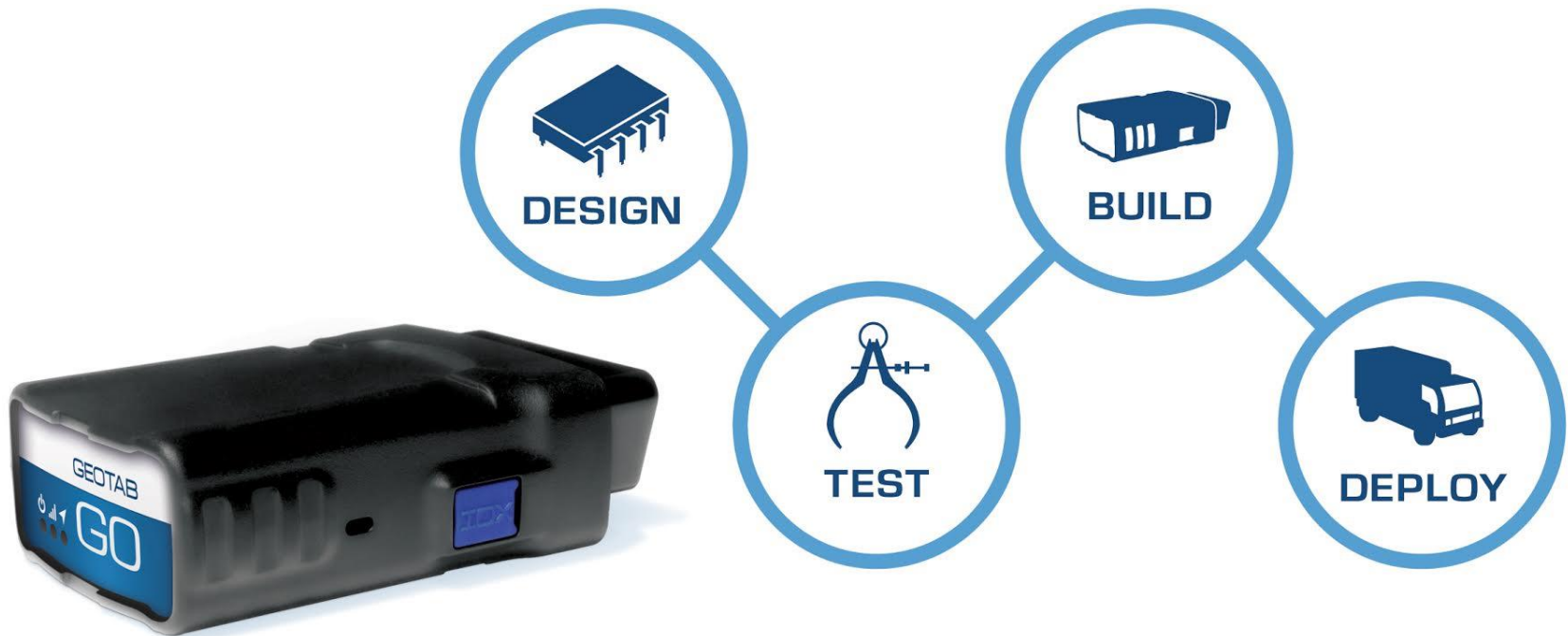# GEOTAB
management by measurement

The Geotab Way

An Engineering Approach to Everything

The Geotab Way

+ We make everything, Hardware, Software and Firmware

+ We focus on engineering and resellers focus on customers

The Geotab Terminology

Zone - geocoded known location, also referred to as a geofence by some

Group - refers to a subset of the data in the organization that can be used to separate data for reporting and access purposes

Route - is a planned set of stops for a vehicle

Trip - is the actual travel path a vehicle

Rules - the criteria that defines a situation that the system is using to monitor (i.e.- idle longer than 3 minutes)

Exceptions - this is the result of the monitoring of the rules

Log Reason - individual points of data generated by the Geotab patented algorithm

The Geotab Terminology

Curve Based Logging

In the original GPS logging algorithm first used by Geotab, the decision as to whether to save a GPS data point was decided in real time based on previously saved GPS data. In order to more accurately and efficiently save the GPS data it was decided to retroactively save the data based on specific criteria.

