

BELROBOTICS

Dealer Tools Suite 6.0 User Manual



English Version

BELROBOTICS 
THE GRASS MASTERS

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1. INTRODUCTION

The 'Dealer Tools Suite' (DTS) is an application SW running on PC that gives you the following functionality:

- Upgrade the FW embedded in your Belrobotics robot (mower or ballpicker) so that you can benefit of new features, functionalities of the robot or improve its performances.
- Analyze the activity (working time, alarms,...) and the settings (parameters, options,...) of the robot so that you can optimize its performances by better understanding its behavior. This analysis is performed by downloading into DTS an "history log" of the robot.

To use DTS6.0, you need :

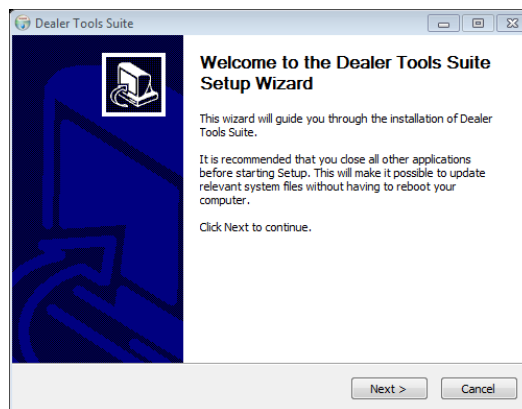
- A PC running under windows operating system (Windows xp, Windows 7.X, Windows vista (not tested), Windows 8.X)
- To connect physically to the robot, you need the Belrobotics USB cable (reference part BR19130). When you are connected to the robot, you will be able to upgrade the FW of the robot or download its latest "history log".
- If you robot has Track&Trace module, you can also download robot "history log" from the streamline server. (see Track&Trace manual).

This user manual gives you the following information :

- How to install or upgrade the DTS SW on your PC (Chapter 2)
- How to use the DTS SW :
 - o Description of the main DTS window, the database window and the menus (Chapter 3)
 - o Import a "history log" from a robot and add/create the robot inside the DTS database (Chapter 4)
 - o Upgrade the FW embedded in your robot (Chapter 5)
 - o Understand and analyze the content of an "history log": machine information and settings (Chapter 6), machine programmed rest periods (Chapter 7) and machine activity (Chapter 8)
 - o Recuperate into DTS6.0 information available on your PC from usage of earlier versions of DTS4.X or DTS5.X (Chapter 11)

2. INSTALLING 'DEALER TOOLS SUITE' SW ON PC

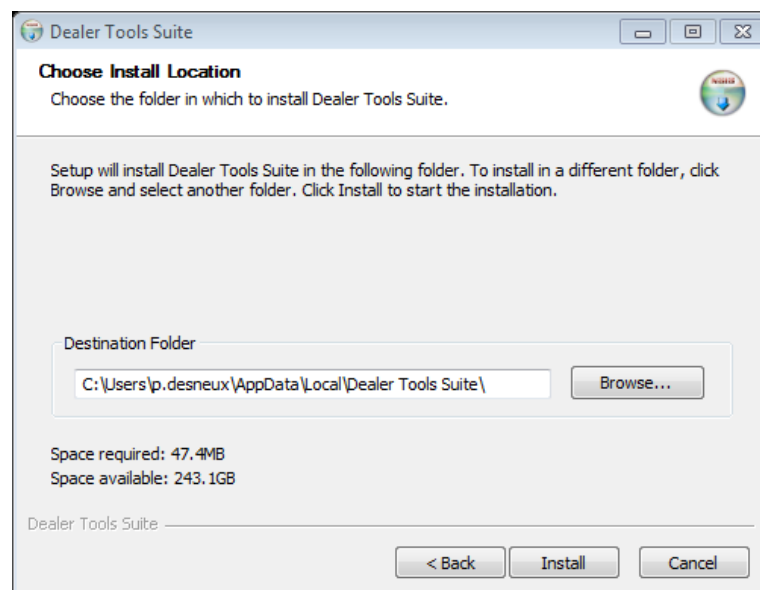
- Download from Belrobotics extranet the latest version of "DTS6.0_setup.exe"
 - o Go to Belrobotics extranet (<http://www.belrobotics.net/football/>)
 - o Login (bottom of the page)
 - o Go on extranet category "Dealers Tools Suite/DTS6.0"
 - o Download the "DTS6.0_setup.exe" and store it on your PC
- Execute "DTS6.0_setup.exe". The following window will appear.



- Choose the Destination Folder where the DTS executable and the DTS database information will be stored on your PC. Then, click on 'Install'

It is strongly recommended that you do not change the Destination Folder and keep the default path proposed by the DTS installer.

If this is NOT your first DTS6.0 installation on this PC (you are upgrading DTS6.0 SW), the installer will propose you the path where DTS6.0 is currently installed. DO NOT CHANGE the path otherwise you will have multiple versions of the tool installed on your PC and you will not be able to access your existing DTS6.0 database.

