

BELROBOTICS

Track&Trace Manual



English Version

BELROBOTICS 
THE GRASS MASTERS

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1. INTRODUCTION

The 'Track&Trace' is an optional functionality of your BELrobotics lawnmower robot. This manual applies to the robots programmed with the firmware version of Release 2013 and with the 'Track&Trace' modules programmed with 'T&T' SW Revision 5.3 (Mar 2013).

The 'Track&Trace' is a performing tool offering the following features:

- Remote monitoring of the machine
- Remote control of the machine
- GPS localization of the machine
- Enhanced security (anti-theft)

The principle of the 'Track&Trace' option is depicted in Figure 1. A robot fitted with the 'Track&Trace' option includes a 'Track&Trace' module embedding :

- a GPS receiver, allowing localization of the robot.
- a GSM/GPRS unit, allowing communications, through SMS/data sent over the GSM/GPRS network, to:
 - o The BELrobotics 'Track&Trace' server storing information about the robot (status, position, alarms,...). The BELrobotics 'Track&Trace' server is accessible through a secured web interface.
 - o Mobile Phones with predefined configurable phone numbers 'ALARM_PHONE', 'CONTROL_PHONE', 'ALARM_PHONE2'. Those mobile phones will be able to send some commands to the robot and receive some alarms.

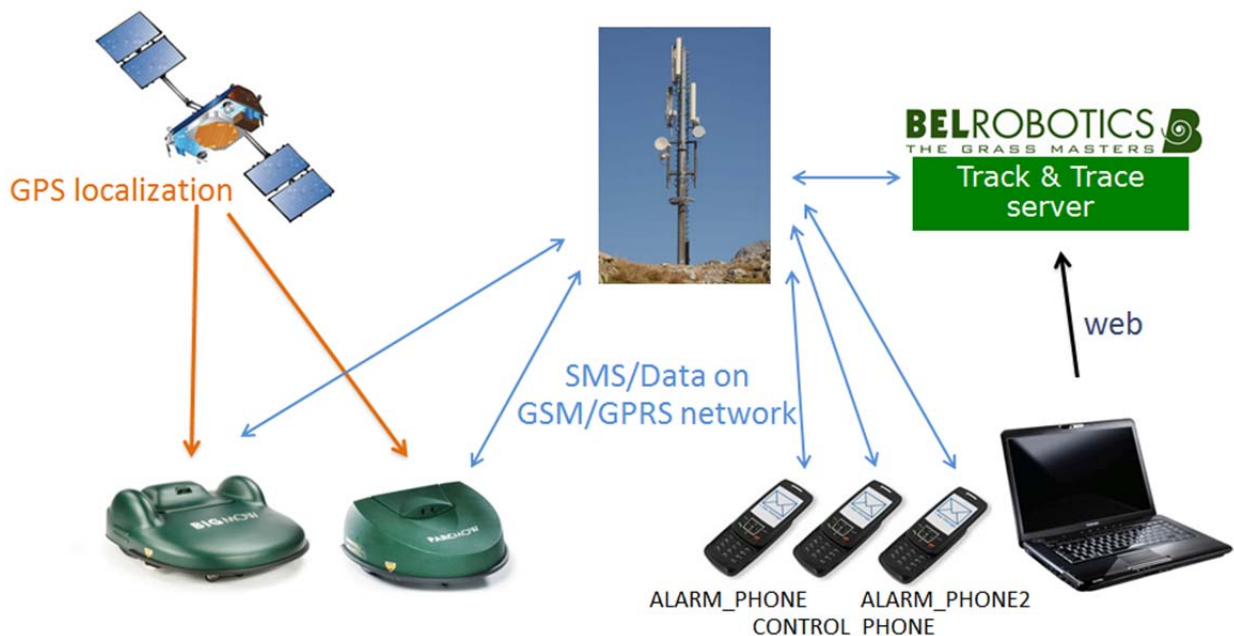


Figure 1 : 'Track & Trace' principle

2. INSTALLING 'TRACK&TRACE'

The hardware 'Track&Trace' module including the SIM card (robot phone number) is installed and preconfigured by BELrobotics.

Before having access to the 'Track&Trace' functionality, you have to contact your BELrobotics dealer to activate the system, receive the robot phone number and receive your account username and password to be able to access the BELrobotics server. The robot phone number can also be found on the 'Track&Trace' module itself.

To finalize the installation, configure the numbers of the 'ALARM_PHONE', 'CONTROL_PHONE' and 'ALARM_PHONE2' as described in Section.3.3.

3. USING TRACK&TRACE THROUGH SMS

This section describes the syntax and functionality of the commands which can be sent through SMS to the robot.

3.1. OVERVIEW 'TRACK&TRACE' SMS COMMANDS AND ALARMS

The Table 1 is listing all the commands which can be sent by SMS. These are grouped in 4 categories. The command syntax is **case insensitive**. When a command is received by the 'Track&Trace' module, a **confirmation message with the result of the command is always sent to the caller**. The confirmation message of the control commands is also sent to the ALARM_PHONE if different than the CTRL_PHONE.

Commands functionality	List of related commands
Configuring 'Track&Trace' phone numbers	<i>AlarmPhone, ClearAlarmPhone, CtrlPhone, ClearCtrlPhone AlarmPhone2, ClearAlarmPhone2</i>
Getting 'Robot' status information	<i>Status, Position, MowerData</i>
Controlling 'Robot' (all versions)	<i>BackHome, Restart, TimerOff, TimerOn</i>
Controlling 'Multizone Robot'	<i>EnableZone X, DisableZone X, TimerOff X, TimerOn X</i> (X=A, B or C : zone identifier)
Security aspects (anti-theft)	<i>SetFence, NoFence</i>

Table 1 : List of SMS commands

Next to the commands functionality, the 'Track&Trace' module is also providing an '**Alarm_SMS**' service : each time an alarm is occurring on the robot, an **SMS message is sent**

to the **AlarmPhone** and **AlarmPhone2** and the history of recent alarms and events of the robot is also sent to the 'Track&Trace' server. See Section 3.7 for more details about the alarms.

The Table 2 shows the **features granted depending on the calling phone number**:

	<u>ALARM PHONE</u>	<u>CONTROL PHONE</u>	<u>ALARM PHONE2</u>	<u>OTHER PHONE</u>
'Configuring phone number' commands	See Section 3.3			
'Getting Robot information' commands	Yes	Yes	Yes	Yes
'Controlling Robot' commands	Yes	Yes	No	No
'Security' commands	Yes	No	No	No
Receiving ALARM_SMS	Yes	No	Yes	No

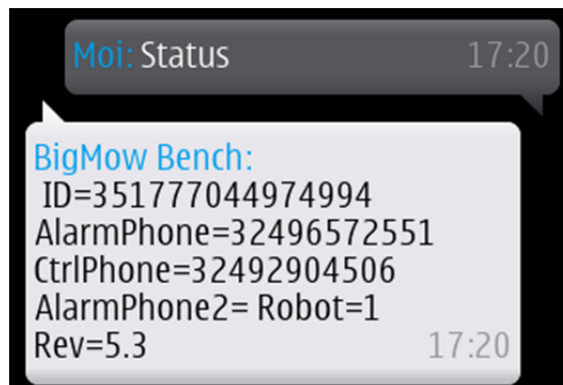
Table 2 : Features granted in function of calling phone number

3.2. GETTING INFORMATION FROM THE ROBOT THROUGH SMS

The 3 commands *Status*, *Position*, *MowerData* can be sent from any phone number and the sender is receiving a confirmation SMS with some information.