As GPS data is received it is stored in a speed buffer and a position buffer. The curve based logging algorithm makes use of a standard curve reduction technique on both the speed curve and the position curve data to decide which GPS points to log after enough points have been received.

Understanding Curve Based Logging

The following is a table that shows all the Curve Log reasons that you can see in the log details and a brief explanation of what they mean:

Log Reason	Description
CurveBased	This GPS point was logged by running the curve algorithm on the GPS positional data.
CurveSpeed	This GPS point was logged by running the curve algorithm on the GPS speed data.
CurvePositionEstimateError	The curve algorithm was run up until this point because the difference between the actual position of the vehicle and the estimated position of the vehicle (based on the last set of data sent to Checkmate) is greater than the allowed threshold.
CurveTimeOut	The curve algorithm was run up until this point because the timeout value of 100 seconds was reached.
CurveOtherEvent	The curve algorithm was run up until this point because of a non-GPS based event, currently only includes the saving of a system fault.
CurveZeroSpeed	This GPS point was logged because the vehicle either came to a stop or started moving from a stop.

Understanding Curve Based Logging

Speed - All Points
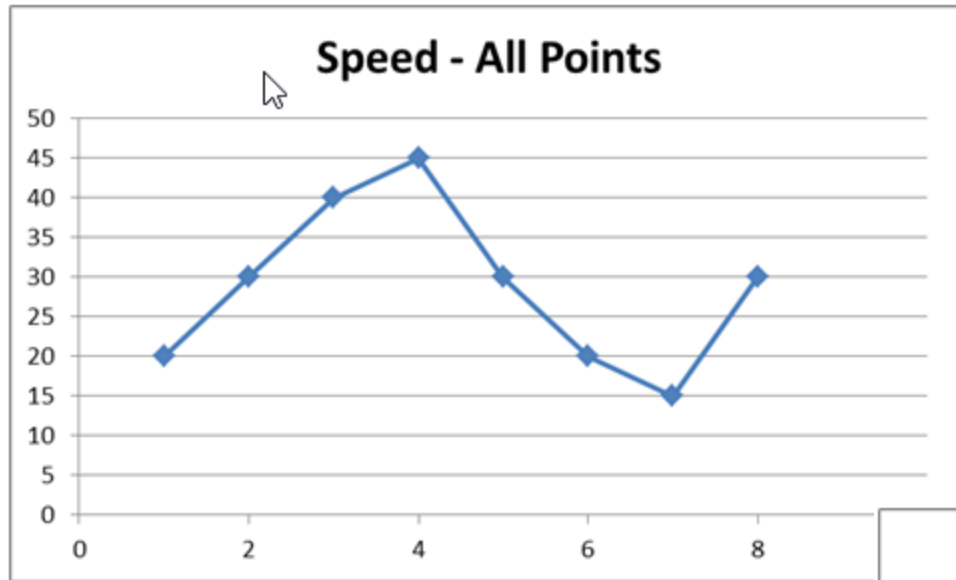
Link to Knowledge Base article:
https://helpdesk.geotab.com/entries/22102520-Introduction-on-GPS-Curve-Logging