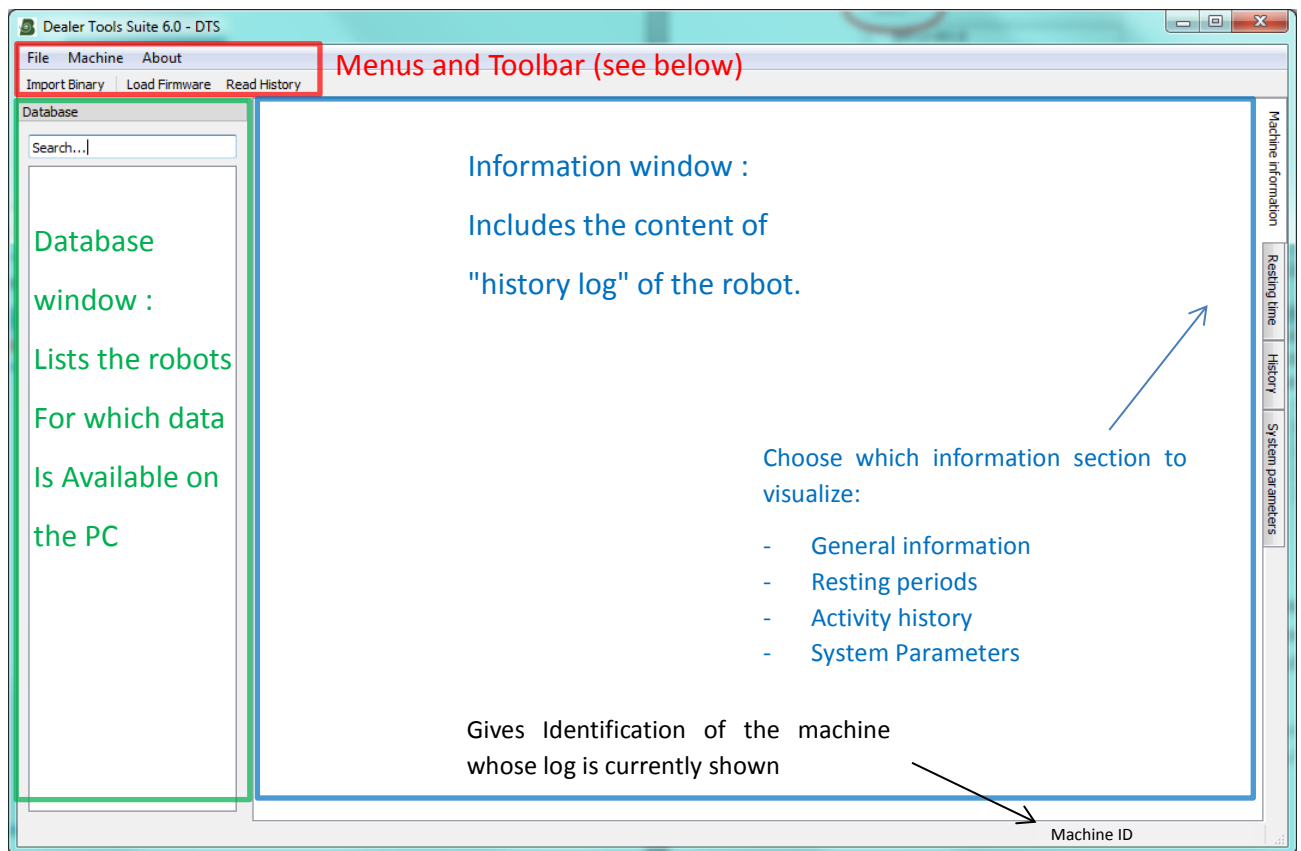


- After installation, an icon is created on the desktop of your PC and you can use this icon to start the DTS application.



3. DTS 6.0 MAIN WINDOW AND MENUS DESCRIPTION

The main window of DTS6.0 is described here below:



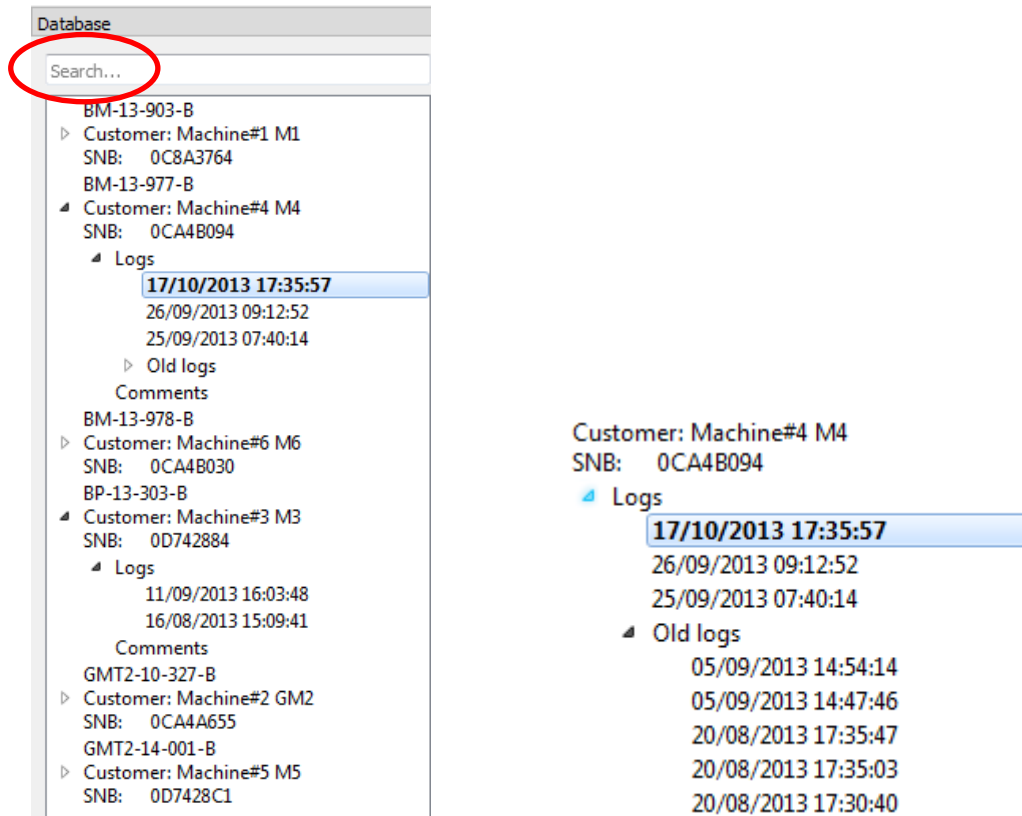
3.1. THE DATABASE WINDOW

The database window is showing you the list of robots for which some information is available in the DTS6.0 database.

The robots are ordered by type (BM, BP, GM, PM), then by construction year and machine number.

The log which is currently visible in the information window is highlighted in "**BOLD**".

When a machine contains multiple "history log", only the 3 last logs are directly accessible but the older logs are stored in "Old logs".



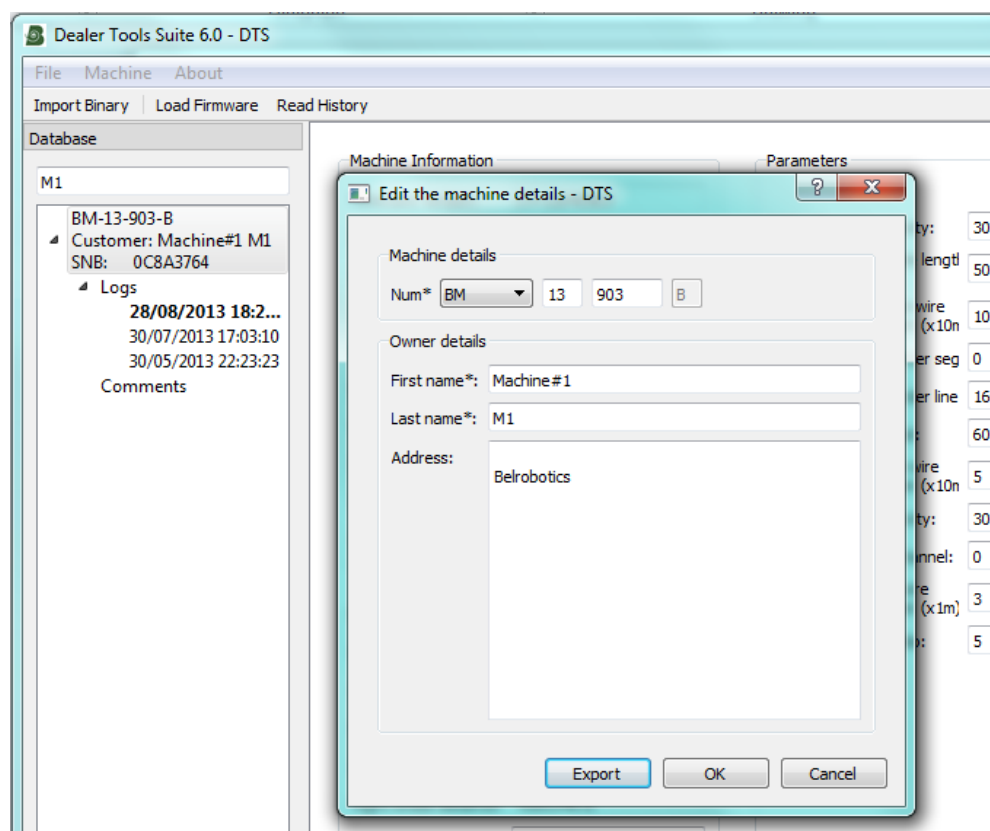
3.1.1 Machine "Search" Function :

The Database window has a "Search" function highlighted in the picture here above. When you want to retrieve easily a machine stored in your local database, you can enter one or several strings in the "Search" window and only the machines matching the "search" criteria will be shown in the list.

