

Ground Traffic Control System™

INTRODUCTION

The Ground Traffic Control (GTC) System™ by AB Dynamics is the next generation of software and hardware solution available in mid-2019 that will monitor, command and coordinate your proving ground vehicle testing. It is a comprehensive package for all vehicle traffic at a proving ground including: robot controlled vehicles, ADAS platforms, human driven vehicles but also fixed proving ground infrastructure. It replaces the existing AB Dynamics Driverless Base Station™ (DBS) software and Base Station Safety Controller (BSSC)™ hardware solution, that some of our durability and ADAS customers are currently using, to provide a quantum leap for new vehicle testing capabilities.

The system is designed from the ground up for the future of vehicle track testing and how our customers will be using AB Dynamics products. Future applications could include autonomous vehicle (AV) testing, swarm testing, sim-city environments, vehicle-to-vehicle (V2V) & vehicle-to-infrastructure (V2X) communications, mixed driver and driverless vehicle testing, proving ground management and AV fleet management. The new system comprises of a centralised real-time server that communicates with the vehicles & platforms, and a new software interface that provides monitoring, command and control.

FEATURES

Real-Time Server

For reliable and safe operation of a proving ground, the GTC Server™ provides a real-time link between vehicles on the test track and the control & monitoring software at the base station. All vehicles on the proving ground will automatically connect to the GTC Server™ on power up and the server will establish a continuous communications link throughout the testing day for command & monitoring purposes.

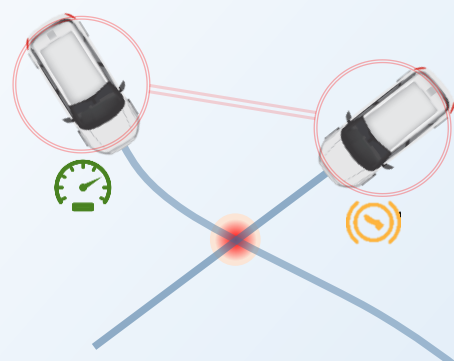
The GTC Server™ also features several general purpose digital inputs and outputs to connect to proving ground infrastructure such as laser trip fences, traffic lights, flood lights, traffic gates & ground loop sensors. This allows for the enhanced monitoring, management and control of the proving ground automatically from the user interface.

An advanced collision detection & prevention system will monitor the position, heading and speeds of all vehicles using their GPS positioning data. If a potential collision is detected, the server can command a range of braking actions to robot driven vehicles (both human operated and driverless) to prevent a collisions and keep the testing on schedule. For human driven vehicles, an in-vehicle audio/visual alert will warn the user of a potential collision. This system will allow for mixed driverless robot and human driver testing to maximise proving ground efficiency and safety.



Features:

- Hard Real-Time Processor
- Fast communications relay to vehicles & control software
- Integrated driverless vehicle safety controller & distributed E-Stop
- Advanced Collision Detection & Prevention
- Proving Ground Rule Area Monitor
- 8 Digital Inputs, 16 ADCs & 8 Digital Outputs
- EtherCAT for unlimited digital I/O

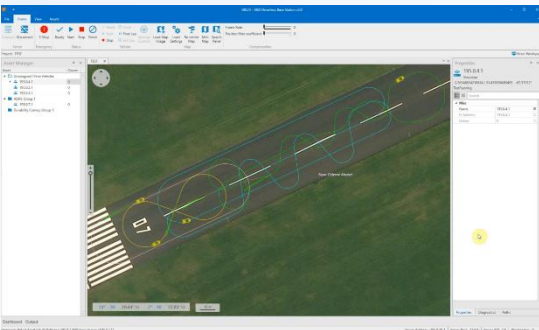
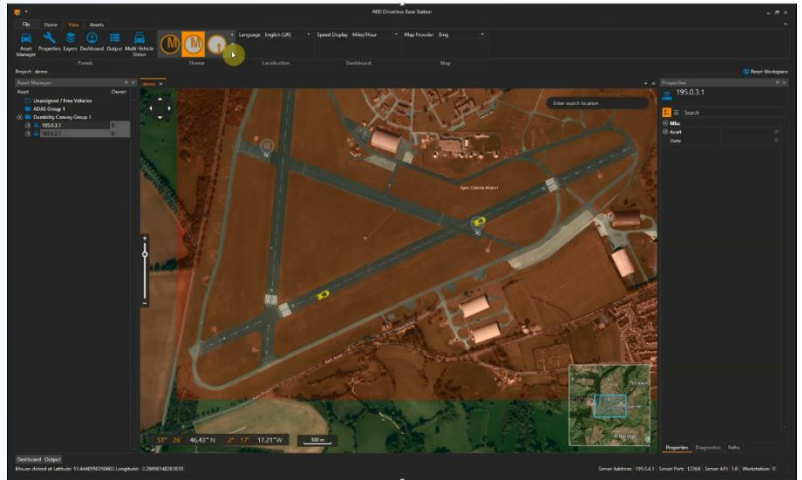


Advanced User Interface

The GTC Software™ application for Windows 10 provides an advanced interface for the user to monitor & control the vehicles on a proving ground. This application replaces the Driverless Base Station software and comes with many new features:

Customisable Interface

The application provides complete flexibility for customising the screen layout to the user's preference and provides visual themes including day, night and touchscreen mode. Panels within the application can be docked, undocked, tabbed and resized to provide an optimised view for your particular testing application. The panels available include: Map Viewer, Asset Manager, Property Viewer, Virtual Dashboard and Data Grid Viewer.



