

Application Note

*Eco-Drive-GPS Premium-Features in AVL
Firmware 2.11.0 and Above*

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Revision History

Date	Rev.	Comments
October 2013	1.0.0	Initial version.
December 2013	1.0.1	Removed chapter "How to activate the PREMIUM-features". A new document how to , refer to the application note "AppNotes_How-ToActivatePremiumFeatures_v1.x.x.pdf"
February 2015	1.0.2	Changed the document background
February 2015	1.0.3	Unnamed: PAID-FEATURES to PREMIUM-FEATURES
March 2017	1.0.4	Corrected description of the optional settings <angle_slow>,<angle_high> in the configuration parameter ECO-DRIVE.LIMITS.
May 2019	1.0.5	Added BOLERO40 series as new products supporting ECO-DRIVE-GPS
October 2019	A	Initial Lantronix document. Added Lantronix document part number, logo, contact information, and links.

For the latest revision of this product document, please check our online documentation at www.lantronix.com/support/documentation.

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1 ABOUT THIS DOCUMENT

This application note provides information how the ECO DRIVE GPS feature in the ALV firmware 2.11.x and higher.

- ECO-DRIVE-GPS: It is satellite-based GPS feature with a sophisticated algorithms that analyses and verifies incoming GPS data for calculating the fuel consumption and fuel emission of the vehicle when driving. ECO-DRIVE-GPS enables fleet managers to always keep track of fuel consumption and driving style of the drivers for helping them analyse to improve driving efficiency and save up to 15% fuel costs.

How to activate this PREMIUM-FEATURE, please refer to the "[*AppNotes_HowToActivatePremiumFeatures.pdf*](#)"

1.1 What is Eco-Driving?

Eco-Driving is driving a vehicle in such a way as to reduce fuel consumption, greenhouse gas emissions and accident rates. In addition to external circumstances, such as weather, road conditions and traffic jam, driving behaviour can considerably influence the vehicle's fuel consumption.

A feature in the AVL firmware called "ECO-DRIVE-GPS" can compute the vehicle fuel usage characteristics and help evaluate a trip and driving style to increase your vehicle efficiency, reduce fuel consumption and cost. This feature uses the incoming GPS data together with user **pre-set parameters** to measure the current speeds, harsh brakes, harsh accelerations and to compute fuel consumption and other trip information. The FOX3-2G/3G/4G and BOLERO40 series can transfer the detailed driving information to a server giving you the possibility to view this data on-screen and generate printed reports according to fleet manager-defined parameters.

Lantronix FOX3-2G/3G/4G and BOLERO40 series with activated ECO-DRIVE-GPS will allow fleet managers to:

- Monitor vehicle over-speeds in different road topologies. Excessive speed is not only dangerous, but it also results in excessive fuel consumption.
- Monitor how, when and where a vehicle has been driven.
- Alerts reports with detailed driving information if pre-set parameters are exceeded.
- Monitor engine idle times and find ways to reduce it.
- Monitor harsh accelerations and harsh braking.
- Monitor fuel consumption and find ways to reduce it.
- Transfer the trip data and provide an analysis as feedback to the driver.
- Reduce approximately 15% (or more) fuel costs and carbon dioxide.
- Reduce stress for drivers, passengers and fellow road users.
- Reduce risk of accident for drivers and other road users.
- Improve driving behaviour and reduce the risk when detecting aggressive driving style.

1.2 How does ECO-DRIVE-GPS work?

ECO-DRIVE-GPS is a satellite-based GPS feature with a sophisticated algorithm that analyses and verifies incoming GPS data during driving to calculate in details the driving information such as tip distance, tip time, engine idle times, number of harsh brakes, accelerations, over speeds and the fuel consumption of the vehicle for a trip. It is a very easy to use feature that helps fleet managers to connect to the fleet and monitor driver's behaviours and fuel consumption and find ways to improve them.

