



MPH™ 900

User's Guide



LP 2740 D
24



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If you need technical assistance, please contact us at

Remington Elsas
PO Box 1046
Madison NC 27025

866 967 4900 or 1-866-9MPH900
336 379 7135

e-mail Stefano.masciangelo@elsag.it
Bernard.Howe@remingtonelsag.com

web WWW.REMINGTONELSAG.COM



About this guide

This guide is the reference manual for the Mobile Plate Hunter™ 900 user interface.

This document is intended to provide the User with the basic information on system operation necessary to use the system in the field. Additional information on Hot List data conversion; System Administration and Vehicle Installation is available in separate documents.

The system user interface is a software program, called CarSystem, which runs on a Mobile Data Terminal or a laptop or any other on-board computer. The computer must be connected to the MPH™900 processor, as explained in the Installation manual.

Section 1 explains the general framework of the CarSystem including the Main Menu Page.

Section 2 is devoted to the preliminary Hot List download procedure.

Section 3 presents all the License Plate Reading (LPR) applications.

Section 4 shows the GPS Localization control page.

Revision History

		Original Document	Masciangelo
A	5/18/2005	New Software Revisions	Child
B	10/07/2005	Updated for 9-9 release and NYSP	Child
C	02/28/2006	Update for release 1.2.0; CarSystem 2.9.0	Masciangelo



TABLE OF CONTENTS

<u>Revision History</u>	3
<u>1 MPH900 Car System Framework</u>	5
<u>1.1 Main Menu Page</u>	5
<u>1.2 Diagnostic Section</u>	7
<u>1.3 Other controls and Information</u>	7
<u>2 Hot List Download</u>	8
<u>3 Applications</u>	10
<u>3.1 LPR – License Plate Reader – main window</u>	11
<u>3.2 LPR-Alarm Management</u>	13
<u>3.3 LPR – Last Events Panel</u>	17
<u>3.4 LPR – Camera Management</u>	18
<u>3.5 LPR – Other controls</u>	19
<u>3.6 LPR – Operations - Hot List Operation</u>	20
<u>3.7 LPR – Operations – Reports and queries</u>	22
<u>4 GPS – Localization</u>	29



1 MPH900 Car System Framework

The MPH900 is a License Plate Reading System, which consists on the following components:

- a set of IR or color cameras
- a processor
- a Mobile Data Terminal (MDT) hosting the on-board user interface,

Refer to the Installation Manual for instructions on how to set up the hardware components in the car and power the system up.

The **MPH900 Car System** is a framework for the execution of different applications on-board a car.

The functions currently available on the graphic interface are:

- License Plate Reader (LPR)
- GPS Localization

The Car System Graphic User Interface (GUI) has been developed to be viewed on a display at 640x480, 800x600, 1024x768 resolution¹. At 1024x768 resolution the GUI displays the plate images at the best possible quality, while providing a good view of interface icons. At any other display resolution, the application will have a dimension of 800x600 pixels. The Car System is fully touch-screen enabled and optimized, meaning that if the vehicle MDT/PC/laptop has a touchscreen, the icons and buttons are touchscreen sensitive. Button and icon sizes have been chosen to maximize touch screen ergonomics.

Main Menu Page

The **Car System** must be launched from the Desktop double-clicking the following icon.



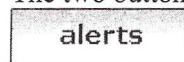
CarSystem.ico

¹ Unit of measure in pixel



When the **Car System** starts, the main page below is shown. With this main page, you can select the application you want to run:

The two buttons on the top-right section have the following meaning:



Alerts button: blinks when there is a pending alarm that has to be managed

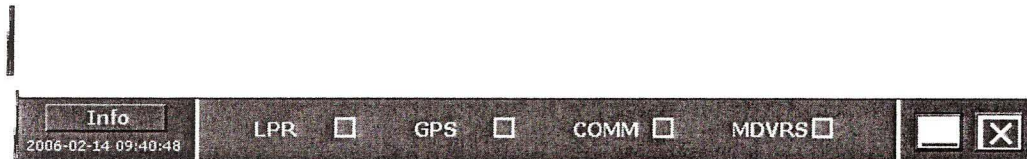


HAZARD button: This is currently disabled. When the wireless communications option is installed, this will send an alert message to the central dispatch center when pressed.



Diagnostic Section

Minimize Button Diagnostic Area Info Button



Date/hour Close Button

Fig. 1.1 - Section C – Diagnostic

In the lower part of the application there is a status display of the devices mounted on the car and managed by the MPH 900 **Car System**.

The diagnostic is not exhaustive and doesn't show all the functioning states of a device but shows three basic states to assist the operator in identifying problems. The three indicator states are:

- the device is working correctly and communicating with the PC (green),
- the device is connected but there are some anomalies (yellow). This can also indicate that the component is still starting or waiting for communication.
- the device is not connected or is not communicating (red).

Other controls and Information

The minimize button  can reduce the application as an icon on the. When the user wants to use the program, he can restore the application by pressing the icon on the taskbar or selecting it with the Alt + Tab keystroke.