3.2.1 Status command

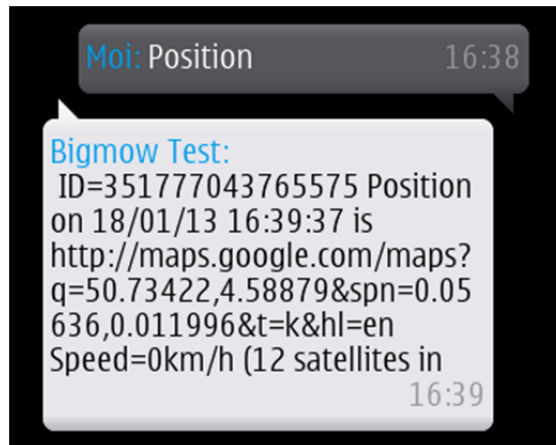
The *Status* command simply asks the module to send its status back:



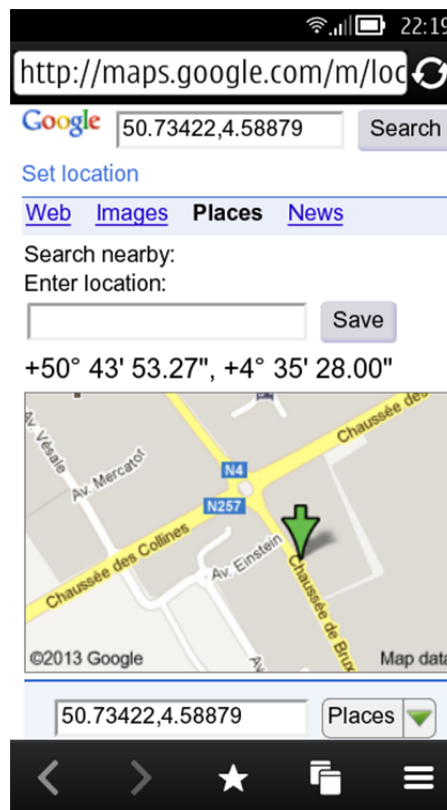
- ID = unique identification number of the 'Track&Trace' module embedded in the robot (IMEI)
- Alarmphone = phone number of the ALARM_PHONE
- CtrlPhone = phone number of the CONTROL_PHONE
- Alarmphone2 = phone number of the ALARM_PHONE2
- Robot = 0 (Robot is off) or 1 (Robot is on)
- Rev = revision number of the 'Track&Trace' FW

3.2.2 Position command

The *Position* command simply asks the module to send GPS position information:



- ID = unique identification number of the 'Track&Trace' module embedded (IMEI)
- Position : Last valid position acquired by the GPS receiver and the corresponding time
- A Google map link on which you can click to see the corresponding position



- Speed : approximate speed of the robot – the speed is computed by the GPS receiver, so there can be some inaccuracy.
- The number of Satellites in view.

Remark : the length of the SMS message content is limited by the SMS protocol and the

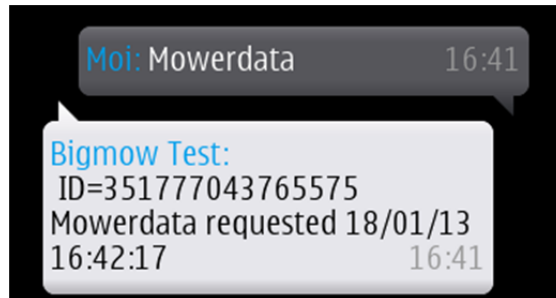
exact answer to the 'Position' command might be shortened by a few characters.



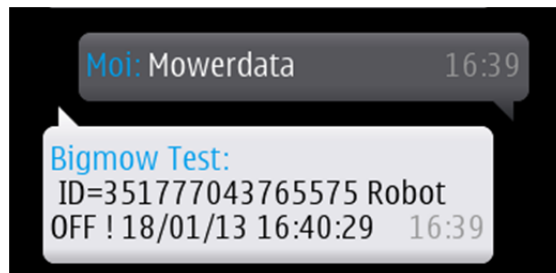
3.2.3 Mowerdata command

The *Mowerdata* command asks the module to transfer the current history log of events from the robot to the 'Track&Trace' BELrobotics server so that it can be imported into DTS from the web as described in section 4.4.

When the robot is switched on, the 'Track&Trace' module is able to request the history log from the robot and sends the following confirmation SMS:



When the robot is switched off, the 'Track&Trace' module can not get the history log and sends the following confirmation SMS:



3.3. CONFIGURING 'TRACK&TRACE' PHONE NUMBERS

The first operation to perform before using 'Track&Trace' SMS functionality is to program the 'ALARM_PHONE' and 'CONTROL_PHONE' numbers which are undefined after installation. This operation is necessary before first use and in some cases after 'Track&Trace' FW upgrade (your BELrobotics dealer will inform you when this would occur).

This operation is **strongly recommended** as leaving the 'ALARM_PHONE' and 'CONTROL_PHONE' undefined will give the possibility to any phone to take the control on your robot. This is less critical to keep 'ALARM_PHONE2' undefined as this phone has no control authority on the robot (see Table 2).

Programming the 'Track&Trace' phone numbers is achieved using the commands:

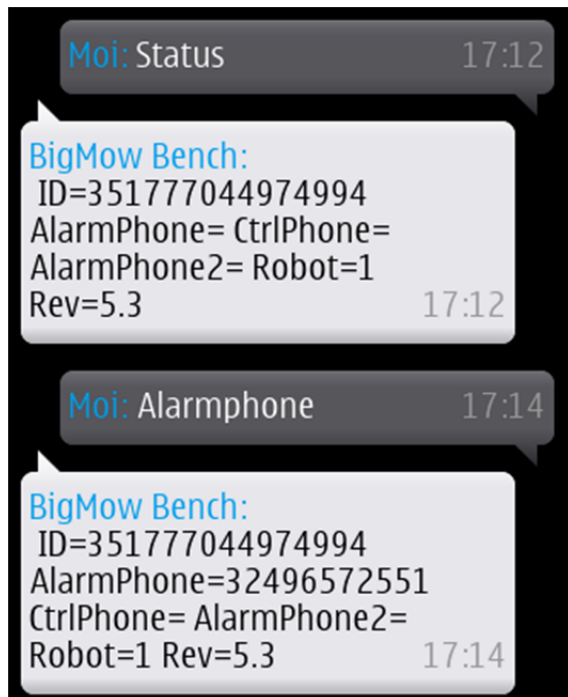
- *AlarmPhone* : the number of the mobile phone calling the 'Track&Trace' becomes the 'ALARM_PHONE' unless it is already defined.

When the 'ALARM_PHONE' is already defined, the command has no effect.