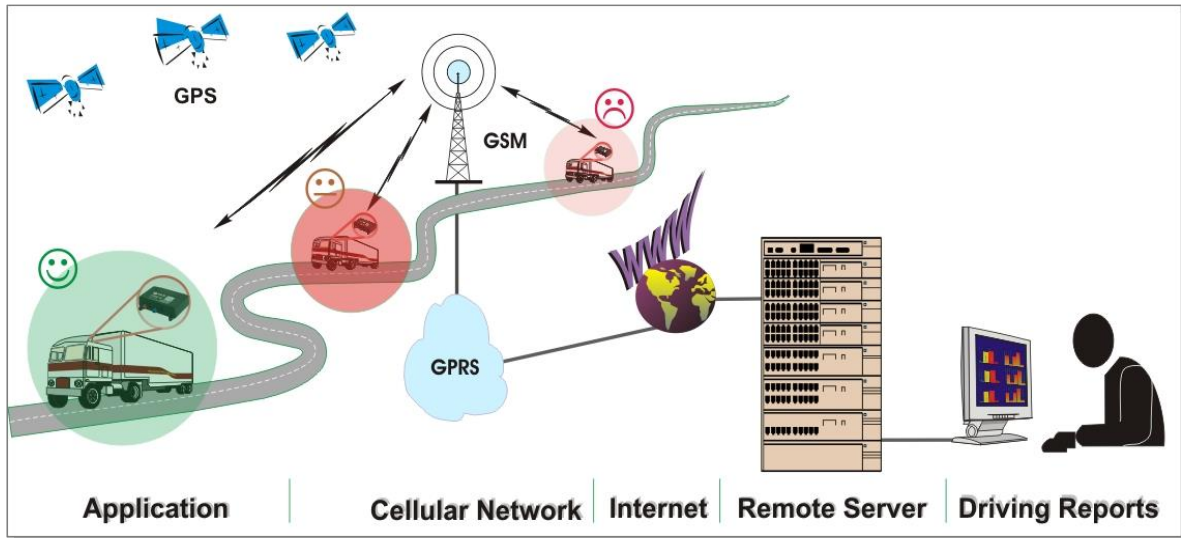


Figure 1: Collect and analyse detailed driving information using features of ECO-DRIVE-GPS

To use features of the ECO-DRIVE-GPS a valid configuration must be stored into the AVL unit. When a trip is stopped, the trip data with the detailed driving information can be transmitted to a server using the *Ecodrive.eStop* event.

A full description about the ECO-DRIVE-GPS device configuration, events and dynamic entries can be found in the sub-sections below.

1.2.1 How to configure ECO-DRIVE-GPS

Configuration settings are used to define the route topologies and speed limits for switching between different topologies as well as limits for harsh accelerating and braking and generating the corresponding events. ECO-DRIVE-GPS offers 2 different configuration models either to keep track of fuel consumption (l/100) or fuel emission (g/km) of the vehicle. The software computes the fuel consumption or the fuel emission (g/km) of your vehicle in detail and provides you with a complete overview of all costs involved in maintaining the vehicle.

The configuration settings below are used to define the car parameters based on the data provided on the Vehicle Registration Certificate.

8	16.04.07	21	8566	22	ADY000019	L	2	9	01	P.2	66	/4000	T	177
J	M1	4	AC	18	4804-4928	19								1812
E	WF0WXXGBBW6G70286	3	X	20	1427-1514	G								1555
D1	FORD			12	-	CO2	13	75	weight	14	-			-
	BWY			V.7	157	F.1	2185	2	2185					
	SDBA1			7.1	1145	7.2	1110	7.3	-					
	5PAAP2			8.1	1145	8.2	1110	8.3	-					
	-			M.1	79	0.2	3000	0.3	71					
D3	Mondeo			Q.1	1800	0.2	750	S.1	5	S.2	-			
2	FORD (D)			15.1	205/50R16	89T								
5	Fz.z.Pers.bef.b. 8 Sp1.			15.2	205/50R16	89T								
	KombiLimousine			15.3	-									
V9	70/220*2003/76B			R	GRAU			11	7/-					
14	EURO engine			K	e1*98/14*0156*17									
13	Diesel			G	24.10.05	17	K	16	DH339511					
10	0002	M1	0462	BT	1998									
22	F.1/F.2:2260 u.7.2/8.2:1180			b.	Anhängebetrieb*ww.AHK 1t									
	.EGTG*zu1.Ges.Gew.d.Zuges				max.3750kg*									