The image to the right is a graph of the result after the curve logging algorithm is applied to the data in the above image. As you can see that even though the algorithm had remove some of the GPS points, the graph below still has the same overall shape as the graph above. Curve logging allows us to save data space, while allowing us to convey the information that is needed.
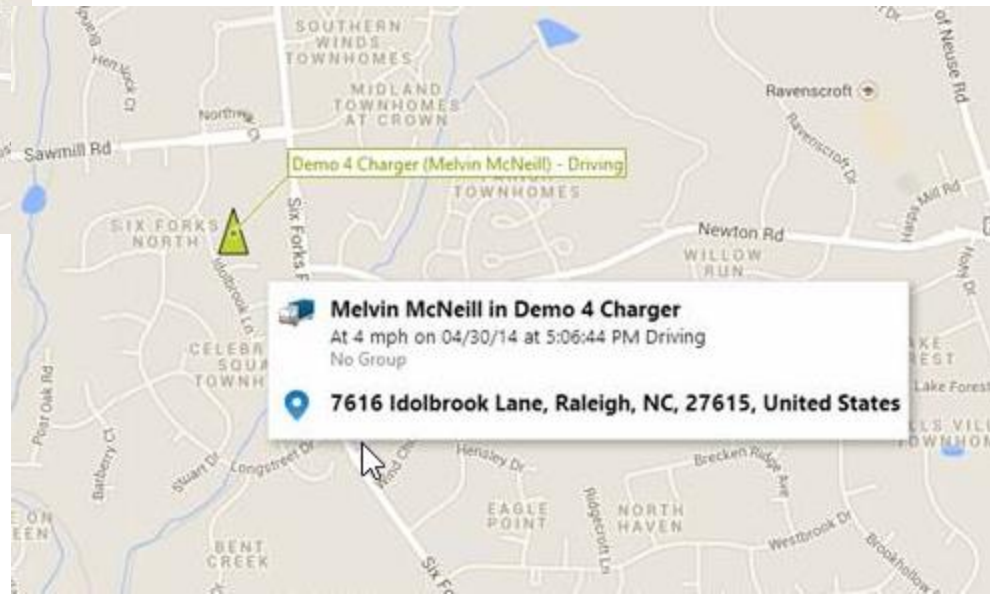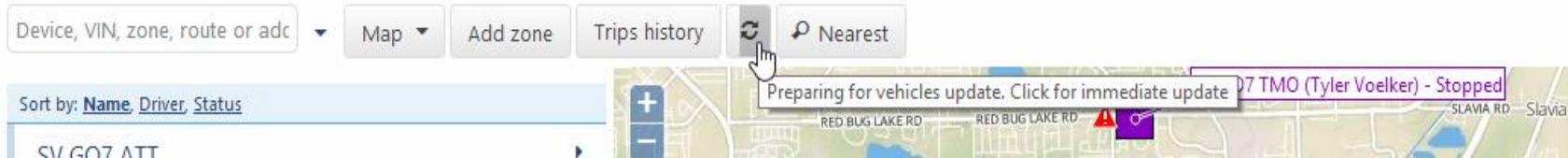

Speed - Curve Based
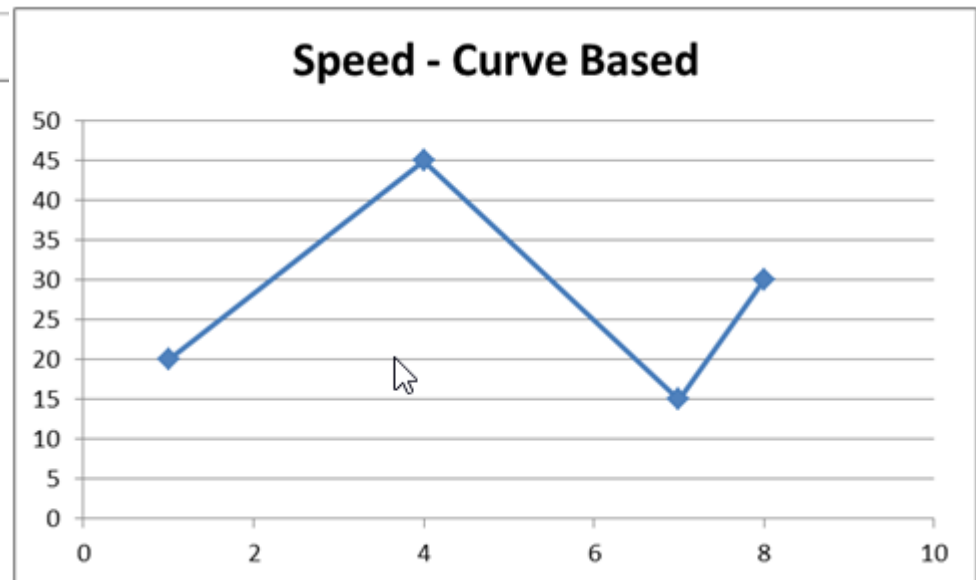
Understanding Data Transmission

Data is not transmitted every time a log is recorded
Data is transmitted when either of the following two criteria are met:

- The expected position of the vehicle differs from the actual position of the vehicle by more than a set threshold.