Multi-Workstation & Multi-Screen Support

The software supports multiple PC monitor screens to maximise testing visualisation for a track test operator. If multiple operators are required, the system also supports many instances of the GTC Software on the same network which all communicate to a central real-time server ensuring all data is synchronised.

Automatic Asset Detection

All available assets on a proving ground will be automatically detected by the software and displayed in a concise hierarchical list. These include all AB Dynamics Power Robot Controllers and ADAS platforms and their sub devices listed such as motion packs, IP cameras, safety controllers etc. In addition, proving ground infrastructure will be detected and listed for control and monitoring. For vehicles that are not robot controlled such as human driven test vehicles or proving ground service vehicles, AB Dynamics will offer a range of vehicle tracking solutions using GPS and radio telemetry to track and display their positions on the map. These tracked vehicles will integrate with the collision detection and avoidance algorithm for mixed use applications.

Live Maps

The GTC Software provides live link to maps from Google Maps, Bing Maps and Open Street Map for monitoring the vehicle positions and paths. For remote working, map tile data can be cached for off-line use. Customised map tiles and existing robot coordinate system image maps can be overlaid when working completely offline or when the proving ground is not yet visible from the built-in map providers.

Monitor Mode

Monitor Mode allows for read-only access to the system to monitor vehicles, paths, position and motion data. This provides a facility for supervisors, track security and track emergency services to monitor proving ground traffic, but without interrupting the vehicle testing.

Virtual Dashboard

The virtual dashboard can display live vehicle data in an intuitive panel to provide feedback to the operator as to the vehicle's performance.



GET IN TOUCH

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RELEASE DATE

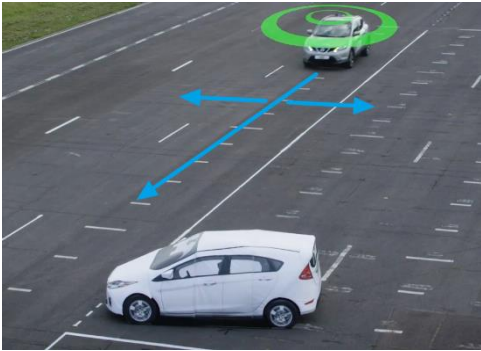
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APPLICATIONS

ADAS / Autonomous Vehicle Testing



Existing ADAS testing is currently focused on a single vehicle under test (VUT) with a single target – such as a car, pedestrian or cyclist. For the next generation of track testing for AVs, scenarios are likely to include a swarm of different targets for the VUT to simulate real-world conditions that a AV may encounter. Such a swarm may include our Guided Soft Target (GST), LaunchPad and Robot Car platforms. This could be for simulating highway or city conditions for AV algorithm & system validation testing.

Controlling whole a fleet of vehicles and platforms is at the centre of the design of the GTC System. Monitoring and control of platforms can be shared between multiple operators at the testing base station on different PC work stations, whilst assets can be managed with ease. This allows simultaneous monitoring and control by multiple operators to increase productivity.

Mixed Mode Durability Testing

Driverless Robot Systems are often used for vehicle durability testing due to the hazardous conditions that test drivers may experience, but also to increase testing accuracy and repeatability. To improve proving ground safety, efficiency and throughput, the GTC System allows mixed traffic – both driverless robot and human driven vehicles that are GPS tracked to coexist on the track using the advanced real-time collision checking and prevention system. Driverless robot controlled vehicles by AB Dynamics will automatically brake at junctions to allow other traffic to pass before continuing with the testing.



Proving Ground Management

The GTC System™ is designed with the whole proving ground in mind. The supervisor can track and monitor the location of all vehicles and robot platforms in a single map view or zoom into individual vehicles. Non-testing vehicles such as maintenance and service trucks can also be tracked and monitored provided with a suitable RTK-GPS and radio system and will be considered in the advanced collision checking & prevention system. This provides an extra level of safety and security.

Fixed assets on the proving ground can be monitored and controlled directly from the software. For example input signals such as ground loop sensors & laser fences can be used to trigger events such as vehicle emergency stops.



Autonomous Vehicle Fleet Management



The GTC System™ can also be extended beyond the test track to monitor and manage fleets of autonomous vehicles. Features such as the live map position views, remote manual control, on-board CCTV access and more will provide a comprehensive suite of tools for autonomous fleet management. With integration from Google Maps, Bing Maps & Open Street View large scale monitoring is now possible.