Figure 2: Vehicle Registration Certificate

a) Use this parameter syntax when monitoring fuel consumption (in Liter)

Syntax	ECODRIVE.CAR=<"Name">,<Weight>,<Engine>,<Max_speed>,<Power>,<Loss>,<Speed>,<Fuel>
Examples	\$PFAL,Cnf.Set,ECODRIVE.CAR="Car01",2185,D,177,66,3.3,100,8 // for fuel consumption

b) Use this parameter syntax when monitoring fuel emission (CO2)

Syntax	ECODRIVE.CAR=<"Name">,<Weight>,<Engine>,<Max_speed>,<Power>,<Loss>,<CO2>
Examples	\$PFAL,Cnf.Set,ECODRIVE.CAR="Car01",5185,D,177,66,3.3,157 // for fuel emission

These configuration parameters are used to define the vehicle parameters provided on the Vehicle Registration Certificate (see above).

- <"Name"> It specifies, enclosed in parentheses, the name of vehicle (e.g. "Car01").
- <"Weight"> It specifies, in kg, the weight of vehicle plus (+) the weight of any optional accessories, cargo and passengers. Refer to the vehicle registration certificate for the weight of the vehicle alone (e.g. "2185+3000 (cargo) =5185")
- <"Engine"> It specifies the vehicle fuel type. Refer to the vehicle registration certificate (e.g. "Diesel").
- <"Max_speed"> It specifies the maximum allowed speed in km/h. Refer to the vehicle registration certificate (e.g. "177").

<"Power">	It specifies the nominal power expressed in kW. Refer to the vehicle registration certificate (e.g. "66").
<"Loss">	It is an internal correction factor fixed for the calculations, at the moment it should be set to 3.3 which fits to most vehicles/cars.
<"Speed">	It specifies a constant speed in Km/h for a known fuel consumption.
<"Fuel">	It specifies the known fuel consumption, in 1/100L, at a constant speed <"Speed">.
<"CO2">	It specifies the fuel emission (CO2) in g/km. If you are going to control the fuel emission, the <speed> setting is not required.

Define settings for controlling speed limits for City, Country and Highway topologies

Syntax	ECODRIVE.TOPOLOGY=<City_Speed>,<TimeOut>,<Country_Speed>,<Highway_Speed>,<TimeOut>
Examples	\$PFAL,Cnf.Set,ECODRIVE.TOPOLOGY=60,10,100,160,20

These limits are used to define different road topologies and timeouts for switching between topologies.

- <City_Speed> It specifies the speed limit (e.g. 60) in km/h for driving on city roads. If the vehicle is travelling over this speed limit, the FOX3-2G/3G/4G or BOLERO40 series sets the state "*EcodrivesOverSpeed1*" to true until the Highway speed limit is reached.
- <TimeOut> It specifies the minimum timeout, in seconds, for changing the topology from City to Country (e.g. 10). If the vehicle is travelling over the specified <City_Speed> speed limit and the timeout expires then the FOX3-2G/3G/4G or BOLERO40 series switches the City topology to Country one.
- <Country_Speed> It specifies the speed limit (e.g. 100) in km/h for driving on country roads. If the vehicle is travelling over this speed limit, the FOX3-2G/3G/4G or BOLERO40 series sets the state "*EcodrivesOverSpeed2*" to true until the Highway speed limit is reached.
- <Highway_Speed> It specifies the speed limit (e.g. 160) in km/h for driving on highway roads. If the vehicle is travelling over this speed limit, the FOX3-2G/3G/4G or BOLERO40 series sets the state "*EcodrivesOverSpeed3*" to true until the vehicle drives back to this specified speed limit.
- <TimeOut> It specifies the minimum timeout in seconds for changing the topology from Country to Highway (e.g. 20). If the vehicle is travelling over to the specified <Country_Speed> speed limit and the timeout expires then the FOX3-2G/3G/4G or BOLERO40 series switches the Country topology to Highway one.

Define settings for monitoring brake deceleration and acceleration limits

Syntax	ECODRIVE.LIMITS=<Max_Brake>,<Max_ACC_City>,<Max_ACC_Country>[,<angle_slow>,<angle_high>]
Examples	\$PFAL,Cnf.Set,ECODRIVE.LIMITS=2,2,1,11,20

These limits are used to control brake deceleration and acceleration in city and country topologies and generate corresponding events. The corresponding events can then be used to transfer specific trip data to a server.