- The GPS speed and position buffers fill up (currently 100 points = 100 seconds).

- Heartbeats when parked, every ½ hour, increasing to every 23 hours.

How often do you update location?

Algorithm applies to all Data

Patented algorithm - curve based logic applies to all things recorded by Geotab

Tracking path - Position data is recorded based on the movement of the vehicle along with speed

Engine data - Coolant temperature for example is recorded when the temperature changes by more than 4 degrees C

Voltage - Battery voltages are recorded based on changes in the voltage every 250mV (exceed for curve on crank)

Accelerometer - is sampled 100 times per second only the rates of change that exceed the thresholds set by the firmware. It is ongoing

Actual vs Posted Road Speed

Hovering over a point on a map triggers the algorithm to determine the roadspeed at that location using one data point

Calculating the roadspeed associated with a trip uses all of the data points of the trip to accurately determine the roadspeed for that street

The reason an algorithm is used is to determine which data set is better OSM or navteq

Secondly the algorithm is used to accurately determine which road a vehicle drove, preventing on ramps, access roads beside highways, etc from triggering false positives

School zones and construction zones are not suported by the Geotab Actual vs Posted Algoritm

Actual VS Posted – A Server Side Process

When a speed violation is identified by MyGeotab the system automatically checks the 6 position records before the event triggered and the 4 positions after to validate whether or not the exception is real.

For example: GPS bounces are everywhere. It is common for a GPS bounce to show that a vehicle has moved from one road to another that may have a different speed limit. If the system determines that the position was erroneous the violation will not be reported.

Idle Reporting

This sample trip starts at "Start of Trip" and Ends at Ignition OFF or start of next trip.

The Idle Time A period does not get attributed to this trip but to the previous recorded trip.

- If Idle Time A is less than 200 seconds it does not get attributed as idling time for this trip (e.g. If Idle Time A = 197 seconds, then the 197 seconds does not get recorded as idle time for this trip but for the previous trip)
- If Idle Time A is greater than 200 seconds, the total amount of idling time gets attributed as idle time (e.g. If Idle Time A = 213 seconds, then 213 seconds will be counted as idle time for this trip)

If Idle Time B occurs without ignition off at the end and is less than 200s it does not get attributed as idle time.

- If Idle Time B is greater than 200 seconds, the total idle time of that period gets attributed as idle time. (e.g. If Idle Time B = 245 seconds, then 245 seconds of idle time is recorded for this trip)
- Any idling time that is followed by ignition off is counted as idle time. (e.g. Idle Time B = 25 seconds followed by an Ignition Off event, then the 25 seconds will be attributed to this trip)

https://geotab.zendesk.com/entries/33992644-How-idling-is-calculated-in-the-Trip-History-Page

Differences

Difference between Risk Management Idle totals and the Trip History Idle Totals

Speeding speed bands and speed rules- 16 second grace period may make a difference
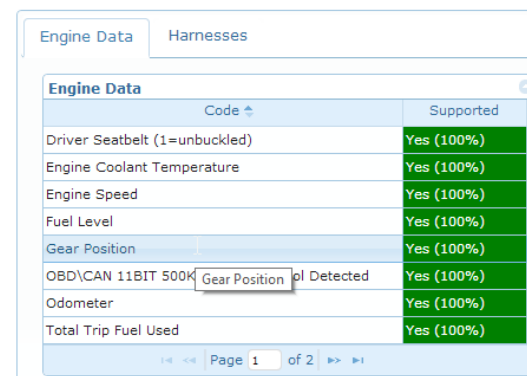
Stock rules and Driver feed back

Reverse Detection in MyGeotab

In-vehicle driver feedback: on the device set up page this feature uses GPS position and speed to detect the reverse and sounds the tone automatically based on that starting when a reverse is detected and stopping only when the vehicle starts driving forward

Backing up When Leaving Rule:

Uses the gear position **only** to determine if a backing event has occurred.