- **ClearAlarmPhone** : will clear the 'ALARM_PHONE' number so it can be assigned to a new number. The command is executed only if sent from the 'ALARM_PHONE' number itself.
- **CtrlPhone** : the number of the mobile phone calling the 'Track&Trace' becomes the 'CONTROL_PHONE' unless it is already defined.
When the 'CONTROL_PHONE' is already defined, the command has no effect.
If 'ALARM_PHONE' is not yet defined, then 'ALARM_PHONE' is also set identical to 'CONTROL_PHONE'.
- **ClearCtrlPhone** : will clear the 'CONTROL_PHONE' number so it can be assigned to a new number. The command is executed only if sent from:
 - o the 'ALARM_PHONE' number
 - o or the 'CONTROL_PHONE' number if the 'ALARM_PHONE' is not defined.
- **AlarmPhone2** : the number of the mobile phone calling the 'Track&Trace' becomes the 'ALARM_PHONE2'.
When the 'ALARM_PHONE2' is already defined, the command has no effect.
- **ClearAlarmPhone2** : will clear the 'ALARM_PHONE2' number so it can be assigned to a new number. The command is executed only if sent from the 'ALARM_PHONE2' number.

The calling phone will always get a confirmation SMS with the resulting values of the 'ALARM_PHONE', 'CONTROL_PHONE' and 'ALARM_PHONE2'.

The following snapshots of SMS messages give some example sequence where the above commands have been used:



← '**Status**' command sent from any phone

Robot answering :

- - ID = Unique IMEI robot identification number
- AlarmPhone Empty : ALARM_PHONE has not yet been configured
- CtrlPhone Empty : CONTROL_PHONE has not yet been configured
- AlarmPhone2 Empty : ALARM_PHONE2 has not yet been configured
- Robot = 1 : Robot is switched on
- Rev =5.3 : 'Track&Trace' FW revision number

← '**AlarmPhone**' command sent from SIM card '+32496572551'

→ Robot answering confirmation that 'ALARM_PHONE' has been set

No picture



← *'ControlPhone'* command sent from SIM card '+32492904506'

← *'Status'* command sent

→ Robot answering confirmation that 'CONTROL_PHONE' has been set.

← *'Clearctrlphone'* command sent from 'ALARM_PHONE'.

→ Robot answering confirmation that 'CONTROL_PHONE' has been cleared.

← *'Clearalarmphone'* command sent from 'ALARM_PHONE'.

→ Robot answering confirmation that 'ALARM_PHONE' has been cleared.

In the mean time, the Robot also switched off for independent reason and is reporting this. (Robot=0).

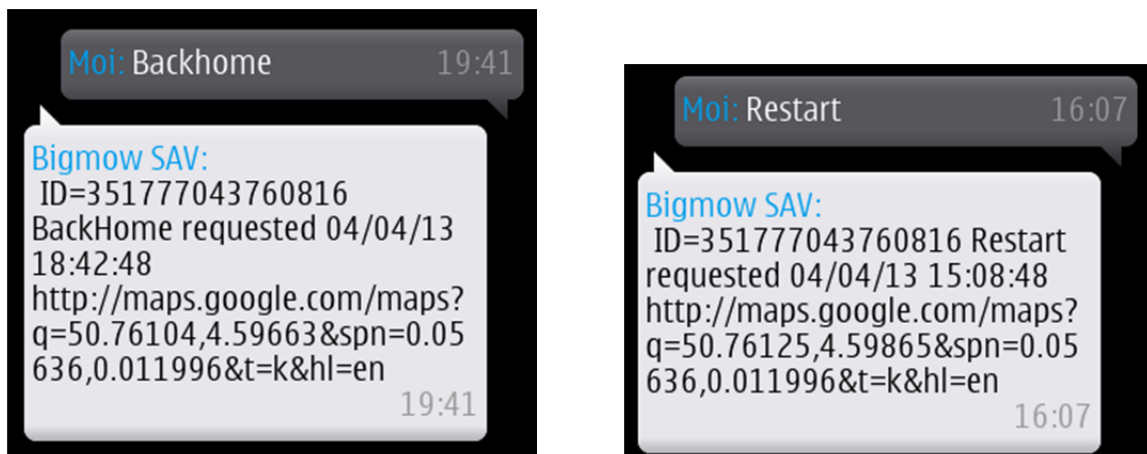
3.4. CONTROLLING THE ROBOT THROUGH SMS

The four commands *BackHome*, *Restart*, *TimerOff*, *TimerOn* can be sent from the ALARM_PHONE or from the CONTROL_PHONE (or from another phone if ALARM_PHONE or CONTROL_PHONE are not defined).

A confirmation SMS is sent to both the calling phone and the 'ALARM_PHONE'. When the sender of the SMS does not have the rights to control the robot (i.e is not the ALARM_PHONE or the CONTROL_PHONE), the confirmation SMS is containing the same information as the answer to the *Status* command. This is informing the sender of the SMS that he does not have the rights to control the robot and that the sent control messages will not have effect on the robot.

3.4.1 Backhome and Restart commands

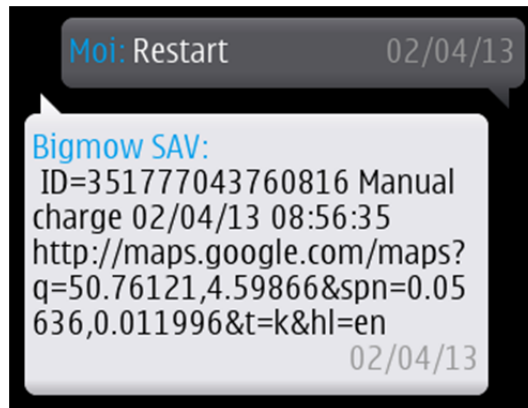
The command *BackHome* is used to send the robot back to its charge station and make it stay there until the command *Restart* is given. This is the same functionality as can be achieved through the keyboard using keys 'F2' (*BackHome*) and 'ON' (*Restart*). Below snapshots show the commands and acknowledgement SMS messages (when sent from a phone having control rights on the robot) related to those commands :



Sending the *Restart* command will allow the robot to leave its station when ALL conditions below are met :

- The robot has checked successfully that there is no 'physical' constraint to work : battery level sufficient, temperature OK,...
- The day and time are not within a programmed active rest period (see *TimerOn* , *TimerOff* commands)
- The robot is not in "manual charge".i.e
 - o the robot is a 2013 model
 - o OR the robot has reached its charging station in standalone automatic way (not pushed manually to station) and there has been no 'Loss of charge/Supply outage' alarm (triggered by bad contact at station).

When the robot is in “manual charge” and it is receiving a [Restart](#) command, it will inform the sender through SMS that it is not possible to execute the command :



3.4.2 TimerOn and TimerOff commands

The rest periods can be programmed through the menus on the keyboard and allow the user to define rest time periods during which the robot will stay in station. As an application usecase, this can for instance be used to keep the robot in station when the trainings or the competitions are taking place at a regular schedule during the week. The option #15 (TimerOff) allows to activate or deactivate the programmed rest periods. This gives the user flexibility to allow the robot working when the trainings or competitions are cancelled for instance.

- Option #15 unset (default) : the rest periods are activated i.e the robot is staying in station during the programmed rest periods.
- Option #15 set : the rest periods are deactivated (TimerOff) i.e the robot is working during the programmed rest periods as if those were not programmed (provided of course no other condition is preventing the robot to work, like for instance [BackHome](#) command received, battery level too low,...).

The Option #15 can be set/unset via the keyboard or through SMS using the commands [TimerOn](#) and [TimerOff](#).