- <Max_Brake> It specifies the braking deceleration limit in m/s^2 (e.g. 2) to occur the harsh brake event and report on this type of driver's activity.
- <Max_ACC_City> It specifies the acceleration limit in m/s^2 for city topology (e.g. 2) to occur the harsh acceleration event and report on this type of driver's activity.
- <Max_ACC_Country> It specifies the acceleration limit in m/s^2 for country topology (e.g. 1) to occur the harsh acceleration event and report on this type of driver's activity.
- [<angle_slow>,<angle_high>] Optional settings. The events *EcoDrive.eHarshTurn* will be generated between 30 km/h and the max. Speed Country. These events are generated when the vehicle makes a change of direction in one second that is greater than a user-defined angle. The angle <angle_slow> is used for the min. speed and <angle_high> for the max. speed in the Country Speed. The limit value that is used now is the interpolation of the two angles <angle_slow> and <angle_high> and speeds and the current speed.

Define settings for starting and stopping an ECO-DRIVE-GPS trip automatically

Syntax	ECODRIVE.AUTOSTART=<Type>,<Speed>,<Timeout>
Examples	\$PFAL,Cnf.Set,ECODRIVE.AUTOSTART=GPS,10,120 \$PFAL,Cnf.Set,ECODRIVE.AUTOSTART=IGN

These settings are used to define the trigger conditions and limits for an automatic start and stop of the ECO-DRIVE-GPS trips. If trips are configured to start and stop automatically via configuration, the commands *\$PFAL,EcoDrive.TripStart* and *\$PFAL,EcoDrive.TripStop* are not required to be executed any more, otherwise executing of both commands will return ERROR.

- <Type> It specifies when a trip should be started. Following are the values that can be specified:

Value	Meaning
IGN	The trip starts and stops when turning ON and OFF the vehicle ignition correspondingly. Trips start when turning on the vehicle ignition and stop when turning off the vehicle ignition. This setting does not require <Speed> and <Timeout> settings. Trip start and stop conditions are based on the Ignition key state.
GPS	The trip starts when driving faster then the defined <speed> and after the specified <Timeout> expires. Stops the trip when driving slower then the defined <speed> and after the specified <Timeout> expires.

- <Speed> It specifies this setting only when using "GPS" as start type. It defines the

minimum speed in km/h for starting and stopping an ECO-DRIVE-GPS trip with Autostart type <GPS>.

<Timeout> It specifies this setting only when using "GPS" as start type. It defines the minimum timeout in seconds for starting and stopping an ECO-DRIVE-GPS trip with Autostart type <GPS>.

1.2.2 How to use ECO-DRIVE-GPS supported Events and States

Events and states are used to define when to transfer the trip data to a server. Events are generated at run-time, for example when starting or stopping an ECO-DRIVE-GPS trip, detecting a hard acceleration or a harsh braking during driving. You may use these event to report specific ECO-DRIVE-GPS trip data to a server.

For example:

```
$PFAL,Cnf.Set,AL0=Ecodrive.eStop:TCP.Client.Send,0,"EcoDrive Stop: &(EcoTripResult)"
```

// Whenever a ECO-DRIVE-GPS trip is stopped, the FOX3-2G/3G/4G or BOLERO40 series reports the ECO-DRIVE-GPS trip data via TCP.

STATES – are evaluated every second	
State notification code	Meaning
Ecodrive.sStart	True, as long as an ECO-DRIVE-GPS trip is active.
Ecodrive.sStop	True, as long as an ECO-DRIVE-GPS trip is inactive.
Ecodrive.sOverSpeed1	True, as long as the current speed is between the predefined city and country speed limits.
Ecodrive.sOverSpeed2	True, as long as the current speed is between the predefined country and highway speed limits.
Ecodrive.sOverSpeed3	True, as long as the current speed is over the predefined highway speed limit.
EVENTS – are evaluated just when the event occurs	
Event notification code	Meaning
Ecodrive.eStart	This event occurs when an ECO-DRIVE-GPS trip is started.
Ecodrive.eStop	This event occurs when an ECO-DRIVE-GPS trip is stopped.
Ecodrive.eHarshTurn	This event occurs when a harsh turn during an active ECO-DRIVE-GPS trip is detected.
Ecodrive.eHarshBrake	This event occurs when a harsh brake during an active ECO-DRIVE-GPS trip is detected.
Ecodrive.eHarshAcceleration	This event occurs when a hard acceleration during an active ECO-DRIVE-GPS trip is detected.