Any machine including in its number, in its name or in its customer's name or customer's address the string you have typed in will be matching the "search criteria".

3.1.2 Editing Machine Identification

When you want to modify the identification of a robot, you have to "double click" on the robot in the database window. A new window will open where you will be able to edit the robot identification details : type, number, owner name, owner address.



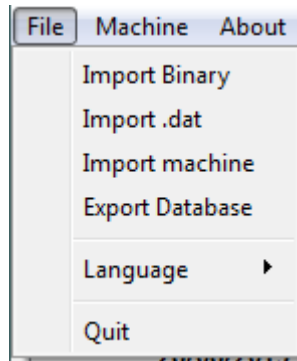
3.1.3 Exporting / Importing data corresponding to one machine

When you want to share data corresponding to one machine with somebody else (for instance with Belrobotics or Belrobotics Dealer for support), you can export the data corresponding to one machine by using the "Export" button available in the "machine edit" window (see picture here above). This will create a zip file including the data of the machine. You can then send this zip file via mail to share it.

When you want to import data corresponding from a machine, you can read the zip file you have received. This will create a new machine or add/merge the data with a corresponding machine if it already exists. The "Import Machine" functionality is available through the "File Menu".

3.2. FILE MENU

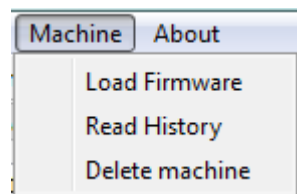
The 'File' menu is giving you the following functionality :



- Import Binary : download inside DTS tool an history log of a robot that is stored on your PC. Typically, this is used for importing into DTS a log which is available on the Track&Trace server. Refer to chapter 4 for more details.
- Import .dat : recuperate inside DTS 6.0 database the information of robot present in your existing DTS4.x or DTS5.x database. Refer to chapter 11 for more details
- Import machine : read a zip file including data of one machine. Refer to chapter 3.1.3 for usage
- Export Database : create a zip file including the complete local DTS6.0 database. This is useful for backup or re-installing DTS on another PC.
- Language : choose the language of DTS6.0. English, French and German are available languages. You have to quit and restart the application to make the language change effective.
- Quit : Exit DTS6.0 application

3.3. MACHINE MENU

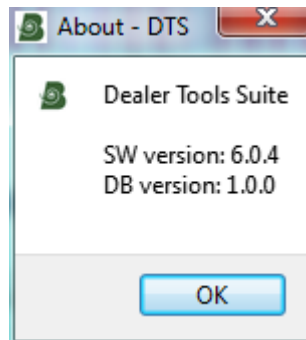
The 'Machine' menu is used when you are connected to the machine with the Belrobotics USB cable (BR19130). This menu is giving you the following functionality :



- Load Firmware : upgrade the FW of the robot. Refer to chapter 5 for more details.
- Read History : download an "history log" directly from the robot. Refer to chapter 4 for more details.
- Delete Machine : Remove the machine from your database. It is recommended you make an export zip file before so you can retrieve it later if needed.

3.4. ABOUT MENU

The 'About' menu gives you the version of the DTS6.0 tool currently installed on your PC.



4. IMPORT A "HISTORY LOG" AND CREATE/ADD A ROBOT IN YOUR DATABASE

Creating/Adding a new robot in the database is achieved by importing a "history log" of this robot. When a "history log" is imported, DTS6.0 is checking the "SNB" (serial number of the mainboard) included in the "history log" :

- o If DTS6.0 is recognizing a "SNB" already present in its database, then the new log is added to the existing machine with that "SNB".
- o If DTS6.0 is not recognizing the "SNB", the following window is popping up and gives you the possibility to :
 - Add the log to an existing machine – this occurs if you have changed the mainboard of the machine – you then have a new "SNB" attached to this machine
 - Create a new machine : you then have to enter the details of it.on the right side of the window below.

Select or create a machine - DTS

Existing machines

- BM-13-903-B
Customer: Machine#1 M1
SNB: 0C8A3764
- BM-13-977-B
Customer: Machine#4 M4
SNB: 0CA4B094
- BP-13-303-B
Customer: Machine#3 M3
SNB: 0D742884
- GMT2-10-327-B
Customer: Machine#2 GM2
SNB: 0CA4A655

Machine details

Num: BM 14 0001 B

Owner details

First name: Machine#5

Last name: Manual DTS

Address: Belrobotics

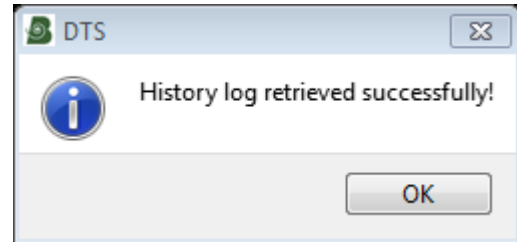
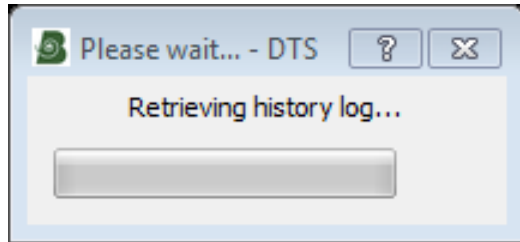
OK Cancel

Importing a "history log" can be done in 4 different ways:

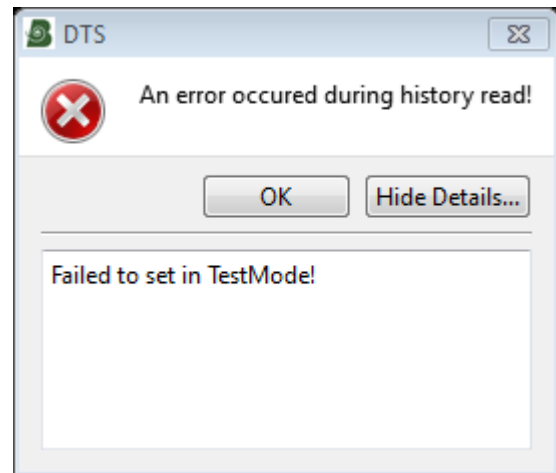
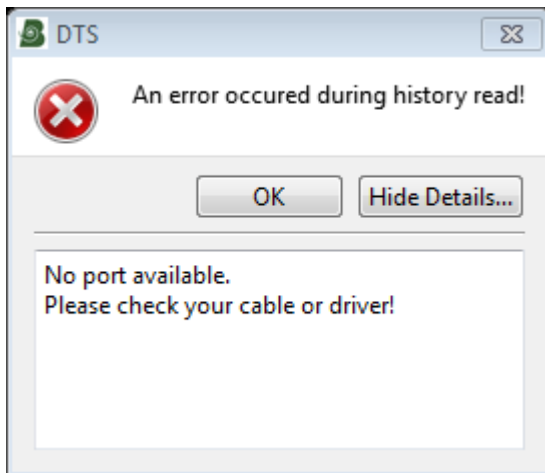
- o Menu 'File => Import Binary' : importing a file in native format from the robot located on your PC. Typically, you download this file from the Track&Trace server where the robot has sent it.
- o Menu 'File => Import .dat' : see chapter 11.
- o Menu 'Machine => Read History' : you are connected to the robot with the Belrobotics USB cable and you take the latest log from the robot.

