AEB test equipment

Developers looking to test according to the Euro NCAP and ISO AEB VRU specs can now purchase a free-driving platform – the only system of its kind worldwide

The number of fatalities and injuries of vehicle occupants due to road accidents has continued to decrease thanks to improvements in vehicle passive safety features. However, nearly 50% of accident fatalities happen in crashes involving pedestrians or other road users. Some safety features have been implemented to reduce pedestrian injury caused by front-on collisions (such as the pedestrian airbag). The next big step was the introduction of collision detection and mitigation systems to protect these vulnerable road users (VRUs).

Different tools are needed to test autonomous emergency braking systems (AEB) for many types of vehicles. Over 10 years ago 4activeSystems began developing and supplying test dummies and propulsion systems for real-world system testing.

The dummy objects, such as articulated pedestrians, bicyclist dummies, motorcyclists and animals, mimic real objects due to their optimized radar response, infrared reflectivity (using lidar systems) and visual appearance (for camera systems). Thanks to their lightweight structures, damage to the dummy and the test vehicle is limited following a crash.

In setting up a test scenario, the dummies must be programmed to move on a predefined trajectory. State-of-the-art VRU test systems, such as the 4active SB and XB, use belt-driven platforms to maneuver the objects on straight line paths. This is the current standard. As development for fully autonomous driving continues, more complex traffic scenarios involving numerous road users must be replicable.

ABOVE: FBsmall is suitable for testing both cars and trucks at speeds up to 50km/h (31mph)

For this purpose, 4activeSystems has developed a free-moving platform, the FBsmall, designed for VRU testing. FBsmall is a GNSS/IMU-controlled free-moving, battery-powered platform. It has a very high positional accuracy of ±2cm, ensuring high repeatability of tests.

For VRU testing, it is essential that the underlying propulsion system does not affect the sensor response, so only the dummy object should be detected. Therefore the platform beneath the dummy has been designed to be extremely low profile, taking into account the correct distance estimations for camera-based systems. Thanks to the special shape and damping plastic materials, the radar response is very low from all directions (orders of magnitude below dummy objects).

LEFT: Experts at activeSystems work continuously to improve the VRU dummy tech

Based on accidentology analysis, the typical speed of pedestrians and bicyclists involved in accidents resulting in severe injuries or death, is between 3km/h and 20km/h (12.5mph). The third big group of VRUs involved in road crashes are motorcyclists. Speeds in these crashes are typically higher. As such, the FBsmall has been designed to reach speeds up to 50km/h (31mph). Updates that will enable the system to reach 80km/h (50mph) are in development.

The user-friendly software interface enables user-defined trajectories to be entered easily and displayed online on a satellite map. The system can communicate to any major automotive dynamic motion analyzer, so absolute and relative position data between platforms and test vehicles is available for monitoring, movement triggering and speed control.

The FBsmall is also overridable by heavy trucks in stock configuration for development of ADAS for commercial vehicles. ❮