For more details how to use these events or states refer to alarm configuration examples in chapter 1.3.

1.2.3 How to report ECO-DRIVE-GPS trip generated data via dynamic entries

Dynamic entries are used to send trip data to a server with the help of PFAL commands. The following table shows the dynamic entries used for the ECO-DRIVE-GPS feature.

The format of the dynamic entry is: **&(dynamic entry)** //dynamic entry can be set to one of the entries listed below.

For example:

\$PFAL,CNF.Set,AL8=EcoDrive.eStop:TCP.Client.Send,0,"EcoDrive Stop **&(EcoTripResult)**"

&(EcoTripResult) will report all trip data e.g.: **"15;10157;235000;110;77.1;Highway;20.65;8.5;360;1350;2310;34000;32;3.520;3313;71000;67;5.534;4944;130000;89;11.268;3"**

Dynamic entries (ECO-DRIVE-GPS)	Description
EcoTripID	Reports a string containing the current trip ID.
EcoTripCar	Reports a string containing the current car name.
EcoTripDist	Reports a string containing the current trip distance, in meters (e.g. 676 meter)
EcoTripTime	Reports a string containing the current trip time in seconds (e.g. 91 sec)
EcoTripCurFuel	Reports a string containing the current mileage in Litre/100km (e.g. 18.0 Liter)
EcoTripFuelTotal	Reports a string containing the total fuel consumption in Litre (e.g. 0.099 Liter)
EcoTripCurRoad	Reports a string containing the current road topology (e.g. 1=city) (2=country) (3=highway)
EcoTripAvgSpeed	Reports a string containing the average speed in m/s (e.g. 7.4 m/s)
EcoTripCurSpeed	Reports a string containing the current speed in m/s (e.g. 3.3 m/s)
EcoTripResult	<p>Separated by semicolons, this dynamic entry reports a string containing the data of the current trip. The trip data are formatted as follow.:</p> <p>e.g. "15;10157;235000;110;77.1;Highway;20.65;8.5;360;1350;2310;34000;32;3.520;3313;71000;67;6.834;4944;130000;89;10.268;3"</p> <p>Meaning of the values in the reported trip data</p> <ul style="list-style-type: none"> 15 -- Id trip (starts again at zero after a device reset); 10157 -- Trip time (s); 235000 -- Distance (m); 110 -- Current speed (m/s); 77.1 -- Avg. speed. (m/s); highway -- Current topology; 20.65 -- Fuel consumption (l); 8.5 -- Current mileage (l/100km); 360 -- Standby time (s); 1350 -- Cruise control time (s); 2310 -- City time (s); 34000 -- City distance (m); 32 -- City counter overspeed (s); 3.520 -- City fuel consumption (l); 3313 -- Country time (s); 71000 -- Country distance (m); 67 -- Country counter overspeed (s); 6.834 -- Country fuel consumption (l); 4944 -- Highway time (s); 130000 -- Highway distance (m); 89 -- Highway counter overspeed (s); 10.268 -- Highway fuel consumption (l); 3 -- Counter invalid GPS Info
EcoTripCurData	Reports a string containing the last trip data. The trip data are formatted similar to the &(EcoTripResult) dynamic entry.

1.2.4 How to start/stop a trip manually and request ECO-DRIVE-GPS trip generated data via PFAL commands

The following PFAL commands can be used to start and stop an ECO-DRIVE-GPS trip manually and request the last or current trip information. The autostart parameter (ECODRIVE.AUTOSTART) must be left empty when starting and stopping an ECO-DRIVE-GPS trip manually otherwise the FOX3-2G/3G/4G or BOLERO40 series returns an error.