The close button  closes the Graphic User Interface.

The Info button  in the left bottom opens a dialogue window that shows information about the version of the software installed on the Car System.

The time in the lower left is taken from the PC clock and is also sent to the LPR processor for use in identifying the precise, synchronized time of transit² and alarm activity.

² A Transit is a plate read event that does not turn out to be an alarm. When the system reads a plate and displays the green arrow indicating the active camera, we refer to this as a transit. An alarm is a plate read that matches the Hot List and brings up the alarm text and the red arrow/bar indicating the side of the vehicle on which the alarm plate was detected.



Hot List Download

A prerequisite for the MPH900 Alarm Mode function is the availability of a list of wanted License Plates or Hot List. Without a correctly loaded Hot List, the system can only work in Data Collection Mode, that is, just reads and stores every plate that crosses the cameras field of view.

The MPH900 uses a very simple format for Hot List entry. Records consist of an 8-character plate number, a 2-character state and a note or comment field that can be 100 characters long. The note field is displayed to the operator on an alarm and can be unique to the record. Please refer to the Remington Elsas Data Conversion Summary for a detailed description of the formats and data fields the system uses.

Once a properly formatted hot list is prepared and placed in a .txt file, copy the file to the MDT.

Check to see that the BLUE HCO icon appears in the lower right corner, or that it appears as a window³.

Copy the File and paste it into C:\Hot List on the MDT connected to the MPH900 Processor.

The HCO icon should turn yellow for a moment indicating that the data is being converted. When the icon turns blue again, the .txt file in the C:\Hot List directory is deleted.

A copy of the Hot List is saved in the C:\HL_backup folder.

When the processor unit is connected, the data should be transferred and the HCO icon will become blue again and the "Traffic Light" window below will appear. If the traffic light does not appear, check the log by clicking on the HCO icon. Also, check that the Processor unit is on and connected properly and that the Car System is running and on the License Plate Recognition Screen (ready to read plates) with the LPR icon green.

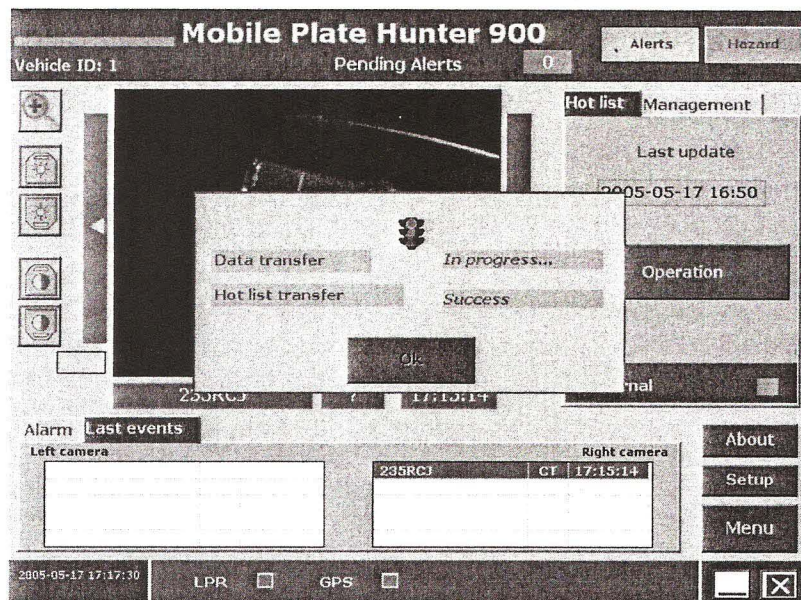
Clicking on either the HCO icon in the system tray will display the active log file and show the number of records processed.

Note that the processor does not have to be connected for these steps to work normally. The conversion and copy can be done in one location and connected to the processor

³ If it does not appear at start-up, make sure that it is in the C:\Converter as HLConverter.exe and that shortcut to it appears in C:\Documents and Settings\[User Name] or All Users\StartMenu\Programs\Startup. If one Icon is already yellow, check to see that there is nothing in C:\Converter\HL_UPLOAD_PATH, HL_INTERMEDIATE_FORMAT, and HL_SOURCEPATH are empty.



later. The MDT will store the pending update until connection.



When the Traffic light turns green, the operator presses OK and the Hot List is loaded. It is a good idea to perform a Search for a few plates in the Operation area to assure that the list is correctly formatted and loaded before the start of a tour.



