

Accident statistics repeatedly show that **in 40 percent** of all fatal pedestrian accidents, the driver does not see the person until just before the impact. In the case of children the situation is even more dramatic. According to the 2006 figures from Germany's Federal Statistical Office, **48 percent** of accident victims between the age of six and 14 ran onto the road without looking out for traffic. **25 percent** of accidents involving children happened when they suddenly appeared from behind a visual barrier.

As you know, the best accident is the one that never happens. That's why we developed a system that can assist motorists handle pedestrians that suddenly appear from between two parked cars.

AMULETT is the name of the research project which is a German acronym for '**Active mobile accident avoidance and mitigation of accident effects through cooperative data acquisition and tracking technology**'. It has come up with what we call the **Car-2-X Communication**.

The system involves vehicles communicating with radio transponders that are carried by people for personal safety purposes. The sensor systems between the car and the transponder reveal and recognize even pedestrians that are hidden from view.

The three-year venture has been funded by the Bavarian State Ministry for Economic Affairs, Infrastructure, Transport and Technology. The other participants include Continental Safety Engineering International GmbH, the Fraunhofer Institute for Integrated Circuits, the Institute for High Frequency Engineering at Munich's Technical University, and ZENTEC GmbH.

The car sends and receives data with the Amulett, which works like **a Radio Frequency Identification (RFID)**, and could be built into common things like **schoolbag or a mobile phone** in the near future. When the transponder receives an interrogation signal from the vehicle it immediately transmits an identification message which enables its position to be locked on and identify the carrier as a road user who is at risk.

The system works effectively even when the person carrying the transponder is not visible from the driver at the moment of danger.

Electromagnetic waves are identified by the car via a multi-antenna system in the frequency range of **2.4 GHz**, with a signal processing unit determining the **angle of arrival** and identification.

The signal's **travel time** between interrogation from the car and response from the transponder determines the distance of the pedestrian.

Based on the data received, the system calculates the level of danger and alerts the driver correspondingly. If the driver, for whatever reason, fails to respond, extra precautionary measures can be employed to prevent the impending accident from happening or minimizing its consequences. The current system in the vehicle provides the driver feedback through a head-up display which was designed so that the driver is not alarmed, but can make intuitive interpretations leading to appropriate actions.