To start manually an ECO-DRIVE-GPS:

EXECUTE	\$PFAL,EcoDrive.TripStop
---------	--------------------------

To stop manually an ECO-DRIVE-GPS:

EXECUTE	\$PFAL,EcoDrive.TripStop
---------	--------------------------

The following PFAL commands can be used to request the trip information via a remote server.

Example to request current trip data:

EXECUTE	\$PFAL,EcoDrive.CurrentTrip	<i>// to be sent/executed from the server side.</i>
REPORT	\$<EcoDrive.CurrentTrip> \$current trip 1 \$current car "IK-AF-260" \$total time 2220 \$total distance 45000 \$current speed 83.0 \$average speed 73.0 \$topologie country \$total fuel 7.500 \$current fuel 5.5 \$idle time 50 \$cruise control time 0 \$data city 900,15000,1,12,7.900 \$data country 1200,27000,0,6.700 \$data highway 210,3000,0,5.300 \$invalid positions 0 \$\$SUCCESS	- ID of the trip (automatically incremented). - Car name. - Total time of the trip (s). - Total distance of the trip (m). - Current speed (km/h). - Average speed (km/h). - Current topology. - Total fuel consumption (l). - Current fuel consumption (l/100km). - Idle time (s). - Cruise control time (s). - Time, Distance, Overspeed, Overspeed-Counter, Fuel consumption (l). - Time, Distance, Overspeed, Overspeed-Counter, Fuel consumption (l). - Time, Distance, Overspeed, Overspeed-Counter, Fuel consumption (l). - Counter of invalid GPS Info.

Example to request last trip data:

EXECUTE	\$PFAL,EcoDrive.LastTrip	<i>// to be executed from the server side.</i>
REPORT	\$<EcoDrive.LastTrip> \$current trip 97 \$current car "IK-AF-260" \$total time 3246 \$total distance 80753 \$current speed 12.1 \$average speed 89.6	- ID of the trip (automatically incremented). - Car name. - Total time of the trip (s). - Total distance of the trip (m). - Current speed (km/h). - Average speed (km/h).

Continued

REPORT	\$topologie None	- Topology used in this trip.
	\$total fuel 6.624	- Total fuel consumption (l).
	\$current fuel 0.0	- Current fuel consumption (l/100km).
	\$idle time 20	- Idle time (s).
	\$cruise control time 2055	- Cruise control time (s).
	\$data city 819,9638,96,0.788	- Time, Distance, Overspeed, Overspeed-Counter, Fuel consumption (l).
	\$data country 2312,67036,114,5.473	- Time, Distance, Overspeed, Overspeed-Counter, Fuel consumption (l).
	\$data highway 15,4079,0,0.363	- Time, Distance, Overspeed, Overspeed-Counter, Fuel consumption (l).
	\$invalid positions 0	- Counter of invalid GPS Info.
	\$\$SUCCES	

1.3 ECO-DRIVE-GPS configuration examples

Below you will find some tested ECO-DRIVE-GPS configuration settings for different types of vehicles:

// ECO-DRIVE-GPS Settings for BMW 523i (Petrol)

```
$PFAL,CNF.Set,ECODRIVE.AUTOSTART=GPS,10,120
$PFAL,CNF.Set,ECODRIVE.CAR="IL QR666",2235,P,222,125,3.3,256
$PFAL,CNF.Set,ECODRIVE.LIMITS=5,5,3,11,20
$PFAL,CNF.Set,ECODRIVE.TOPOLOGY=60,10,110,140,20
```

// ECO-DRIVE-GPS Settings for Volvo V70 D3(Diesel)

```
$PFAL,CNF.Set,ECODRIVE.AUTOSTART=GPS,10,120
$PFAL,CNF.Set,ECODRIVE.CAR="IK-HR00",2310,D,205,120,3.3,159
$PFAL,CNF.Set,ECODRIVE.LIMITS=5,5,3,11,20
$PFAL,CNF.Set,ECODRIVE.TOPOLOGY=65,10,130,170,20
```