Applications

In the following the *Car System* License Plate Recognition application is described:

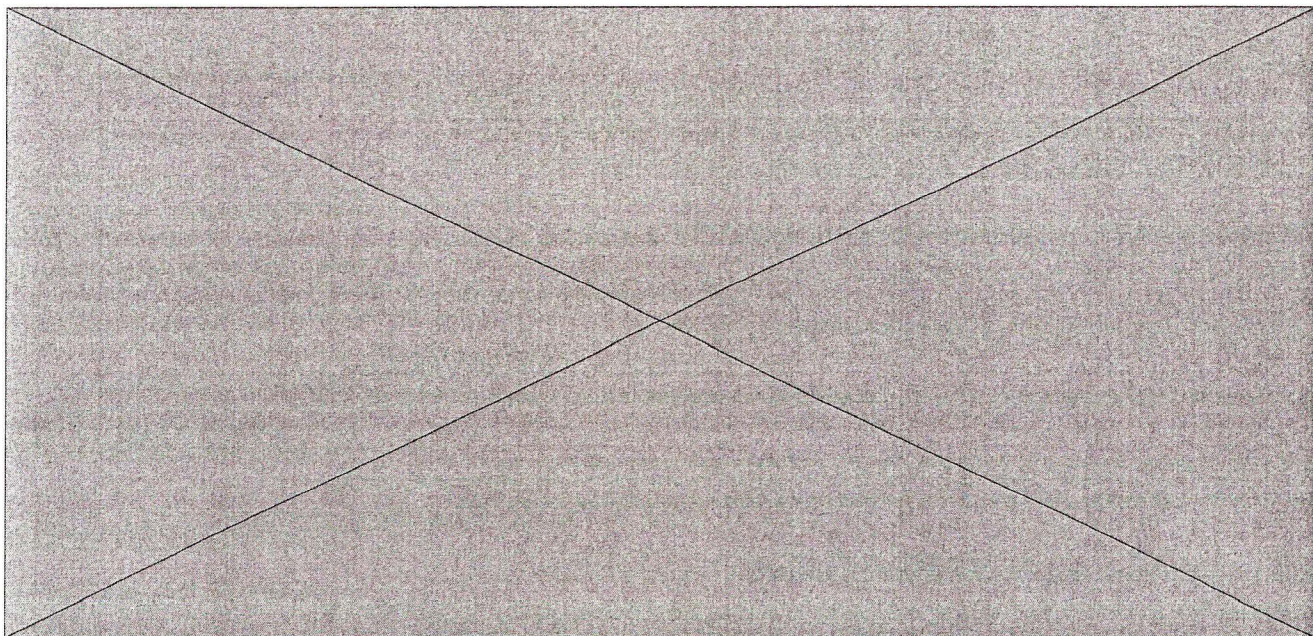
The LPR application monitors the activity of the LPR Processor connected to the PC or Laptop. It gives the user a view of the plates being read and of the status of the processor. The interface also provides the operator with important Hot List and alarm management functions.

The LPR "Processor" is the system connected to the camera head(s). The processor is responsible for managing the images and plate numbers being sent by the cameras and matching them against the Hot List. The processor is capable of functioning without the MDT for periods of time during which stores plates images and alarms until it connects with the Car System again. When the cameras are active, they are **each** capable of capturing up to 450 images per minute.

The GPS Localization area is intended to allow the operator to monitor and manage GPS data being received from an NMEA compatible GPS receiver attached to a USB or Serial Com port.



LPR – License Plate Reader – main window





The main LPR Screen provides a number of different controls and indicators described below. Note that the tools are only active during an alarm.

Tools Panel



Zoom

With this tool you can enlarge the image



Brightness

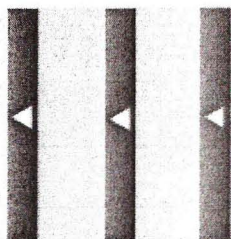
With these tools you can set the brightness of the image



Contrast

With these tools you can set the contrast of the image

Lateral Bars



These bars appear on the side of the image and can have three different colors

Blue: the *camera live* is enabled

Red: there is an alarm on the vehicle side indicated.

Green: there is a normal read of a plate number on the side indicated

AH061GN

?

16.07.45

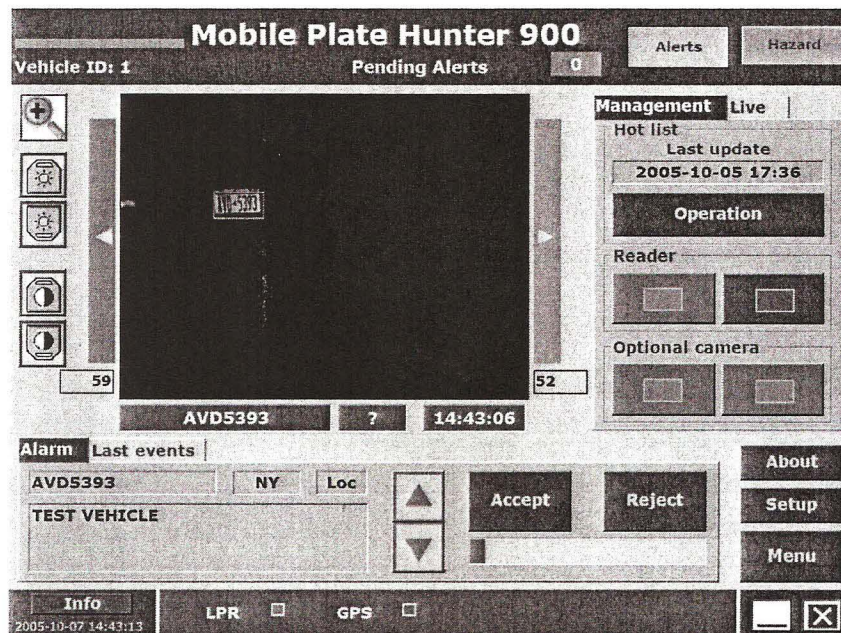
This area shows the Plate Number, the State, as in the Hot List, and the timestamp