- [TimerOn](#) : rest time periods are activated : unset Option#15 : robot stay in station during rest periods
- [TimerOff](#) : rest time periods are deactivated : set Option#15.: robot might work during rest periods

For multi-zone robots, these two commands apply to the timers of all the three zones A,B and C i.e; activate or deactivate the rest time periods of the three zones.

3.5. CONTROLLING MULTI-ZONES ROBOTS THROUGH SMS

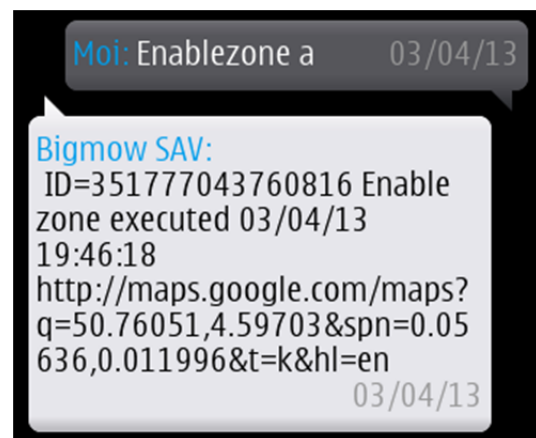
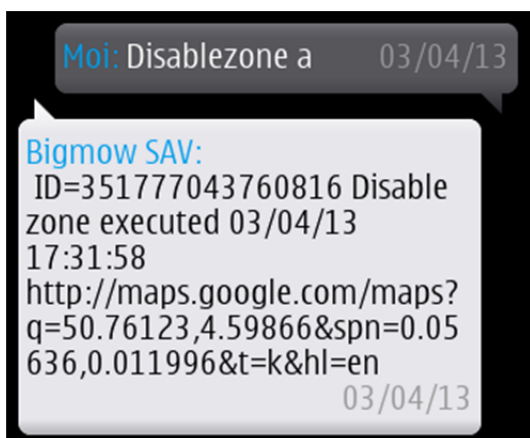
When the robot is operating in multi-zones configuration, the following SMS commands are supported : [EnableZone X](#), [DisableZone X](#), [TimerOff X](#), [TimerOn X](#) where 'X' is a parameter

identifying the zone (X=A, B or C) for which the command will be effective.

Those commands can only be sent from the ALARM_PHONE or from the CONTROL_PHONE (or from any phone if CONTROL_PHONE is not defined). A confirmation SMS is sent to the calling phone and the 'ALARM_PHONE'.

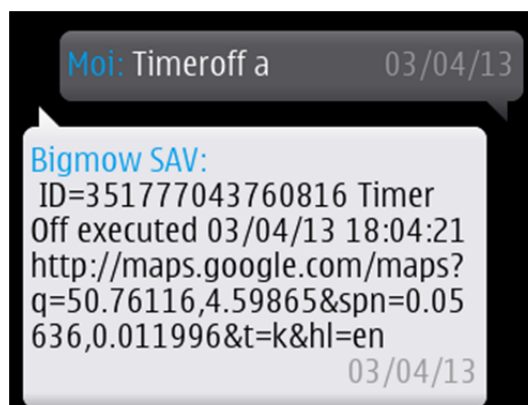
3.5.1 **EnableZone X and DisableZone X commands**

The commands *EnableZone X* or *DisableZone X* are used to respectively set or unset the option #17 of the zone X (X=A, B or C). When *DisableZone X* is sent, the robot will no longer work in the zone X. If the robot is currently working in zone X when it is receiving this command, the robot is going back to its station (as if it is receiving the *BackHome* command). The zone X is kept disabled until the robot is receiving the *EnableZone X* command (or the user is changing option #17 for zone X through the keyboard). Below snapshots show SMS messages of those commands when executed for Zone A :



3.5.2 **TimerOff X and TimerOn X commands**

The commands *TimerOff X* and *TimerOn X* have the same functionality as the global commands *TimerOff* and *TimerOn* described in chapter 3.4.2 but for the sole specified zone X (X=A, B or C). Below snapshots show SMS messages of *TimerOff X* command applied to Zone A:



3.6. SECURITY COMMAND : VIRTUAL FENCE

The virtual fence commands allow to define a virtual zone identified by the robot using its GPS position. The goal of these commands is to enhance the security of the robot with respect to theft. These commands must not be used for defining operating (i.e. mowing) zones.

As soon as the robot detects that it is out of the virtual zone, it will send an 'Alarm_SMS' Out-of-Zone to the ALARM_PHONE. The user must **define the virtual zone large enough so that it completely encloses the normal operating zone defined by the wire**. In these conditions, the robot should never go out of the virtual fence zone unless theft, in which case it will send the alarm.

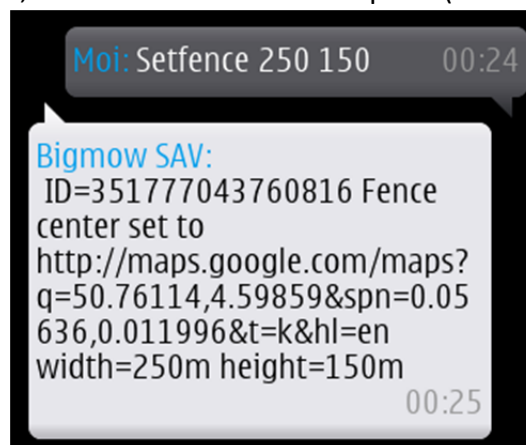
The virtual fence is defined as a square (or rectangular) zone centered at the position where the robot is located when it is receiving the command. It is thus recommended to go with the robot in the middle of its working zone (wire defined) and send the command. **As the GPS accuracy can be affected by external factors (trees, buildings,...), it is also recommended to take some margin in the distance defining the fence so to avoid receiving false alarms** When receiving the command, the 'Track&Trace' module is already taking some margin by adding 15m to the parameter passed in the command.

The virtual fence commands can only be sent by the 'ALARM_PHONE'. If the ALARM_PHONE is not yet defined, it is set to the number that issued the *Setfence* command.

A confirmation SMS is sent to the caller.

The virtual fence is defined using the command *SetFence*. The syntax of the command is:

- *SetFence [width in meters] [height in meters]* : the width and height arguments are optional : when no arguments are given, the default width and height are 300m. When only 1 argument is given, the zone is defined as a square (width=height).

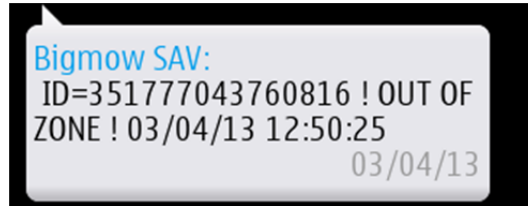


In order to ensure a maximum accuracy, when receiving the *SetFence* command, the 'Track&Trace' module checks that the current GPS position is accurate enough. If it is not the case, the confirmation SMS suggests 'Retry within 2 minutes'.