// ECO-DRIVE-GPS Settings for Seat exeo Benzin (Petrol)

```
$PFAL,CNF.Set,ECODRIVE.AUTOSTART=GPS,10,120
$PFAL,CNF.Set,ECODRIVE.CAR="IK-AN100",2040,P,202,88,3.3,172
$PFAL,CNF.Set,ECODRIVE.LIMITS=5,5,3
$PFAL,CNF.Set,ECODRIVE.TOPOLOGY=60,10,110,140,20
```

// ECO-DRIVE-GPS Settings for Skoda Diesel

```
$PFAL,CNF.Set,ECODRIVE.AUTOSTART=GPS,10,120
$PFAL,CNF.Set,ECODRIVE.CAR="IK-FF200",2185,D,177,66,3.3,157
$PFAL,CNF.Set,ECODRIVE.LIMITS=5,5,3,11,20
$PFAL,CNF.Set,ECODRIVE.TOPOLOGY=60,10,110,140,20
```

Based on the configuration settings above, the alarms below will allow you to test all features of ECO-DRIVE-GPS. If you want to perform the test locally (serial) then replace the text "*MSG.Send.TCP*" by "*MSG.Send.Serial0*" and restore all alarms into the device.

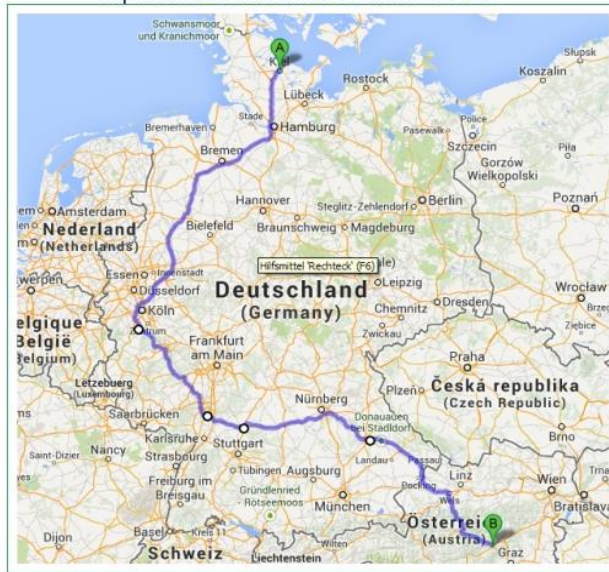
```
$PFAL,CNF.Set,AL0=Sys.Device.eStart:Sys.Timer0.Start=cyclic,10000
$PFAL,CNF.Set,AL7=EcoDrive.eStart:TCP.Client.Send,8,"eCoDrive Start"
$PFAL,CNF.Set,AL8=EcoDrive.eStop:TCP.Client.Send,8,"eCoDrive Stop &(EcoTripResult)"
$PFAL,CNF.Set,AL9=EcoDrive.eHarshTurn&GPS.Nav.sFix=correct:TCP.Client.send,8,"Harsh turn
&(speed.kmh)kmh &(course)deg, &(EcoTripCurData)"
$PFAL,CNF.Set,AL10=EcoDrive.eHarshBrake&GPS.Nav.sFix=correct:TCP.Client.send,8,"Harsh brake
&(EcoTripCurData)"
$PFAL,CNF.Set,AL11=EcoDrive.eHarshAccelerate&GPS.Nav.sFix=correct:TCP.Client.send,8,"Harsh
Acceleration &(EcoTripCurData)"
$PFAL,CNF.Set,AL12=Ecodrive.sOverSpeed1:Sys.Counter0.Increment=1
$PFAL,CNF.Set,AL13=Sys.Counter.s0=30:Sys.Counter0.set=0&TCP.Client.send,8,"City:
&(EcoTripCurRoad) Overspeed &(EcoTripCurData)"
$PFAL,CNF.Set,AL14=Ecodrive.sOverSpeed2:Sys.Counter1.Increment=1
$PFAL,CNF.Set,AL15=Sys.Counter.s1=180:Sys.Counter1.set=0&TCP.Client.send,8,"Country:
&(EcoTripCurRoad) Overspeed &(EcoTripCurData)"
$PFAL,CNF.Set,AL16=Ecodrive.sOverSpeed2:Sys.Counter2.Increment=1
$PFAL,CNF.Set,AL17=Sys.Counter.s2=600:Sys.Counter2.set=0&TCP.Client.send,8,"Highway:
&(EcoTripCurRoad) Overspeed &(EcoTripCurData)"
```

The statistic information reported by FOX3-2G/3G/4G and BOLERO40 series can be graphically represented on your web-server for providing a general overview of the drivers to see who is driving economically and who is not. The company is then able to find out what can be improved. In this way you not only improve your company's profitability, but also document in a simple and accurate way to provide your company with an Eco-driving education.