LPR-Alarm Management

When the MPH900 detects a License Plate, which is in the hot list, an audible and visual alarm shows the presence and location of the alarm. This alarm can be accepted by the operator by pressing the **Accept** button, whenever the actual plate matches the Hot List information, including the State. Otherwise, the operator can reject by pressing the **Reject** button. Rejected alarms are still stored, but are marked differently for after-action reporting. Typical reasons for rejecting an alarm are state mismatch and bad plate read. The Reject could be also used to avoid duplicated alarm entries, in cases when the same alarm is hit more than once.

The Operator can zoom and adjust the image to view details.



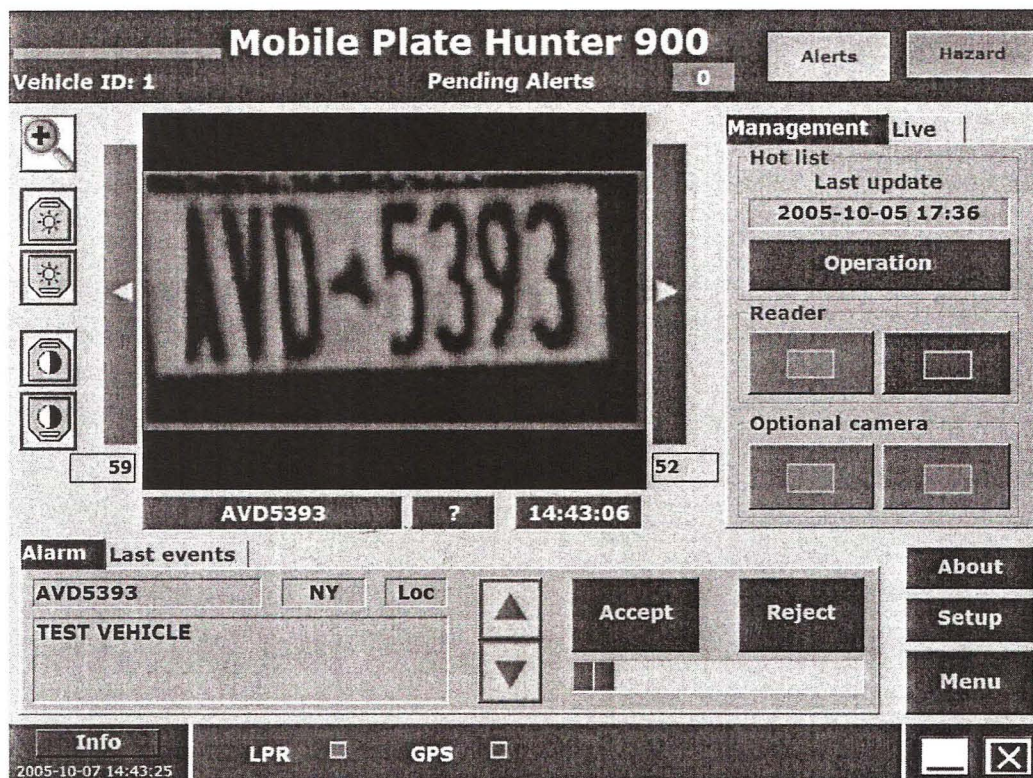
Note that the Tools Panel above is only active in Alarm management Mode. That is, you can only zoom and adjust Alarm images.

The message from the Hot List is displayed in the Alarm note box. This note is created when the Hot List extract is performed and can be general ("STOLEN VEHICLE!") or specific ("Warrant for registered Owner - John Public, 6'0" White male, ...") based on the information available.