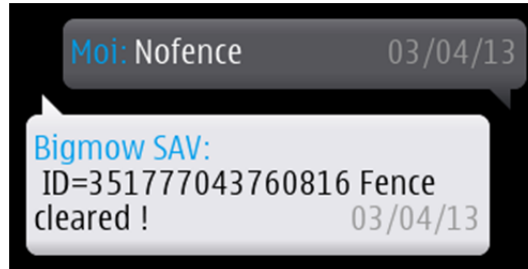
When the fence has been set and the robot is leaving the virtual fence zone, an 'Out of Zone'



alarm SMS is sent :



The virtual fence mechanism can be disabled by sending the command *NoFence* :



3.7. ALARM SMS

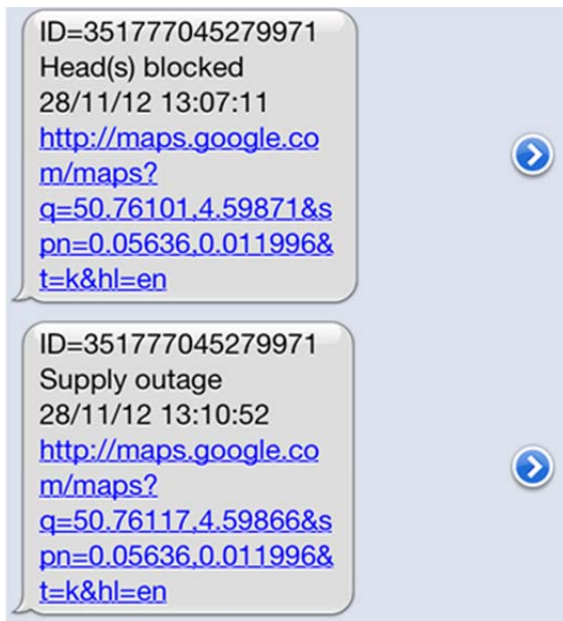
The 'Track&Trace' module is sending 'Alarm_SMS' to the 'ALARM_PHONE' and 'ALARM_PHONE2'. The events causing a 'Track&Trace' Alarm_SMS are:

- All the same alarms as the ones reported on the robot display. Examples : Battery Discharge, No Wire Signal, Blocked Head, No Station Found,... - The complete list of those alarms can be found in Appendix 1 : List of ALARMS SMS.
- Robot switching off after manual operation or after a 15' period of keyboard inactivity. This information is sent through the 'Robot OFF' alarm SMS.
- Security threat detection: robot leaving the zone defined by the virtual fence (see section 3.5) or 'Track&Trace' module detecting abnormal move (speed>10km/hr or distance between initial position (module start) and current position >1000m).

The system is **filtering the 'Alarm_SMS'** in order to avoid useless SMS to be sent and reduce the cost of communications: when the same alarm type is repeated successively (no other kind of alarm in between) and the robot has not been switched off/switched on, no new SMS is sent.

The 'Alarm_SMS' is including the root cause of the alarm and the GPS position of the robot. Here below a few examples:





4. USING 'TRACK&TRACE' BELROBOTICS SERVER ON THE WEB

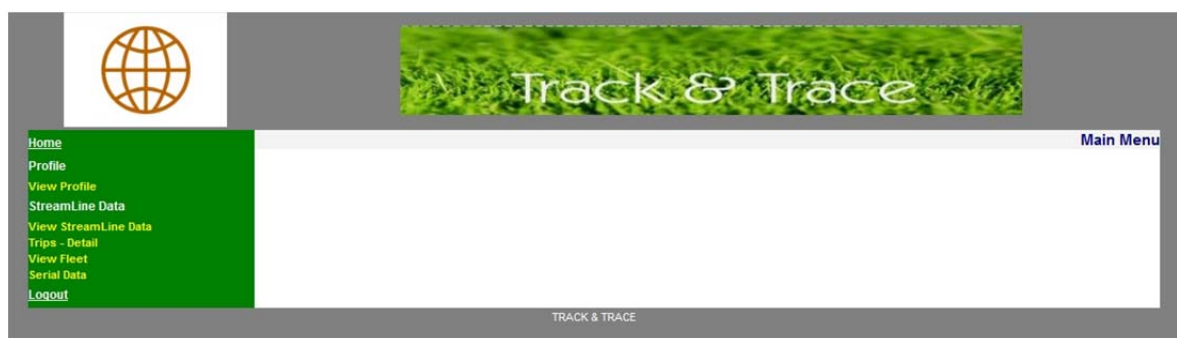
Accessing the 'Track&Trace' Belrobotics website gives you the following features:

- View your user account profile
- For any machine (robot) registered on your account, view the summary of main events (start Track&Trace module, SMS received,...) that have occurred on the 'Track&Trace' module
- For any machine (robot) registered on your account, view on GoogleEarth the last positions logged by the module (hourly when running)
- For any machine (robot) registered on your account, collect detailed history logs to be viewed in DTS (Belrobotics PC tool)

Remark: depending on your account access rights, you might have some extended features not described in this manual. Take contact with your BELrobotics dealer for support on those.

4.1. ACCESSING THE BELROBOTICS 'TRACK&TRACE' SERVER

Go on following address: <http://track.yourstreamline.com/onlinetracking/> and enter your account user name and password. You will then get the main menu window:



The 'View Profile' command will show you the data corresponding to your profile i.e user account: name, address, phone,...

4.2. VIEW STREAMLINE DATA

This menu allows you to monitor the activity/events of the 'Track&Trace' modules of your fleet. The reported activities/events are not related to the robot but only the 'Track&Trace' module (SMS communication, GPS activity).

Selecting the 'View Streamline Data' menu, you will first get a window listing of all the machines of your fleet:

View Data

StreamLine Data

Search For : Select Field Total Records : 20

Select records per page to display 250

SI.No	IMEI	Description	Last Download Date	
1	351777045115894	CH-15894-BM902	2013-01-14 12:06:06	
2	351777044006466	CH-06466-BM903	2013-01-14 12:03:23	
3	351777041883347	CH-3347-BM385	2012-12-10 14:12:09	
4	351777043031614	CH-1614-BM779	2012-11-29 13:01:48	
5	351777040181313	CH-1313-BM599	2012-11-28 01:07:35	

Each machine is identified by the following ID's defined at installation of the module:

- o IMEI = unique 'Track&Trace' module reference number
- o Description string consisting in :
 - First 2 letters = country
 - 5 last digits of the IMEI
 - Machine type : BM, PM, GMT2, GMT1, BP respectively for BigMow, ParcMow, GreenMow Type1, GreenMow Type2, BallPicker
 - 3 or 4 digits corresponding to the machine number

The 'Last Download Date' column is giving you the time at which the last information has been exchanged between the 'Track&Trace' module and the 'Track&Trace' server.

You can then select the machines for which you want to see the details and then click on 'View Data' to get a window similar as the one herebelow. The content can also be downloaded in excel format with the 'Download' button.



