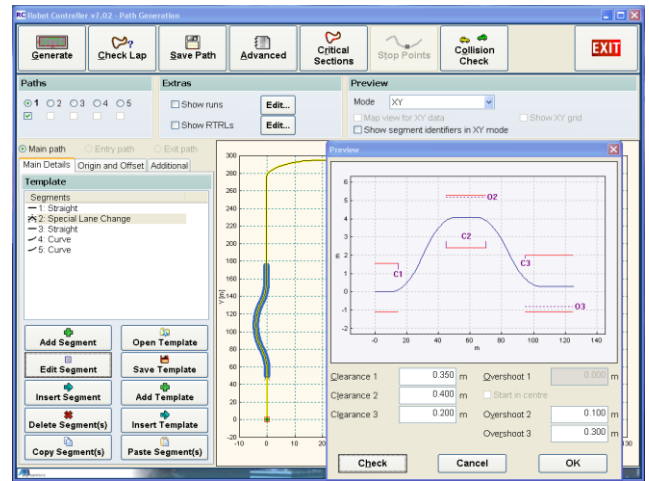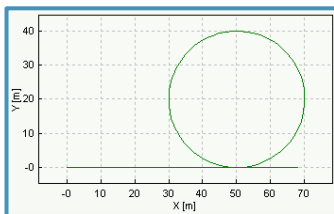# Path Following

An upgrade for ABD steering robots, also used in ABD's Driver.less Testing System

Introduction

The path following system from AB Dynamics offers a major enhancement to the capabilities of driving robots, enabling the robot system to guide a vehicle along a path at any speed, with exceptional accuracy and repeatability. Path following uses feedback from a 2cm GPS-corrected inertial motion pack to make real-time corrections to the vehicle's steering, keeping the vehicle on the path.


Path following can be used with any current ABD steering robot (together with pedal robots if available) and also forms an integral part of ABD's Driverless Test System and the Soft Crash Target Vehicle. It can be used for short duration tests, such as the ISO lane-change, and also for long tests such as multiple laps of a durability circuit. It offers significant improvements in vehicle testing accuracy and repeatability, leading in turn to cost and time savings. Path following can be used on any suitable test track without need for any modification to the track surface. A path (command file) can be generated using data recorded while driving, or alternatively may be created in geometric segments, as shown above right. Paths can have associated speed profiles enabling ABD pedal robots to control the vehicle's speed. Some examples of tests that can be performed with path following:


Steady state cornering

Traditionally driven manually around a painted circle; with path following this test can be done at any location on a VDA and path overlay repeatability is guaranteed. Speed control can be manual or using ABD pedal robots.
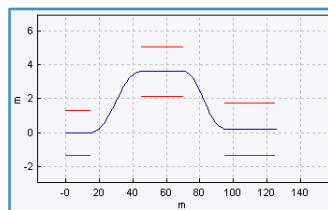
Double lane-change

The ISO lane change manoeuvres and the American Consumer Report lane-change profiles can be automatically programmed and then precisely optimised through the cones for maximum speed, maximum smoothness or other objectives.
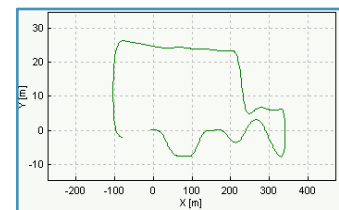
Complete laps of a circuit

A path can be recorded around a circuit and replayed for as many laps as needed. No human test driver can drive multiple laps as repeatably as a path following system, allowing the engineer to evaluate the variables he's really interested in

Features

- Used by customers, safely and reliably, at over 200kph
- Can be automatically tuned for a huge range of vehicles
- In use for more than 10 years around the world
- Recognises and responds automatically to over-steer or under-steer
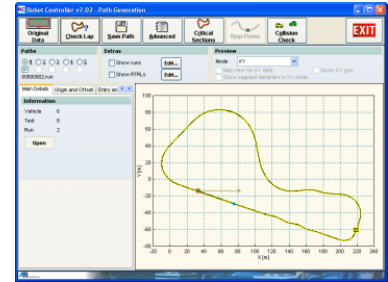- Multiple vehicles can be synchronised using GPS time

Minimum system requirements

ABD steering robot
SR15 | SR30 | SR60 | Torus, | SR150

2cm GPS-internal motion pack
AB Dynamics | OxTS | GenySys | iMAR

Path following software
See below

Path following software

The software can be purchased in modules, each tailored for a specific type of testing:

SR Opt 12a PF starter pack	SR Opt 12b Dynamics module[1]	SR Opt 12c Durability module[1]	SR Opt 12d ADAS module[1+2]
PF standard test	Optimised lane-change manoeuvres (ISO and Consumer Report)	Speed control (when used with AR): varying speed profile along the path	Start test using GPS time (for synchronised testing)
Generate paths from geometric segments	On-centre steering feel test	Stopping on a point (precise control of the stopping position)	Time-sychronised control of position along the path (needed for multiple vehicle interaction)
Generate paths using recorded data	PF lead-in to an open-loop test – used to perform any other steering robot test at a specific point on the track	PF lap test: multiple laps of the same circuit path, with optional entry and exit paths	PF straight-line triggered path test, used for cut-in manoeuvres
Steady-state cornering (constant radius circles)	Optimised lane-change manoeuvres (ISO and Consumer Report)		Virtual guide rails to relax or disable PF control in specific sections of the path
Critical sections – for improved safety in high-risk path sections	On-centre steering feel test		Path following in reverse
Speed control (when used with AR): constant velocity; throttle on/off	PF lead-in to an open-loop test – used to perform any other steering robot test at a specific point on the track		Start test using GPS time (for synchronised testing)

[1] Requires SR Opt 12a | [2] Requires SR Opt 12c