CAUTION: not all vehicles provide this data. The system will not indicate whether or not the gear position is triggering an exception because there is no data to validate the rule against.

Engine Data	Harnesses

Engine Data	
Code ⬆	Supported
Driver Seatbelt (1=unbuckled)	Yes (100%)
Engine Coolant Temperature	Yes (100%)
Engine Speed	Yes (100%)
Fuel Level	Yes (100%)
Gear Position	Yes (100%)
OBD\CAN 11BIT 500K Gear Position ol Detected	Yes (100%)
Odometer	Yes (100%)
Total Trip Fuel Used	Yes (100%)

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Time and Reporting

+ MyGeotab uses the time zone of the report requester in all reporting this is not a defect it is by design.

+ Data is recorded as the real time in the world- UTC

+ Vehicle time zones are set by the end user and may not be set or accurate

+ The user preference defines the time zone of the report

+ Emailed reports are reported in the time zone of the account requesting the report Eastern time is (UTC-5 hours)

+ If a time zone is not set the default is Eastern Standard Time

   Vehicle time zones are used to determine after hours trips based on the work hours assigned to the vehicle and the time zone the vehice is assigned to. These trips are highlighted in the Trips History and documented in the Risk Management Report regardless of the timezone the requester is viewing them in.

Seatbelt Monitoring

Misconception #1: Seatbelt is proprietary and very difficult to decode and maintain. Ford plays "Hide the Seatbelt" at least once a model year.

Misconception #2: An indicator light on the dash does not mean we get seatbelt on the CAN. Lights are not linked to the Can in all vehicles only those after 2008 and only those decoded by Geotab are available

Misconception #3: A remote scan tool session is an immediate fix. The scan tool session identifies how a vehicle communicates seatbelt, then the data has to be tested, added to the beta firmware retested, then built into production - this is a several month process

	Engine Data	Harnesses	

Engine Data	
Code ⬥	Supported
Driver Seatbelt (1=unbuckled)	Yes (100%)
Engine Coolant Temperature	Yes (100%)
Engine Speed	Yes (100%)
Fuel Level	Yes (100%)
Gear Position	Yes (100%)
OBD\CAN 11BIT 500K Engine Protocol Detected	Yes (100%)
Odometer	Yes (100%)
Total Trip Fuel Used	Yes (100%)

Driver Seatbelt (1=unbuckled)

|◄ ◄◄ Page 1 of 2 ►► ►|

Driver Feedback: There is a Difference

In-vehicle alerts VS Server side processing

Building Blocks not Feeds

SDK

Introduction

▸ Guides

    Getting started

    Concepts

    Using in JavaScript

    Using in .NET

    Using MyGeotab URLs

    Using GO devices

    GO device logging

    Using other devices

    Developing addins

▸ API

Using in JavaScript

Jump to... ▼   FEEDBACK

GeotabApi Object

Geotab provides JavaScript developers with easy to use and consistent access to our API through the GeotabApi object. It provides authentication handling, asynchronous method calling, error handling and multi-call support. A copy of api.js is included in the JavaScript examples.

Creating a GeotabApi object

Reference the file api.js before your main JavaScript code:

```
<script type="text/javascript" src="api.js"></script>
<script type="text/javascript">
    // Your code goes here
</script>
```

In your main JavaScript code, initialize the GeotabApi object by providing the constructor with a callback function to handle the authentication:

Posted VS Actual

+ Updating posted road speed - edit in minutes not months to improve accuracy

+ Update the map server for all MyGeotab databases instantly

+ This edit overides OSM and navteq data for posted speed

+ Update to OSM at the beginning of every month

+ OSM validates the edits and then updates to the world servers monthly

+ If edits are fraudulant all edits on that user profile are rolled back

+ No waiting a year for navteq to update their maps