



## Cushioned driverless vehicle for dynamic interactions and low-speed impacts with other vehicles

The ABD Soft Crash Target Vehicle (SCTV) has been designed to allow the testing of vehicle collision detection and pre-crash systems and a wide range of ADAS development work. It is designed to enable low-speed collisions to be carried out without causing significant damage to the test vehicle. It consists of a radar-reflective dummy-vehicle composed of a number of inflatable cushions and simulated wheels (which do not touch the ground), mounted around a Central Drive Box, with its own small diameter wheels, which is designed to drive the SCTV at typical speeds of 50 km/h (30 mph).



Cut-away showing central drive box inside SCTV cushions



Side impact (both vehicles moving at 30km/h)

The Central Drive Box uses an electric motor with on-board batteries to propel the vehicle and houses the control system, which can accurately guide the vehicle along a pre-programmed course at a defined speed. The controller uses position feedback from a GPS-corrected inertial navigation system to ensure that high-precision guidance is achieved. The time signal from the GPS unit is used to ensure the precise millisecond synchronisation that is necessary to generate accurate crash simulations.

The batteries used to power the system will provide sufficient power for a typical half-day of use. Additionally, they can be recharged between tests by quick connection to a suitable supply at the track.

The control system and software is based on ABD's standard robot controller and software, so that users already familiar with ABD's in-vehicle robots will find using the SCTV easy. The unit is radio-controlled from a remote base-station using ABD's standard driverless testing system, which can also be used to coordinate robotic control of the test vehicle, thereby providing an easy-to-use single software environment. The driverless testing system also enables the SCTV to be driven manually using remote controls.

### Summary of features

- Lightweight carbon fibre and aluminium chassis
- Rollover protection for control system
- Typical cushion thickness 60 cm
- Electric drive system with belt drive transmission
- 4-wheel hydraulic braking system with failsafe spring-actuated braking
- Lithium Iron Phosphate battery pack
- Electrically-actuated steering system with override facility for manual manoeuvring
- ABD Driverless control hardware mounted in shock-resistant, splash proof casing
- Inertial Navigation System with GPS correction
- Control software for operation of Soft Crash Target allows coordinated motion with other vehicles using an ABD driverless system.

Anticipated Performance	
Maximum speed	70 km/h
Maximum acceleration	0.2g
Maximum deceleration	0.9g
Maximum lateral acceleration	0.4 – 0.5g
Impact resistance	Designed to withstand 50g
Central drive box mass	165kg
SCTV mass (central drive box + cushions)	220kg
Central drive box dimensions	1850 x 600 x 1000mm (approximate)
Testing duration	Estimated 4 hours before battery recharge required
Path-following accuracy	Dependent upon motion pack (2cm 1SD RMS typical maximum)

### Collision with driverless robot-controlled vehicle



Ford Focus controlled by ABD Driverless Test System – no human onboard.

SCTV and Ford Focus on same straight-line path. Focus travelling 20km/h faster than SCTV at point of impact. No damage to either vehicle.



For more detailed information on this and other related products contact:

Email: [info@abd.uk.com](mailto:info@abd.uk.com)  
Tel: +44 (0)1225 860200

ABD has representatives throughout the world.  
For details please refer to our website:  
[www.abd.uk.com](http://www.abd.uk.com)

**17 of the top 20** most successful\* vehicle manufacturers in the world **use ABD robots** to develop their vehicles.

\* by global sales volume, 2009