[View Data](#)

StreamLine Downloaded Data

Search For : Select Field Select Operator (Date : yyyy-mm-dd) Total Records : 11

Select Here the details you want to see, Click on 'Download'

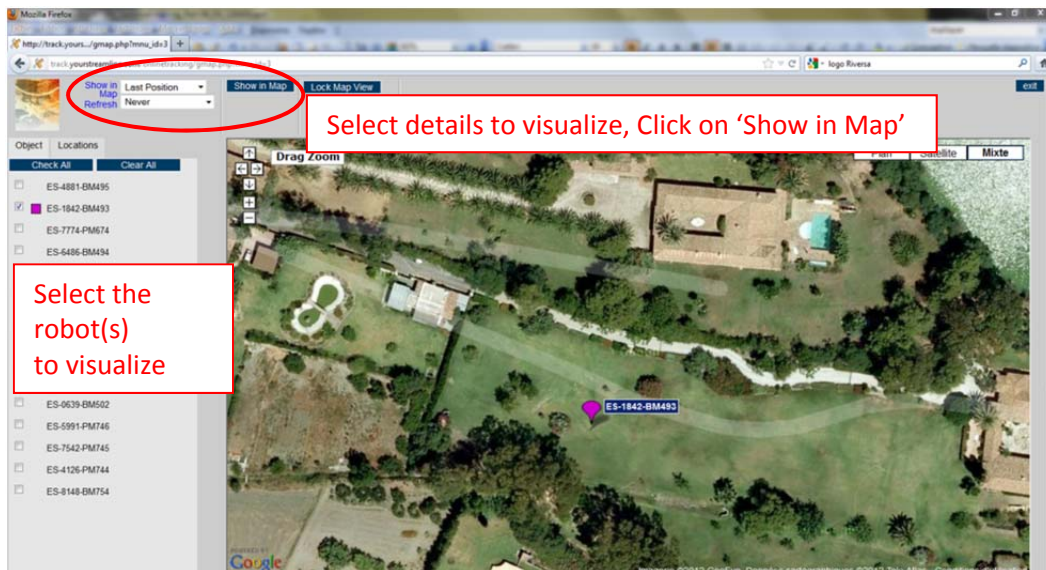
Select records per page to display 250

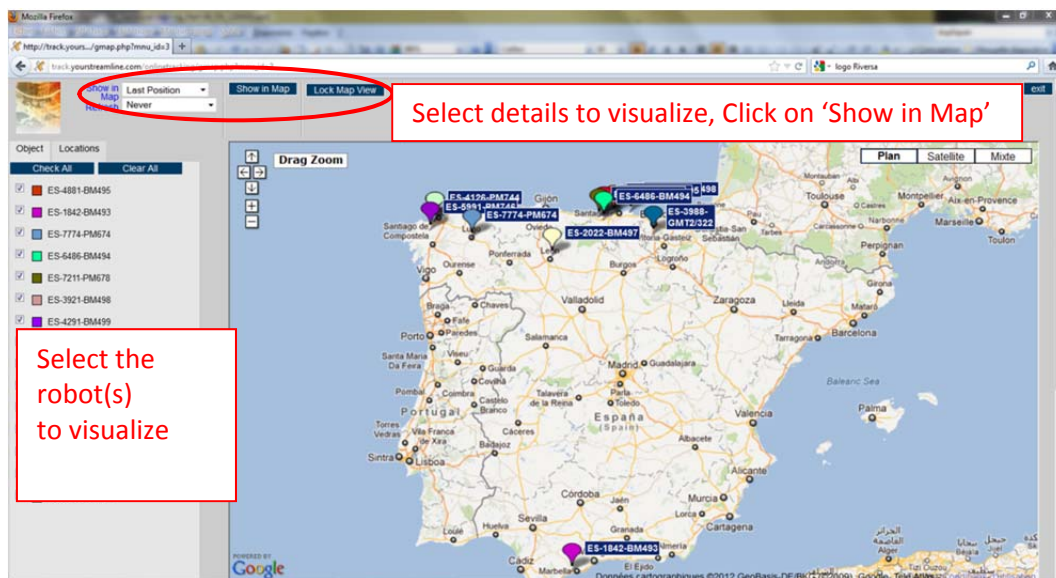
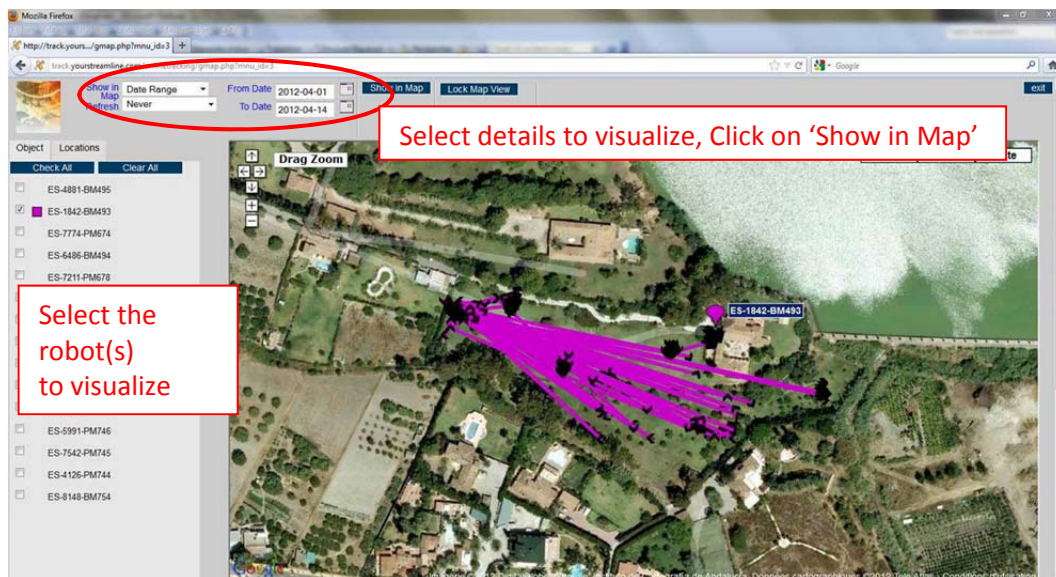
With Select :

Sl.No	IMEI	ID	Vehicle Make & Licence Plate	Date Time	Switch	Event	Name	Lat	Lon	IO	Spd	Head	Temp	Battery	Select Shown
1	351777045115894	0	BigMow, CH-15894-BM902	2013-01-14 12:06:06	Position	Input 1a	-	50.734078333333	4.5885		0	48	18	22.7	☐
2	351777045115894	0	BigMow, CH-15894-BM902	2013-01-14 11:58:43	Module Received SMS	-	-	0	0		0	0	-0	25.95	☐
3	351777045115894	0	BigMow, CH-15894-BM902	2013-01-14 11:58:27	Position	Input 1a	-	50.73408	4.5883766666667		0	294	17	19.63	☐
4	351777045115894	0	BigMow, CH-15894-BM902	2013-01-14 11:56:30	Position	Input 1a	-	50.73408	4.5883766666667		0	294	18	22.3	☐
5	351777045115894	0	BigMow, CH-15894-BM902	2013-01-14 11:50:40	-	SACT Initiated	-	50.733793333333	4.5891033333333		1	2	18	25.91	☐
6	351777045115894	0	BigMow, CH-15894-BM902	2013-01-14 11:50:06	Position	SACT Initiated	-	50.733728333333	4.5890383333333		5	232	18	25.88	☐

4.3. VISUALIZING ROBOT POSITION

With the commands 'View Fleet', you can visualize in Google Maps the position of the robots. Herebelow a few examples :





The command 'Trips Details' is giving similar information about the last position of the robot(s) sent to the server but in a tabular format where you can also get the timing of those positions.