- o Menu 'Machine => Load Firmware' : see chapter 5.

When you are importing a "history file", the following screens will appear :

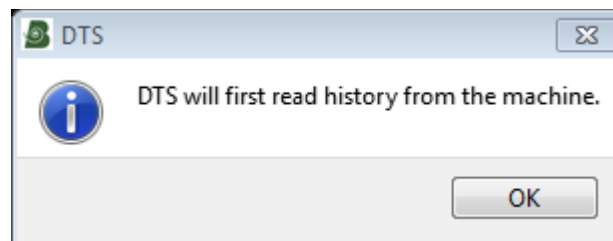


If you are connected to the robot and you get following screens, it means that the connection to the robot is not correct. Check your cable is properly plugged in the PC and in the robot and check that the robot is switched on. If still problem, contact your Belrobotics dealer.



5. UPGRADE THE FW OF THE ROBOT

Before upgrading the FW of the robot, DTS6.X will first download the latest "history log" :



Then you have to choose the BMB file (format of the robot FW) that you have downloaded from the Belrobotics extranet (<http://www.belrobotics.net/football/index.php/fr/software-robotics>) :

Football & BIGMOW Cutting edge technology Unrivalled quality Reduced maintenance 50 % savings Nature friendly More enjoyable Easy to adapt More than 350 clubs

Football pitches have found their master



Contact

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Back to Belrobotics

Softwares:

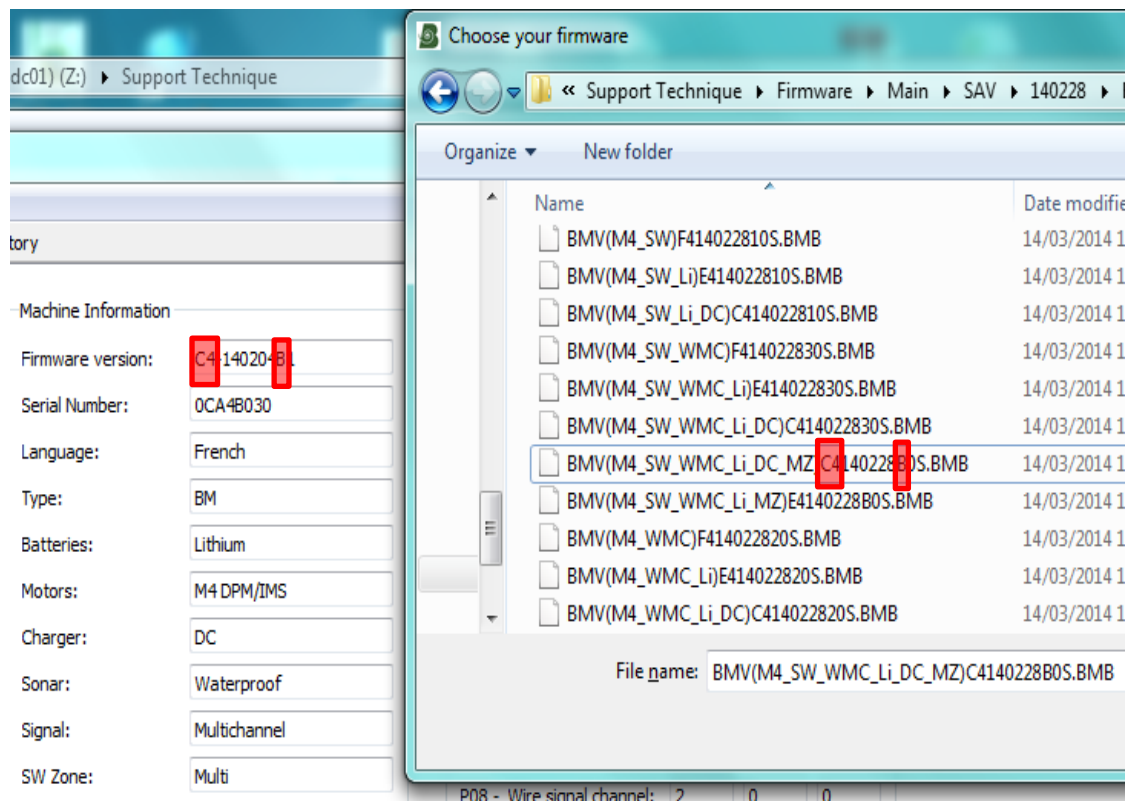
Download your firmware version

Configuration BELROBOTICS

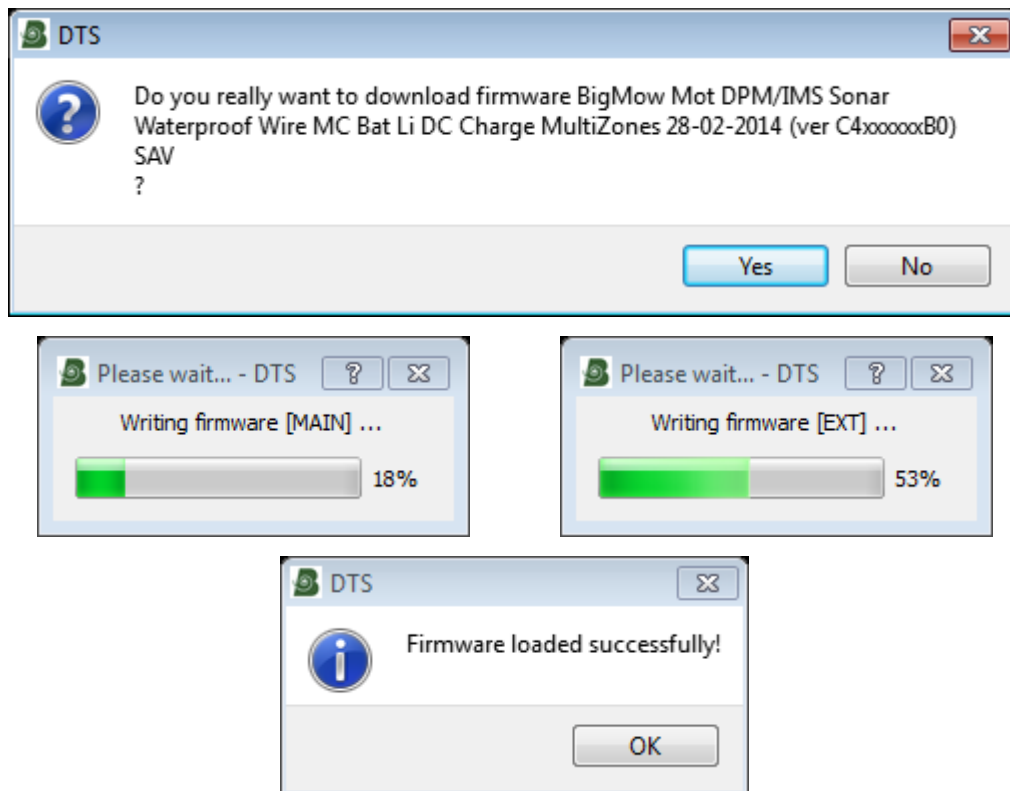
Robot model: BigMow	Multizones option: No
Wheels motors: DPM/IMS	Battery: Lithium (LFP)
Sonar type: Waterproof	Charge: Direct (DC supply)
Peripheral signal: Multi Channels (blue boards)	Validation