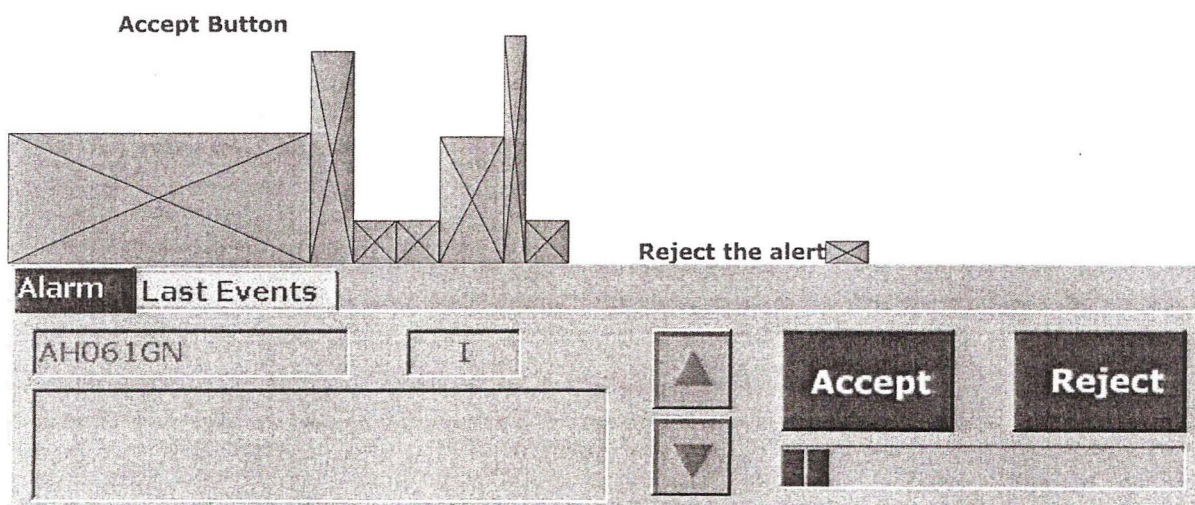
The State displayed during an alarm represents the State that applies to that alarm/plate record. In the example above, the plate in the database is a NY plate, but the system did not determine State. The operator presses **Accept** acknowledging that the record matches the NY plate in the image



As mentioned earlier, when an alarm is active, the zoom and image enhancement icons become active, allowing the operator to verify the plate and manipulate the image to gather information about the target vehicle.



The **Alarm** Panel shows the details of the detected plate string:





State Plate String

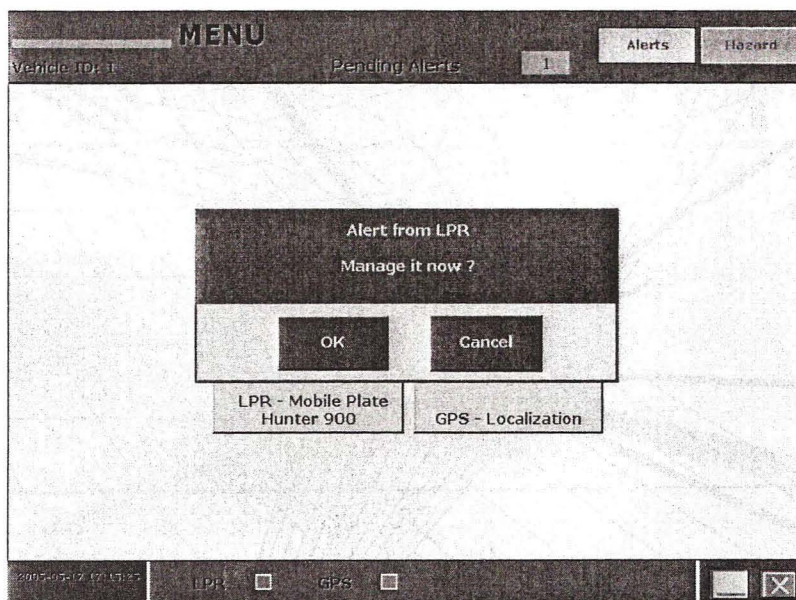
Alarm Timer Note field

The Acceptance Timer allows the user to identify a valid alarm or to reject an alarm for reasons such as state mismatch or incorrect plate reading. The accepted and rejected alarms are both stored, but marked appropriately for after-action reporting. If the operator fails to respond within the default Acceptance Period, the system times out and saves the alarm for processing at the operations center.

The "Loc" in the upper left of the alarm area (to the right of CT in the figure above) indicates that this alarm was generated by a match to a record that was added to the Hot List Locally, through the Operations Interface. "Ext" in this area indicates that the alarm is based on a record that was added as a Hot List load from an external source, that is, a batch file dropped in the c:\Hotlist folder or a wireless load.

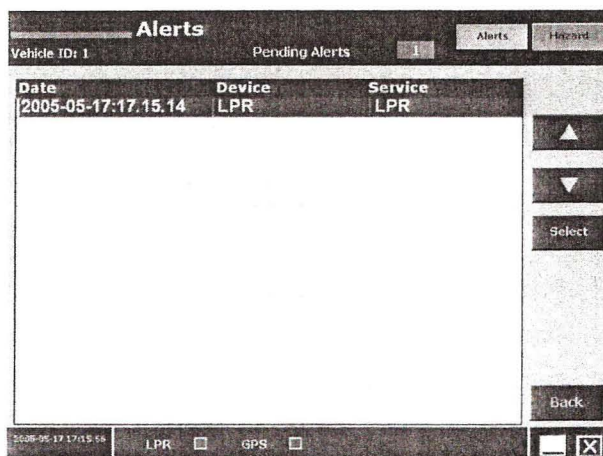


If an Alarm goes off while the LPR main window is closed, for example, while you are viewing GPS status or running another program, a dialog box appears.



If you select OK, you return to the main LPR window and you can Accept or Reject the alarms. If you select **Cancel** you remain in the current window and the alarm management is postponed. The Pending Alerts counter is incremented as shown above.

If the operator wants to manage a pending alarms it is also possible to press the **Alerts** pushbutton. The following window is displayed.