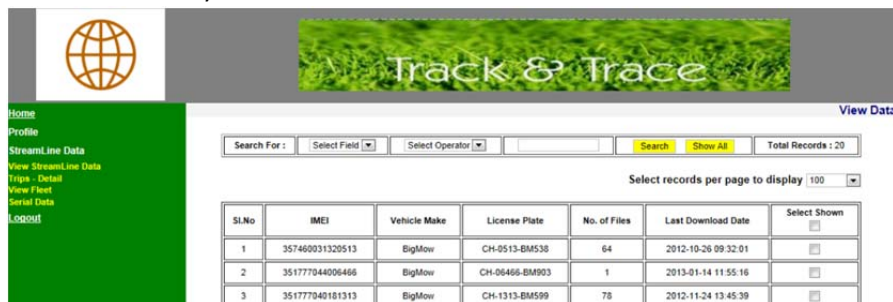
Track & Trace														
StreamLine Downloaded Data														
Search For : Select Field Select Operator (Date : yyyy-mm-dd) Search Show All Total Records : 153														
Last 3 months Select records per page to display 250														
Sl.No	Vehicle	Date	Time	Address	Place	Distance	Odometer	Action	Speed	Heading	Driver	Trip type	IO	Geozone
1	BigMow, CH-0513-BMS38	2012-10-26	13:26:35			0.0	0.0	Module will powerdown shortly	0	W		Business	-	Google
2	BigMow, CH-0513-BMS38	2012-10-26	09:36:57			0.0	0.0	Stop Moving	0	E		Business	-	Google
3	BigMow, CH-0513-BMS38	2012-10-26	09:33:54			0.0	0.0	Input 1a	0	E		Business	-	Google
4	BigMow, CH-0513-BMS38	2012-10-26	09:33:29			0.0	0.0	Input 4a	0	E		Business	-	Google

4.4. DOWNLOADING ROBOT LOGFILE INTO DEALERS TOOLS SUITE

Each time the robot is getting an alarm or getting the SMS command *Mowerdata*, it will send to the BELrobotics 'Track&Trace' server the history log of recent events and alarms. This log is put in a file that can be retrieved from the server and analyzed into Dealers Tools Suite program. Analysis allows you to understand the behavior of the robot, identify some possible issues and find solutions.

To download the history log file from the server, you have to proceed as following:

- Select 'Serial Data' in the main menu window
- You will then get the list of all the robots of your fleet including also the number of log files each robot has sent and the time the last log file has been sent. (when you send the *Mowerdata* command, you might have to wait a few minutes before being able to see the file on the server).



- Select the robot(s) for which you want to download the details and type on the 'View Data Details' button at the end of the screen. You then get the list of log files available for the robot(s) and you can select and download them (Download button at the bottom of the screen).
- You will then get a zip file including the history log file in binary format. Unzip and store the extracted file **without modifying its name**.

Example : 357460031320513_2012-10-26_09_32_01-serialdata.txt

You can then read the file in the Dealers Tools Suite program using 'Import History' menu command.

The compatibility between the log file (whose format is depending on the FW version embedded in the robot) and the Dealers Tools Suite version must be checked. Read the related FAQ or contact BELrobotics for information.



5. TROUBLESHOOTING / FREQUENTLY ASKED QUESTIONS

1. I am sending SMS commands to get information about the robot (Status, Position; Mowerdata) but I do not get any confirmation SMS.

The SMS communication between your mobile phone and the robot is not working. Following possibilities can explain the problem:

- o The GSM network of the operator is temporally not working in your area or in the area of the robot.
- o The 'Track&Trace' module of the robot is not able to receive or send SMS. A possible root cause can be that the module has a low power battery. As long as the robot is working normally, this can not happen. However, when the robot is switched off, the autonomy of the 'Track&Trace' module battery allows SMS communication to continue for a few days. After that period, the module is no longer able to communicate. You have to switch on the robot again. Check then that the SMS communication has been properly reestablished.
- o Your yearly subscription to the 'Track&Trace' option has not been renewed and the service has been disabled. Contact your BELrobotics dealer to re-enable the service.

2. I am not getting SMS alarms from the robot and/or I can not control (Backhome,...) it through SMS.

Following possibilities can explain the problem :

- o SMS communication not working : see here above.
- o You must have the 'ALARM_PHONE' or 'CONTROL_PHONE' rights to have this functionality. Refer to Table 2. Check via [Status](#) command which phone numbers are registered in the 'Track&Trace' module of the robot.
- o The same alarm is occurring continuously. Only one Alarm_SMS is sent in those conditions (see filtering alarms in Section 3.7).

3. The robot is switched off (I can see it through Status command) but I did not receive the corresponding SMS message 'Robot OFF'

Following possibilities can explain the problem :

- o SMS communication not working : see here above.
- o After an alarm has occurred (you should have received an Alarm_SMS for it), the robot is switching off automatically 2 minutes after the alarm occurred, unless the alarm condition has disappeared (example : short signal interruption). In this case, the robot does not send a 'Robot OFF' SMS.

4. I have lost the mobile phone or SIM card corresponding to 'ALARM_PHONE'.

Take contact with your BELrobotics dealer so the 'ALARM_PHONE' can be cleared and you will be able to define a new phone number to receive alarms and send control or security commands.

5. I have lost the mobile phone or SIM card corresponding to 'CONTROL_PHONE'.

The 'ALARM_PHONE' phone can be used to clear the 'CONTROL_PHONE' and allow you to define a new phone number.

6. Can I configure the language used for the 'Track&Trace' service?

For some aspects only.

The language of the 'Alarm_SMS' sent by the robot are in the same language as the one configured on your robot.

The language of the 'Track&Trace' server website is also configurable.

However, the 'Track&Trace' commands SMS must be in English in the same syntax as described in this manual (but the commands are case insensitive). The acknowledgments confirmation SMS are also in English only.

7. The GPS position that I am visualizing through the 'Track&Trace' server is not corresponding to the exact position of the robot.

Make sure you have selected the correct robot to visualize and the correct timestamp.

The accuracy/inaccuracy of the localization is inherent to the GPS system and can be affected by following factors :

- o trees or buildings reducing the sky visibility
- o time and exact location on Earth affecting the number of satellites which can be seen.

When the GPS receiving conditions are very bad, the Track&Trace module keeps the last valid GPS fix, if it exists. This is also the case just after the module has been restarted.

8. I am downloading the history log file from the 'Track&Trace' server but I am not able to open it into Dealers Tools Suite.

Check the size of the file: correct sizes are 8208, 8210, 8284 and 8286 bytes depending on the SW version of the robot (see below table). Any other size means that the file is corrupted and should not be downloaded.

Robot FW Version	History Log Size (bytes)	Minimum DTS SW version
< 130114 (before January 2013)	8208 or 8210	4.4
= 130114	8284	4.14
>130114 (after January 2013)	8286	5.1



Take contact with your BELrobotics dealer to check the versions compatibility between the FW embedded in the robot and the Dealer Tools Suite version you should use.

9. I observe some clock time mismatches between the SMS messages, the information on the 'Track&Trace' server and the log in Dealers Tools Suite

There are five different 'clock' references involved in the system:

- o The clock of the robot that you can define through the keyboard (refer to BELrobotics robot user manual).
- o The clock that the 'Track&Trace' module is capturing directly from the GPS satellites.
- o The clock that the 'Track&Trace' module keeps updated without the GPS reference
- o The clock of the server
- o The clock of the GSM/GPRS network

Depending on the information you look at, you will see the different clock references. Normally, the various clocks should correspond but there might be some differences explaining the mismatch you are observing. (Example : no automatic summer time change, wrong time zone, no GPS fix, ...).

