 6,000 accidents (30% out of 17,000 accidents) Assumed efficiency: 25 % estimated reduction: 735 (6.000 x 25% x 70% x 70%)	12,25%	0,2%
Intervehicle hazard warning	May contribute to the avoidance of accidents due to slippery roads and fog. Number of accidents with personal injuries in slippery road conditions: slippery/slick lane or side wind: some 20,000, Assumed efficiency: 25%; estimated reduction: 2,450 (20.000 x 25% x 70% x 70%)	12,25%	0,7%

4. Functions with support/communication from/to infrastructure			
e-call	Does not contribute to accident avoidance, but means that more rapid assistance can arrive. Effects expected particularly with regard to accident consequences and severity. Efficiency: Non-urban areas: average rescue times are 12 minutes for e-call rather than 21 minutes, i.e. they are shorter by 9 minutes or 43%. This leads to an increase the chance to survive of 12% In urban areas: rescue times average 8 minutes for e-call rather than 14 minutes, i.e. they are shorter by 6 minutes or 43%. This leads to an increase the chance to survive of 7%. (Source: Final report STORM 12/1995 (EU-Project 1993-1995 in the area of Stuttgart). Estimates reduction of fatalities: in non-urban areas 619 (out of 5,158), in urban areas 118 (out of 1,684).	n/a	estimated reduction of total fatalities: 11%
Speed Alert	The effect depends on/is proportional to the road segments equipped with it. Effects difficult to gauge owing to compensation. Speed Alert, however, is very well suited for taking the hazards out of black spots, i.e. the issue of a concrete warning against black spots will lead to the avoidance of black spots. Assumptions: Application on black spots only; those count for 5% of accidents with injured persons. Assumed efficiency: 50%; estimated reduction: 6,335 (362,000 x 5% 50% x 70%)	1,75%	1,75%
Variable Message / Traffic Signs	Produced a decline in accidents of some 30% on the 2,000 km (= 9%) of German roads equipped with them. Number of accidents with personal injuries on all motorways: 25,000 Assumption 10% of all motorways are equipped. estimated reduction: 750 (25,000 x 30% x 10%), probably higher as black spots were equipped with preference	3%	0,2%
Infrastructure Based Warning Systems	Can reduce accidents in longitudinal traffic and side wind-related accidents. Number of accidents with personal injuries of the accident type 'accident in longitudinal traffic': In urban areas: some. 50,000, outside urban areas: some 40,000 in total, i.e. some 90,000 accidents. Assumed efficiency: 50%; Application on black spots only; those count for 5% of all accidents . Estimated reduction: 1,575 (90,000 x 50% x 5% x 70%),	1,75%	0,4%
Lane Keeping Assistant and Lane Departure Warning	Can contribute to a reduction in veer-off accidents. Number of veer-off accidents with personal injuries in Germany 2002: 60,000 Assumed efficiency: 25%; estimated reduction: 10,500	17,5%	2,9%