



Low profile driverless vehicle for dynamic interactions and high-speed impacts with other vehicles

The Mk2 Guided Soft Target vehicle (GST) is the next generation of platform designed for use in the testing of vehicle Advanced Driver Assistance Systems (ADAS). The Mk2 GST shares many of the class-leading features of the original GST design, but with the benefit of an ultra-low height of just 100mm. The GST is the result of collaboration between AB Dynamics and Dynamic Research Inc. (DRI), and combines the innovative DRI drive-over platform concept with AB Dynamics' class-leading Path Following and Synchro control technology.

The GST is designed to enable high-speed collisions to be carried out without causing significant damage to the test vehicle. It consists of a Low-Profile Chassis (LPC), which can be driven over, and a separate foam panel body (the Soft Car 360 harmonized Global Vehicle Target, GVT). When the low-profile vehicle is driven over, the wheels of the vehicle retract into the chassis to protect the suspension of the GST and to provide the minimum possible shock input to the test vehicle's suspension.



Mk2 GST Low-Profile Chassis

The Mk2 GST uses electric motors with on-board batteries to propel the vehicle, and houses a control system which can accurately guide the vehicle along a pre-programmed course at a defined speed. The batteries used to power the system will provide sufficient power for a typical day of testing. Additionally, they can be recharged between tests by a quick connection to a suitable supply at the track.

The controller uses position feedback from a high-precision, GPS-corrected, inertial navigation system to allow accurate path-following control to be achieved. The time signal from the GPS unit is used to ensure the precise millisecond synchronisation that is necessary to generate accurate and repeatable crash and close-passing scenarios. The control system and software is based on the systems used by AB Dynamics standard in-vehicle robots, so that users already familiar with them will find using the GST easy to operate. The GST is controlled via radio from the same remote base-station that is used by AB Dynamics standard driverless testing system. The common software and hardware platform allows the GST and other vehicles driven by AB Dynamics robots to be easily used together to create complex multi-vehicle tests.

Summary of GSTV features

- Aluminium chassis - wheels retract into chassis when LPC is driven over
- Electric drive system with belt drive transmission
- Electrically-actuated steering system
- Lithium Iron Phosphate battery pack giving outstanding power to weight ratio
- 4-disc hydraulic braking system with failsafe emergency braking
- Uses AB Dynamics' proven driverless control system, with hardware mounted in water-resistant casing
- Position feedback from Inertial Navigation System with GPS correction
- Accurate path-following and speed control capability
- Synchro software allows coordinated motion with other vehicles (either driven manually or equipped with AB Dynamics driving robots)



GST fitted with foam panel body



Reassembly of foam body takes 10 minutes

Anticipated Performance / Dimensions

Typical Maximum speed	80km/h+ (depending upon aerodynamic drag)
Maximum acceleration	0.2g (with soft car body fitted)
Maximum deceleration	0.8g
Maximum lateral acceleration	0.4 – 0.5g
Low profile vehicle mass	315kg approx.
LPC Length	2950mm
LPC Width	1680mm
LPC Height (suspension retracted into chassis)	100mm
LPC Wheelbase	1400mm
LPC Front track	660mm
Max ground clearance, set to max ride height	20mm
Edge Detail	22deg edging for minimal radar reflection
Testing duration	One day before a recharge is required (typical)
Battery capacity	3.45kWh (removable for shipping)
Path-following accuracy	Dependent upon motion pack (2cm 1SD RMS typical maximum) Compatible with OxTS and Genesys products
Over-run capacity	Up to 1000kg per wheel [†]

[†]500kg with ultra-low profile top plate



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ABD has representatives throughout the world.

For details please refer to our website:

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"This product may be covered by one or more of the following US Patents: 8,428,864; 8,447,509; and 8,457,877. Patents pending."

All of the top 25 most successful* vehicle manufacturers in the world use ABD technology to develop their vehicles

*OICA World Motor Vehicle Production survey 2012