By selecting the alarm row, it is possible to open the LPR main window and manage the pending alarm.



LPR – Last Events Panel

This list displays the last 5 plates read by each camera along with the time stamp of each. Alarms are listed in Red rows. The window is not updated during alarm management although plates are still read and compared to the Hot List as indicated by the "Transit Beep". The plates being read during that period are still compared to the Hot List and will generate queued alarms if a match is found.

Mobile Plate Hunter 900

Vehicle ID: 1 Pending Alerts 0

Alerts Hazard

Management Live

Hot list
Last update
2005-10-05 17:36

Operation

Reader

Optional camera

33 34

BER3322 ? 14:28:45

Alarm Last events

Left camera	Optional camera	Right camera
BER3322 ? 14:28:35		BER3322 ? 14:28:45
DFD7528 ? 14:28:20		AJR8417 ? 14:28:29
CTR1689 ? 14:28:11		DFD7528 ? 14:28:29
CLX9901 ? 14:28:10		LE[00]NJUD ? 14:28:21
DCP7709 ? 14:28:10		BBA9917 ? 14:28:14

Info 2005-10-07 14:28:54 LPR GPS

About Setup Menu

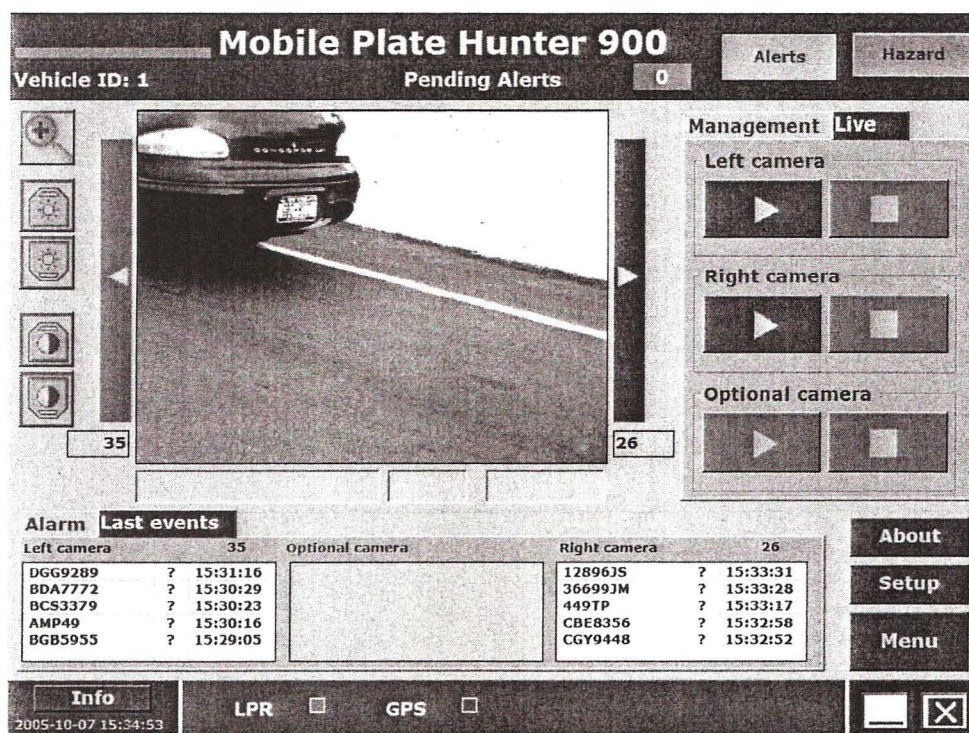
Warning: If you close the LPR window and return to the Main menu, the last reads table resets and begins to count again as new plates are read.



LPR - Camera Management

The “Management” tab on the upper right of the interface, brings the user to the Camera Management area. This allows the operator to temporarily switch a camera to “live” mode. This is useful when aligning cameras and checking for obstructions. Only one camera can be “live” at a time.

When a camera is set to Live, active recognition and hot list checking STOP on both cameras until the stop button is pressed, returning the camera to active plate reading mode.





LPR – Other controls

The About button on the LPR menu brings up information about the version of the software and configuration, or local plate syntax files in use. Information about changing the syntax files is contained in the System Administration and Trouble Shooting Guide.

GUI version	02.02.00
Service version	02.03.00
LPR software version	02.43.00
LPR configuration version	02.43.00
LPR configuration code	HM9.3004.990.00

Close

Setup

The Setup button allows the user to turn off the “Beep” sound that occurs with every read. While this beep can be useful while the driver learns to maximize plate collection, some experienced users prefer to turn it off. The target frame box control is currently disabled.

Transit beep	☒
Target frame	☒

OK



LPR – Operations - Hot List Operation

This area allows the operator to manage the Hot List and check a plate against the list manually.

When the **Operation** button is pressed, the screen below is shown. The following pushbuttons are available:

- **Search** - Search for a Plate in the Hot List
- **Insert** - Insert a Plate into the Hot List
- **Delete** - Delete a Plate number from the Hot List
- **Delete Local Hot List⁴** - Delete the temporary **Hot List**, made up of plates manually inserted by the Operator
- **Close** - Close the window and returns back to the LPR window.