The FW you have to choose is depending on the HW configuration of the robot as you can select it on the Belrobotics Extranet (see above). You can identify the HW configuration corresponding to your robot (if no recent HW change) in the 'Machine information' tab inside DTS tool (see chapter 6).

If you have not modified the HW of your robot you can also verify you pick up the right FW as depicted in the picture below (red characters must match):

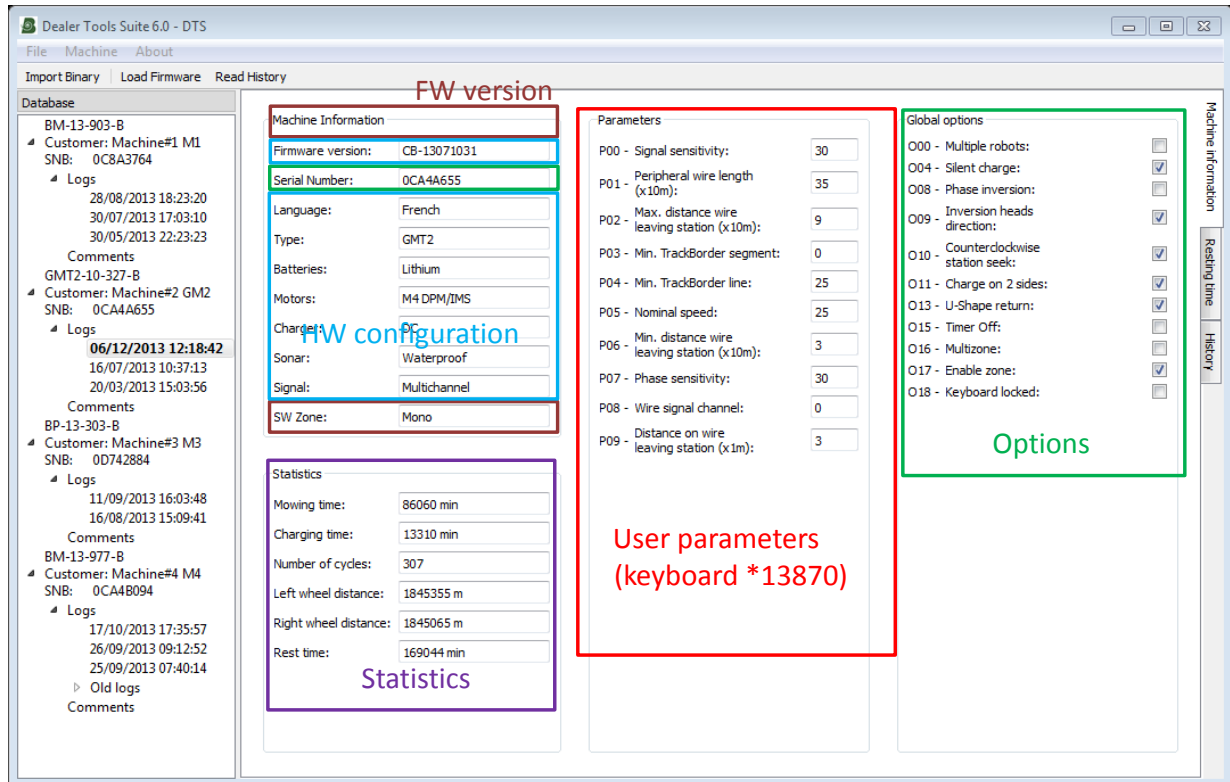


After you have selected the BMB file, you are asked for a last confirmation before the FW is downloaded towards the robot.

