



Reward 2011

## Ford Active City Stop



Ford Active City Stop is a system which helps to avoid or to mitigate accidents at low speeds. At speeds up to 30km/h, a lidar (Light Detection And Ranging) sensor positioned at the top of the windscreen scans the area up to around 7.6m ahead of the vehicle for possible obstacles. If the vehicle detects a braking, slower-moving or stationary vehicle in front and it determines that a collision is likely, the brakes are pre-charged. If the driver remains inactive (no steering or braking input), the car applies the brakes automatically and reduces engine torque.

At relative speed differences less than 15 km/h then Active CityStop may help the driver to entirely avoid the collision with the obstacle in front. If the relative speed difference between the two vehicles is between 15 and 30 km/h the impact is unavoidable through braking alone but Active City Stop will aim to reduce speed prior to the impact.

If the driver intervenes to try to avoid the accident, either by accelerating hard or by steering, Active City Stop will deactivate. Active City Stop is unusual for an autonomous emergency braking system in that it does not give the driver a warning of the impending collision, and brakes very hard, very late. This is intentional: the way in which the system intervenes is not comfortable and drivers will not become reliant on it to avoid around-town accidents.

## **What is the safety benefit?**

Active City Stop is a technology designed to mitigate and, in certain circumstances, avoid low speed rear-end collisions with vehicles which are stationary or travelling in the same direction. Rear end collisions are extremely common. According to some estimates, around a quarter of all accidents involve a rear-end collision. Active City Stop operates only up to 30km/h so focuses on the sorts of rear end collisions which take place during urban driving. Fatal and severe injuries are not common for car occupants in accidents below 30km/h. However, soft tissue 'whiplash' injuries are frequent, not only for the occupants of cars struck from behind but also for those in the striking vehicle. It is estimated that Active City Stop could provide a useful benefit (i.e. avert or mitigate the accident) in around five to nine percent of all car to car collisions.

## **How has the system been assessed?**

Following extensive development tests within the Ford group, Active City Stop was assessed by an independent test laboratory in Germany (BAST). Two different types of artificial targets were used, representing the rear ends of vehicles. Tests were conducted with stationary targets and moving targets. The Focus was driven at the targets and the test driver deliberately took no action to avoid collision with the (harmless) dummy targets. In all cases tested in the programme, Active City Stop either reduced the speed of collision or averted the collision altogether. BAST concluded from their work that Active City Stop functions as designed by Ford: that it is capable of detecting realistic targets and avoiding or reducing the speed of collision. Road tests were done to ensure that the system did not perceive a threat and apply the brakes in benign situations. The system has also been independently evaluated, especially with regard to driver reaction and acceptance, and has been found to increase the perception of safety.

## **What are the limitations?**

Active City Stop is turned on by default at the start of each new journey but can be switched off by the driver. If it switched off, the system defaults on again at the beginning of the next journey. Active City Stop functions only up to 30km/h, so will not assist in accidents at 'highway' speeds. Its lidar can detect vehicles which are at a standstill or which are travelling in the same direction and works at night as well as during the day. However, the sensor is compromised if it is covered by dirt or snow, or in adverse weather conditions such as thick fog or heavy rain. To mitigate this, the sensor is sited in the area which is swept by the windscreen wipers and the windscreen is electrically heated.



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