Mobile Plate Hunter 900

Vehicle ID: 1 Pending Alerts 0 Alerts Hazard

Hot list Hot list results Reports Report results

Plate [] State ? - ALL COUNTRIES [] [] [] Search

Note [] Insert Delete

1	2	3	4	5	6	7	8	9	0
Q	W	E	R	T	Y	U	I	O	P
A	S	D	F	G	H	J	K	L	↕
Z	X	C	V	B	N	M	↶	↷	↸
Caps						#@...		Canc	
Info			LPR ☐			GPS ☐			Close

2006-02-08 15:47:47

The Temporary Hot List is composed by all the plates inserted from the Car System interface through the Insert button. The External Hot List is the one downloaded at the beginning of the mission. The External Hot List can't be deleted from the Car System

⁴ The Temporary Hot List is the set of plates entered manually since the last batch update. An Operator may choose to delete the Temporary Hot List at the end of a shift, thereby removing the plates that were of interest to that investigator.



user interface.

Retroactive alarms.

Whenever a new plate is inserted into the current Temporary Hot List an optional query on all the past read database shall be carried out. A Dialog Box shall ask for confirmation to the Operator. In case of positive match a table with all the previous reads of the new wanted plates is presented.

Mobile Plate Hunter 900

Vehicle ID: 1 Pending Alerts 0 Alerts Hazard

Hot list Hot list results Reports Report results

Match found 215

Date	Plate	State	Reader
2006-03-01 16:48:51	YGR2671	?	M-01
2006-03-01 16:48:43	YGR2671	?	M-01
2006-03-01 16:48:35	YGR2671	?	M-01
2006-03-01 16:48:27	YGR2671	?	M-01
2006-03-01 16:48:19	YGR2671	?	M-01
2006-03-01 16:48:11	YGR2671	?	M-01
2006-03-01 16:48:03	YGR2671	?	M-01
2006-03-01 16:47:55	YGR2671	?	M-01
2006-03-01 16:47:47	YGR2671	?	M-01
2006-03-01 16:47:39	YGR2671	?	M-01
2006-03-01 16:47:31	YGR2671	?	M-01
2006-03-01 16:47:23	YGR2671	?	M-01
2006-03-01 16:47:15	YGR2671	?	M-01
2006-03-01 16:47:07	YGR2671	?	M-01
2006-03-01 16:46:59	YGR2671	?	M-01
2006-03-01 16:46:51	YGR2671	?	M-01
2006-03-01 16:46:43	YGR2671	?	M-01
2006-03-01 16:46:35	YGR2671	?	M-01

Lat 0 Long 0

Note

Export Close

Info 2006-03-01 18:53:35 LPR ☐ GPS ☐

The above Figure shows the result of the query subsequent to the insertion of the YGR2671 plate. The entire set of previous reads is shown as a table that can be browsed by means of the arrow buttons.

Each record shows the Date and time of the read, the plate string, the State and the camera identifier (see also 3.7). On the right the actual image associated to the selected record is displayed together with the GPS coordinates, if available.



LPR – Operations – Reports and queries

The OPERATIONS button on the main page opens up the Hot List management functions and the on-board reporting.

The reporting functions are the following:

- **Shift report:** the report contains the total reads, alarms and rejected alarms of the current day; Data are presented as a table, each row containing the total numbers of reads and alarms for each one-hour time interval of the day, from 00 to 11 PM. The last row refers to 23.00 – 00.00.
- **General report:** The report contains the total daily reads and alarms for every previous operations day. This is a multi-page table where each row corresponds to a day. The total number of recorded days is an installation parameter and can be set according to the user needs.

All the previous reads and alarms are stored in the system. The user interface provides means to query and retrieve data and images.

The reporting and query operations can be utilized even if the MDT/laptop is not connected to the MPHTM900 processor.

Shift definition. A Shift coincides with a solar day from 00.00 to 23:59:59

Statistics definition. Each statistic record shall include:

- 1) **Reads.** Any actual plate read, including alarms.
- 2) **Alarms.** Accepted (confirmed by the user) alarms + Time-out alarms (neither confirmed nor rejected)
- 3) **Rejected alarms.** Rejected (false or repeated) alarms by means of the Reject button on the user interface



Shift Report

The following Figure shows an example of a Shift Report, relative to March, the 1st 2006. Every row represent an hour time interval. For example, between 15 and 16 we had 2185 reads, including 2 accepted alarms.