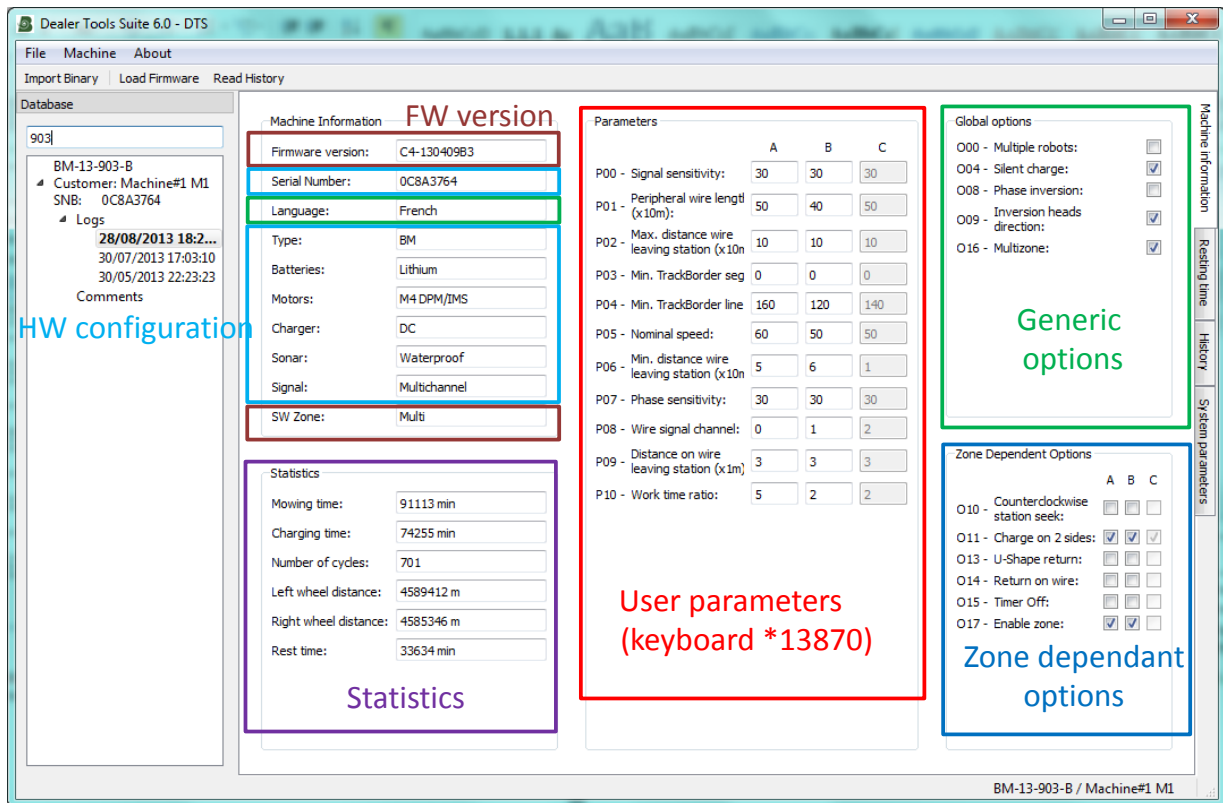


6. MACHINE INFORMATION' TAB

When you are visualizing a "history log" of a machine (highlighted in bold in the database window), the machine information tab gives you the settings of the robot as described in below pictures (respectively for a log corresponding to a monozone SW or multizone SW).



For a multizone SW, if a zone is disabled (Option 17 unset), the corresponding column of parameters and zone dependent options is greyed. (See Example zone C in the picture below).



7. 'RESTING TIME' TAB

The 'resting time' tab gives you the information of the resting periods as configured at the moment when the "history log" has been generated by the robot.

The resting periods information can be shown in 2 formats :

- o Table view : this is showing the resting periods as programmed in the robot through the keyboard menus.

Time view

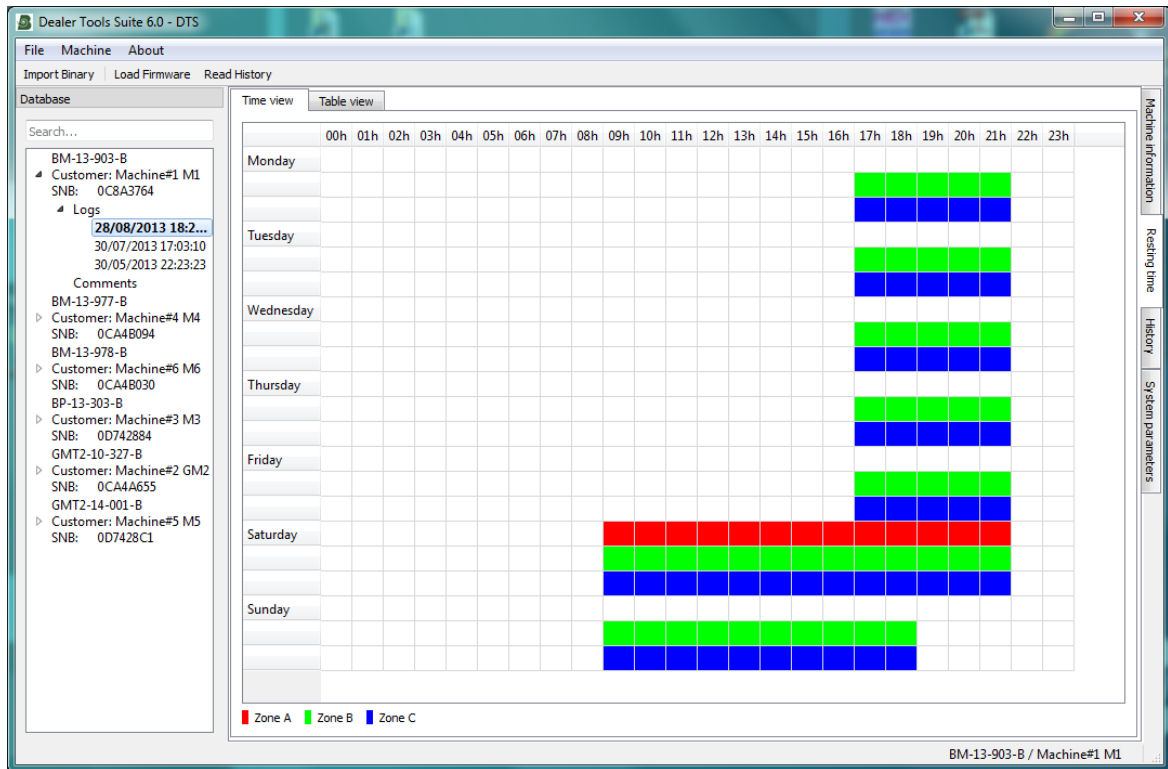
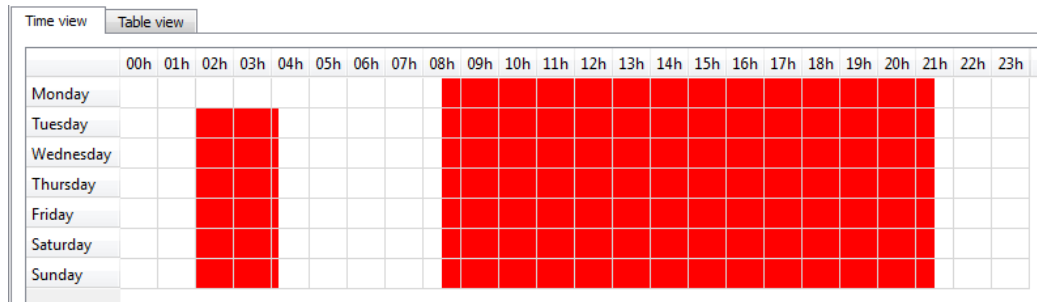
Table view

Zone A

	Range 1	Range 2	Range 3	Range 4	Range 5
Monday	08H30 - 21H30				
Tuesday	08H30 - 21H30	02H00 - 04H10			
Wednesday	08H30 - 21H30	02H00 - 04H10			
Thursday	08H30 - 21H30	02H00 - 04H10			
Friday	08H30 - 21H30	02H00 - 04H10			
Saturday	08H30 - 21H30	02H00 - 04H10			
Sunday	08H30 - 21H30	02H00 - 04H10			

- o Time view : this is showing the week timetable. Passing the mouse over the different periods is giving you the details of the period.

For a multizone FW, the different colors correspond to the different working zones : Red=ZoneA, Green=ZoneB, Blue=ZoneC.



8. 'HISTORY' TAB

The 'History tab' gives you the activity (mowing, charging,...) and events (alarms, on-off, open cover,...) of the robot. It is structured in two panes : a timeline and a list of events.