In particular, the timing information that you get included in the SMS responses is the GPS clock acquired by the 'Track&Trace' module. When the 'Track&Trace' module has been switched off and there is not yet GPS fix, the 'Track&Trace' module clock is starting with the time of the last GPS fix before the module was switched off. If the module has been kept off for several days, the time included in the SMS messages might then be very old. This will become correct as soon as the module has acquired the GPS fix.

10. Is there some subscription fee to the 'Track&Trace' service?

Yes : there is a yearly renewal of the subscription to be done so you can continue with the service. The subscription for the first year is included in the installation price. For following years, your BELrobotics dealer will contact you upfront to make sure you are renewing the subscription and you do not get a service interruption.

APPENDIX 1 : LIST OF ALARMS SMS

English	Français	Deutsch	Nederlands	Italiano	Spanish
1.			Acknowledgement SMS commands		
1.1			MowerData requested		
1.2			BackHome requested		
1.3			Restart requested		
1.4			Manual charge		
1.5			Timer Off executed		
1.6			Timer On executed		
1.7			Disable zone executed		
1.8			Enable zone executed		
1.9			Fence center set to ...		
1.10			Fence cleared		
1.11			Retry within 2 minutes		
2.			Alarms Cutting Heads		
2.1	Alarm Head(s) blocked	Alarm Maehkopf	Alarm Kop	Allarme Testa	Alarm Head
3.			Alarms Wheels, Obstacles detection, Sonar, ...		
3.1	Alarm Wheel ? blocked	Alarm Rad bick ?	Alarm Wiel ?	Allarme Ruota ?	Alarm Wheel ?
3.2	Alarm Wheel L blocked	Alarm Rad bick L	Alarm Wiel L	Allarme Ruota Sx	Alarm Wheel L
3.3	Alarm Wheel R blocked	Alarm Rad bick R	Alarm Wiel R	Allarme Ruota Dx	Alarm Wheel R
3.4	Alarm Wheels L+R blocked	Alarm Rad bick L+R	Alarm Wiel L+R	Allarme Ruote Sx+Dx	Alarm Wheel L+R
3.5	Alarm Cover ?	Alarm Abdeck bick ?	Alarm Top ?	Allarme Coperchio ?	Alarm Cover ?
3.6	Alarm Cover L	Alarm Abdeck bick L	Alarm Top L	Allarme Coperchio Sx	Alarm Cover L
3.7	Alarm Cover R	Alarm Abdeck bick R	Alarm Top R	Allarme Coperchio Dx	Alarm Cover R
3.8	Alarm Cover L+R	Alarm Abdeck bick L+R	Alarm Top L+R	Allarme Coperchio Sx+Dx	Alarm Cover L+R
3.9	Alarm Bumper ?	Alarm Senband bick ?	Alarm Bumper ?	Allarme Bordo sens. ?	Alarm Bumper ?
3.10	Alarm Bumper L	Alarm Senband bick L	Alarm Bumper L	Allarme Bordo sens.Sx	Alarm Bumper L
3.11	Alarm Bumper R	Alarm Senband bick R	Alarm Bumper R	Allarme Bordo sens.Dx	Alarm Bumper R
3.12	Alarm Bumper L+R	Alarm Senband bick L+R	Alarm Bumper L+R	Allarme Bordo sens.Sx+Dx	Alarm Bumper L+R
3.13	Alarm Permanent sonar detection	Alarm capteurs collision G+D	Alarm Sonar ?	Allarme Sonar ?	Alarm Sonar ?
3.14	Alarm Wheel slipping	Alarm Patinage roue(s)	Alarm Vrij wiel	Allarme Slittamento	Alarm Wheel slipping
3.15	Alarm Lifted !	Alarm Soulevement!	Alarm Opgetilt!	Allarme Sollevato!	Alarma Levantado!

English	Français	Deutsch	Nederlands	Italiano	Spanish
4.	Alarms Peripheral wire/signal issues, no wayout				
4.1	Alarm No wire signal	Alarm Kein Sign Kabel	Alarm Geen draad	Alarme No segnale cavo	Alarm No wire signal
4.2	Alarm Wire lost	Alarme Fil perdu	Alarm Kabel verfehlt	Alarme Perdita cavo	Alarm Wire lost
4.3	Alarm Stuck on wire	Alarme Bloquee sur fil	Alarm Neben Kabel	Alarme Fermo sul cavo	Alarm Stuck on wire
4.4	Alarm No wayout path	Alarme Impasse	Alarm Sackgasse	Alarme Nessun passaggio	Alarm No way out path
5.	Alarms Power supply & charge				
5.1	Alarm Discharged	Alarme Batterie trop faible	Alarm Entladen	Alarme Scaricata	Alarm Discharged
5.2	Alarm No station found	Alarme Pas de Station	Alarm Kein Sign LadSt	Alarme Stazione ?	Alarm No station found
5.3	Alarm Overvoltage	Alarme Surtenstion	Alarm Überspannung	Alarme Sovravoltaggio	Alarm Overvoltage
5.4	Alarm Supply outage	Alarme Perte de charge	Alarm Ladekont verlor	Alarme Perdita carica	Alarm Supply outage
5.5	Alarm Wrong Li Battery type	Alarme Mauvais type batterie	Alarm Batterie typ ?	Alarme Batteria tipo ?	Alarm Battery ID ?
5.6	Alarm Missed charge contact	Alarme Pas de contact de charge	Alarm Kein Ladekontakt	Alarme Contatto staz.?	Alarm Charge contact ?
5.7	Alarm Bad Battery Temp. sensor	Alarme Capteur Temp. Batterie	Alarm Batt sensor def	Alarme Bat. Temp. sensor ?	Alarm Bat. Temp. sensor ?
6.	GPS Fence alarms				
6.1			Out of Zone		
6.2			Abnormal move		
7.	Misc alarms				
7.1			Robot OFF!		
7.2	Alarm Reset needed	Alarme Processeur filtre signal	Alarm Neustart erford	Alarme Risetare	Alarm Reset needed
7.3	Alarm Code expired	Alarme Code non valide	Alarm PIN eingeben	Alarme Manca codice	Alarm Code needed
7.4	Alarm not used	Alarme Interne	Alarm ????????	Alarme not used	Alarm not used
8.	Ballpicker specific alarms				
8.1	Alarm Check ball detector	Alarme Compteur de balles	Alarm Ballzaehl defekt	Alarme Palle detectore?	Alarm Check ball det.
8.2	Alarm Trap blocked up	Alarme Trappe reste en haut	Alarm Klappe block	Alarme Vasca bloccata	Alarm Trap blocked Up
8.3	Alarm Trap blocked down	Alarme Trappe reste en bas	Alarm Klappe block	Alarme Vasca bloccata	Alarm Trap blocked Do
8.4	Alarm Front wheel blocked up	Alarme Train avant reste haut	Alarm Vorderrad block	Alarme Ruote ant. blocc	Alarm F.wh. blocked Up
8.5	Alarm Front wheel blocked down	Alarme Train avant reste bas	Alarm Vorderrad block	Alarme Ruote ant. blocc	Alarm F.wh. blocked Do
8.6	Alarm Busy elevator	Alarme Elevateur occupe	Alarm Elevator voll	Alarme Fermata occupato	Alarm Busy elevator ?