The data in the graph below is just used as reference to obtain an estimation model.

Hint: The accuracy of the result depends on GPS validity and the entered settings. The more distance you drive, the more accurate would be the ECO-DRIVE-GPS result.

Trip with activated ECO-DRIVE-GPS



Last trip data with ID 15 reported with *(EcoTripResult)*

"15;10157;235000;30.6;21.4;Highway;20.65;8.5;2160;1350;2310;34000;22;3.520;3313;71000;12;6.834;4944;130000;10;10.268;3"

Business modeling and analysis of the last 15 trips reported to the server

	TOTAL	CITY	COUNTRY	HIGHWAY
Distance [km]	1.434	58	603	773
Consumption[l]	126	6	47	67
Driving time [hh:mm]	17:13	1:24	7:49	8:10
Average Fuel Consumption [l/100km]	8,4	10,5	6,4	8,5
Average speed [km/h]	70	30	70	110

These statistics are based on the transferred data when respective events are occurred.

SPEEDS	IDLES	BRAKES	ACCELERATIONS	TURNES
Over 60 Km/h: 22 times Over 110 Km/h: 12 times Over 160 Km/h: 10 times	Idle: 30 min 8 times Longest: 10 min Average time: 5 min.	Distance: 31 km Over 60 km/h: 14 times Over 100 km/h: 21 times Over 160 km/h: 10 times	Distance: 37 km Over 60 km/h: 39 times Over 100 km/h: 23 times Over 160 km/h: 2 times	Distance: 3km Over 60 km/h: 13 times

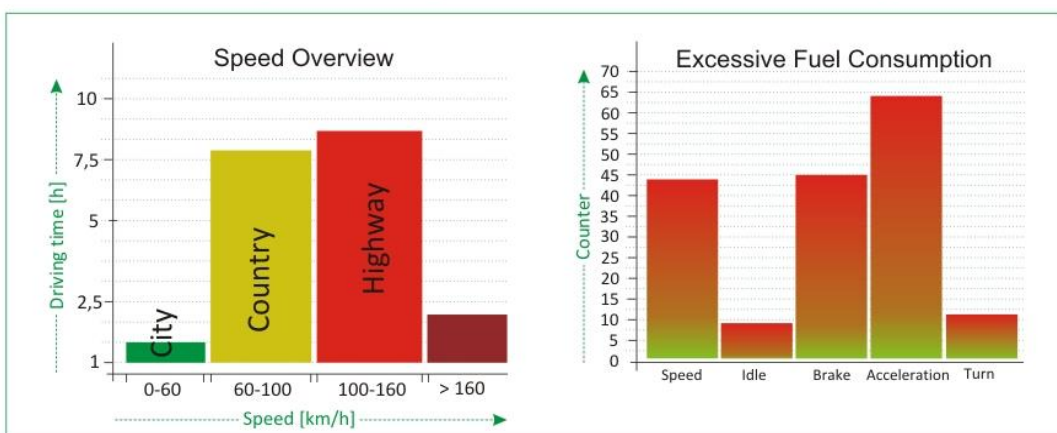


Figure 2: Trip Statistics with ECO-DRIVE-GPS

Based on the transferred reports to the server, the fleet managers may design three simple symbols to describe the driver's driving behaviour, for example:

GREEN DRIVER

Who consumes less fuel.

ORANGE DRIVERS

Who can still improve fuel consumption.

RED DRIVER

Who does not drive economically.



The aim of this design is to teach the drivers to change their driving behaviours. This can be achieved, for example, through real-time information via a display and bounties. To use this feature and motivate your drivers, the fleet managers can introduce a "Fuel-Efficient-Driving-Bounty-System" into their companies to motivate the drivers and let them know who is driving economically and who is not. This kind of system may provide your company with an Eco-Driving education and improve your company's profitability.