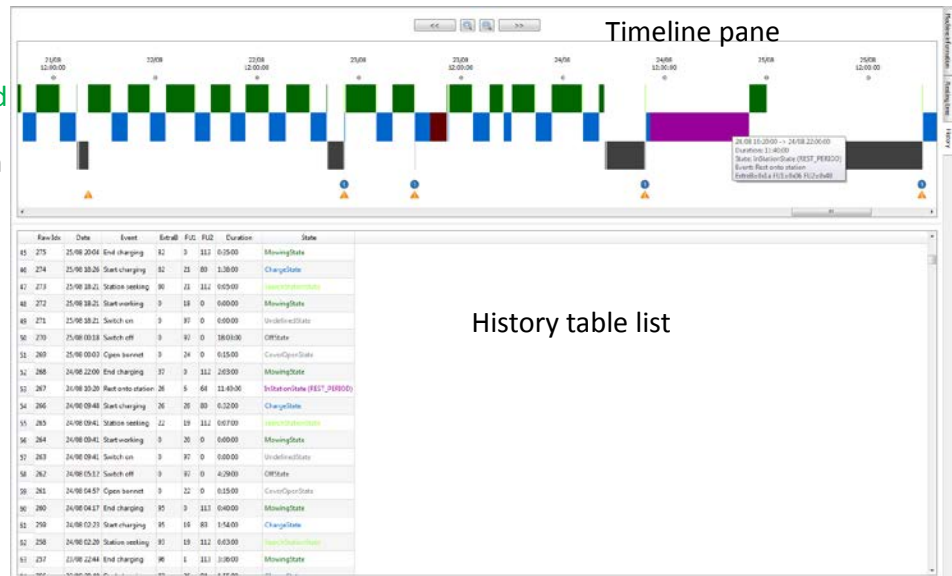
8.1. TIMELINE

The timeline is splitted in 4 parts :

- o Part 1 : indicates the time
- o Part 2 : indicates the periods of time when the robot is active on the field : mowing (mower) or picking balls (ballpicker) (■) or going back to its station (■).
- o Part 3 : indicates the periods of time when the robot is in station : charging (■) or waiting in station (backhome (■), rest period (■), low cut resistance (■),...).
- o Part 4 : indicates the period of time when the robot is stopped either due to an

alarm (■) or due to an action of the user switching off the robot (■).

Robot active on the field
Robot in station
Robot OFF or alarm



You can zoom and move into the timeline using the buttons located at top of the window or using your mouse (scroll wheel) or using the left/right arrows of the keyboard.



When setting the mouse over an event, DTS will highlight the details. If you click with the mouse on an event, the list of history events will be centered over that particular event that will also be highlighted in blue.

The  sign in the timeline is indicating that multiple events are overlapping on each other because the zoom factor of the timeline is not sufficient. If you zoom-in to see a shorter period, these signs will progressively disappear.

The  sign in the timeline is indicating that some events have a zero-length duration in the history. Hence the visualization in the timeline cannot be accurate enough. Click on the  sign to see the details in the history list and be able to analyze properly the sequence of the robot activity.

8.2. INTERPRETATING THE LIST OF HISTORY EVENTS

The list of history events is showing all events stored in anti-chronological order (most recent event at top) as well as extra information that allows to better understand the behavior and performances of the robot.

	Raw Idx	Date	Event	ExtraB	FU1	FU2	Duration	State	WZ	Cut R.	% Chg. cap.	% Disch. cap.
1	319	28/08 18:23	Start charging	58	27	85	0:00:00	ChargeState		85		58
2	318	28/08 18:18	Open bonnet	0	31	0	0:05:00	CoverOpenState				
3	317	28/08 16:40	End charging	99	0	113	1:38:00	MowingState	A		99	
4	316	28/08 14:42	Start charging	99	31	84	1:58:00	ChargeState		84		99
5	315	28/08 14:37	Station seeking	96	30	112	0:05:00	SearchStationState	A			96

The list is containing the following information for each event:

- Column 1 : ID number of the event.
- Column "Event" is describing the event. The occurrence of the event will set the robot into a given state described in the "State" column.
- Column "Date" is giving the date/time (clock of the robot) at which the event occurred. This is corresponding to the start time of the "State". The robot will stay in that state for a "Duration" period and will leave the state at occurrence of the next event.
- Columns "Raw Idx", "ExtraB", "FU1" and "FU2" are reserved for Belrobotics interpretation.
- The other columns contain information depending on the robot type (Mower or Ballpicker), the robot SW version (monozone or multizone) and on the event itself.
 - o Column "WZ" is corresponding to the working zone and is only available for multizone robots. It is indicating the zone (A,B or C) in which the robot is going to work (MowingState for Mower or PickingBallState for ballpicker). In some cases, the cell is kept "blank" because it is not possible to extract from the logfile the working zone.
 - o Column "Cut R." (mower only) is corresponding to the cutting resistance and is

reflecting the energy spent by the cutting heads during the last mowing cycle of the robot. That value is available at the time the robot is starting to charge.

When there are short cycles (manual interruption, alarms,...), the cutting resistance value might be inaccurate.

- o Column "#Balls" (ballpicker only) is corresponding to the number of balls counted by the robot and discharged in the ball collector station at the time of "Unload balls" event. If there are balls blocked in the trap or in the picking roll, the accuracy of the counting might be reduced and wrong numbers reported.
- o Column "%Chg.cap." is corresponding to the % of battery loaded during the preceding charge cycle. That value is available at the "End Charging" or "End Resting" event.
- o Column "%Disch.cap" is corresponding to the % of battery discharged during the preceding working activity (mowing, picking balls or return to station) since the last time the robot has left a charging station.

8.3. COPYING THE LIST OF HISTORY EVENTS

If you wish to share only the list of history events or do some postprocessing on it (example : statistics in Microsoft Excell,...), you can copy it. The list of commands is the following :

- CTRL-A = select the whole list
- CTRL-C = copy it to the clipboard
- CTRL-V = paste it to another application

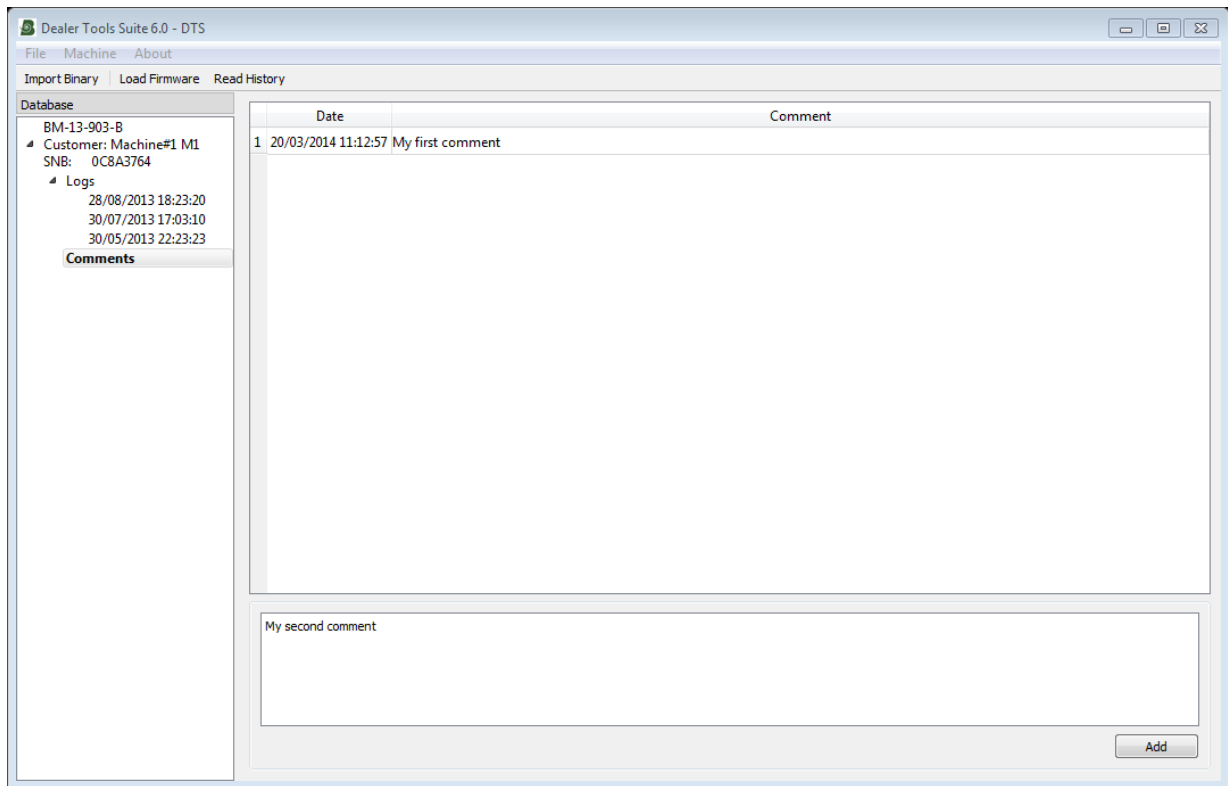
9. SYSTEM PARAMETERS TAB
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The system parameters are parameters affecting the algorithms and functionality of the robot. They should only be modified by the Belrobotics dealer or by Belrobotics qualified staff.

The system parameters tab is giving a table with the values of the system parameters as programmed inside the robot at the time the history log has been produced. The default values (that are function of the SW programmed in the robot) are also shown and any difference between a programmed value and the default value is highlighted in red.

10. COMMENT WINDOW

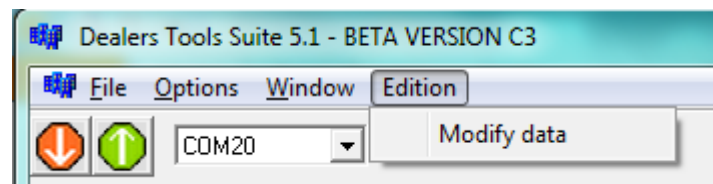
You can also add comments related to your robot. Click on the "Comment" in the database window and you will be able to add comments.



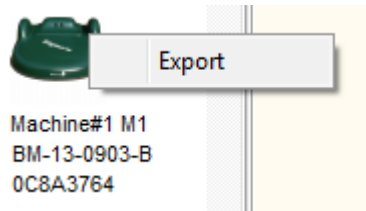
11. RECUPERATE DATA FROM DTS4.X OR DTS5.X INTO DTS6.X

To transfer information that you have in your existing version of DTS (DTS 4.X or DTS 5.X), you first have to 'export' the data of the robot. (Currently, DTS6.0 can only import data robot per robot, hence you have to export robot per robot.)

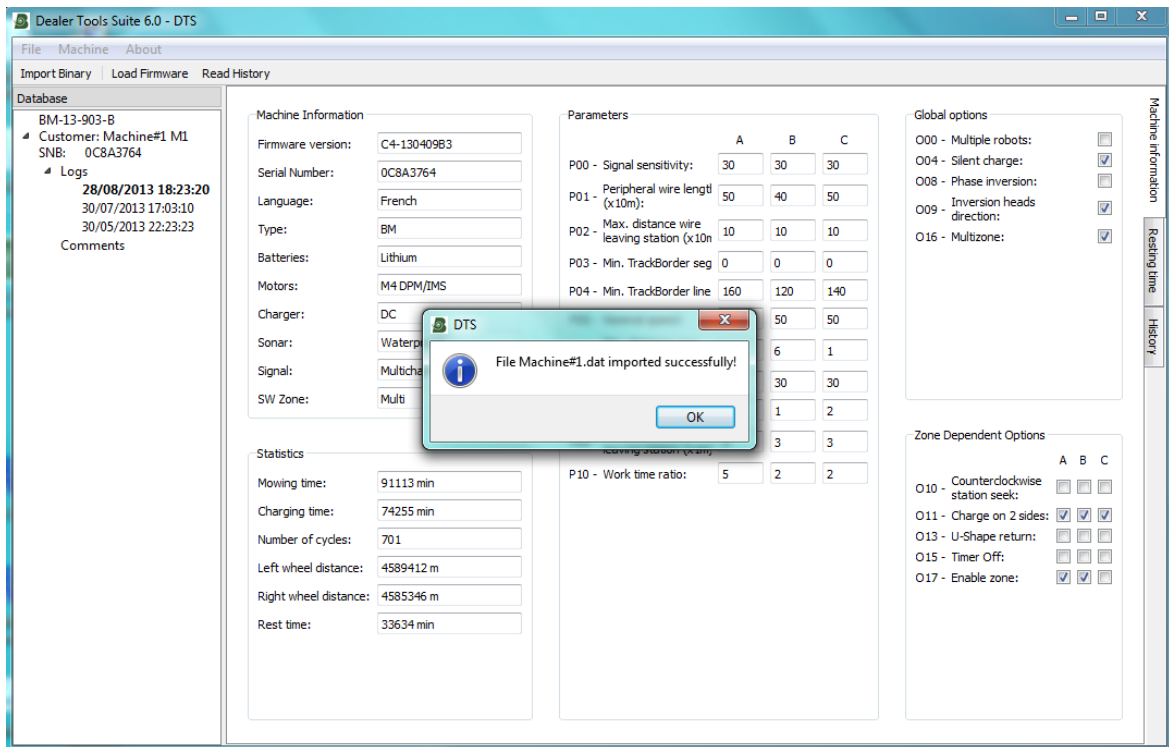
Open DTS4.x or DTS5.x and select the robot to export. If you want to modify the coordinates details of the robot, you can use the menu 'Edition => Modify Data' :



Then you have to export the data by clicking with the right mouse button when the mouse is located on the icon of the robot :



Save the "robot_to_export_file.dat" at a location on your PC. Then inside DTS6.0, use the menu "File=>Import .dat" and select the file you just have created. This will create a new robot in the DTS6.x database and import all the logs of the robot.



12. KNOWN BUGS AND LIMITATIONS

When having a problem with the tool, contact your Belrobotics Dealer.

Herebelow a list of limitations of the initial release 6.0.0. The future releases of the tool will improve those aspects :

- o Some dat file or log file may not be imported into DTS6.0.0 based on their internal content. If you are facing this issue, contact Belrobotics.
- o When importing a .dat file from DTS4.X or DTS5.x, the comments that were stored in the logs are not imported into DTS6.0.
- o The interpretation of event parameters (inside the history tab) might be incomplete or incorrect for some robot SW versions, especially for the SW before 2013.