Mobile Plate Hunter 900				Alerts	Hazard
Vehicle ID: 1		Pending Alerts		0	
Hour	Reads	Alarms	Rejected alarms	2006-03-01	
00 - 01	2629	0	0		
01 - 02	2692	0	0		
02 - 03	2781	0	0		
03 - 04	3066	0	0		
04 - 05	3214	0	0		
05 - 06	3357	0	0		
06 - 07	3592	0	0		
07 - 08	3873	0	0		
08 - 09	3029	0	0		
09 - 10	16	0	0		
10 - 11	1225	0	0		
11 - 12	2442	0	0		
12 - 13	3609	0	0		
13 - 14	1745	0	0		
14 - 15	2464	0	0		
15 - 16	2185	2	0		
16 - 17	2102	0	0		
17 - 18	0	0	0		
18 - 19	0	0	0		
19 - 20	0	0	0		
20 - 21	0	0	0		
21 - 22	0	0	0		
22 - 23	0	0	0		
23 - 00	0	0	0		

Info
2006-03-01 18:48:12

LPR



GPS



Export

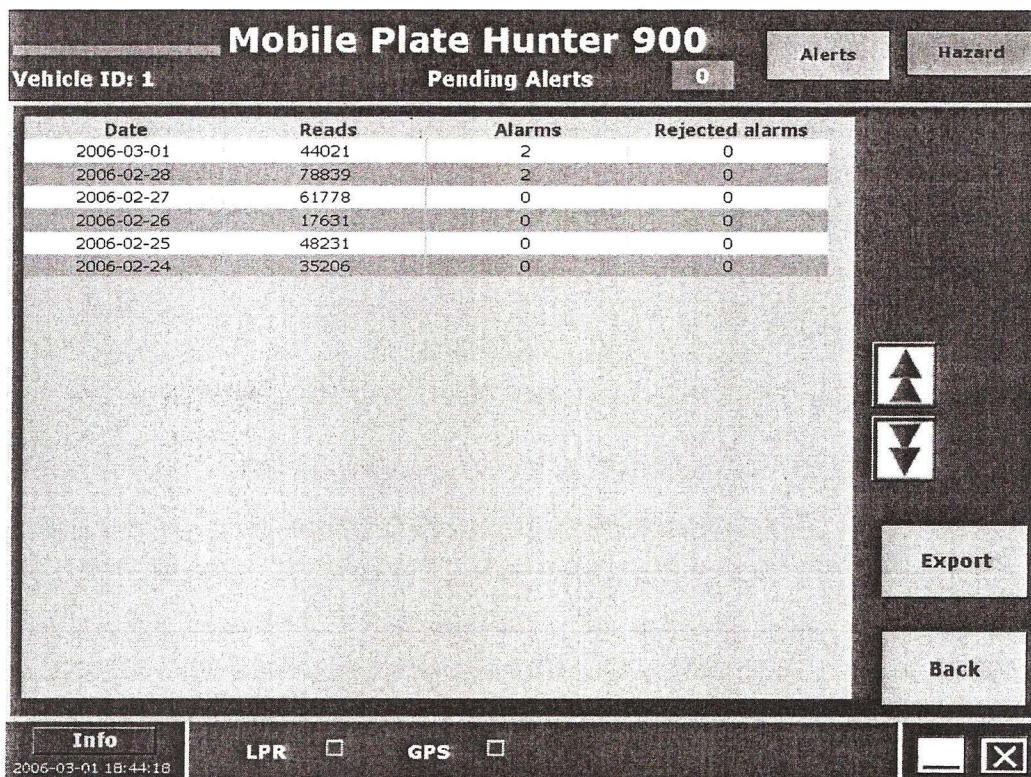
Back



General Report

The following Figure shows an example of a General Report.

The system maximum storage time is set to 5 days plus the current one. The first column reports each day total number of reads.



Queries.

It is possible to query the database of reads/alarms. The search input fields shall be:

- 1) Reads, alarms, rejected alarms (default = alarms)
- 2) State (default = All States)
- 3) Plates
- 4) Date Range (default = today). The Year default is the current year. A button allows changing it to the last Year.
- 5) Time Range (default = last hour)

MPH900
Mobile Plate Hunter 900 Series

Mobile Plate Hunter 900

Vehicle ID: 1 Pending Alerts 0 Alerts Hazard

Hot list	Hot list results	Reports	Report results	
Start	08 02 2006	15		Alarms
	Day Month Year	Hour		Rejected alarms
End	08 02 2006	16		Reads
Plate		State	? - ALL COUNTRIES	Search

1	2	3	4	5	6	January	February	2005	Data download
7	8	9	10	11	12	March	April	2006	
13	14	15	16	17	18	May	June		
19	20	21	22	23	24	July	August		
25	26	27	28	29	30	September	October		
31						November	December		

Info 2006-02-08 15:49:19 LPR ☐ GPS ☐

General report Shift report Close

It is possible to input the search values by using the special context-sensitive touchscreen-enabled virtual keyboard. The keyboard is divided into three sections:

- Days
- Months
- Years

As soon as the focus is on one of the input fields, the correspondent keyboard is activated. For example, if you click (or touch) the "Day" field, the 31-day keys are activated. If the focus is on the "Hour" fields, a 24-keys "hours" keyboard shows up, replacing the 32 "Day" keys.

The search field values are kept after the end of the query as the starting point for the next query. The search values returns to the default values when the Search window is closed.

Search for partial plates.

It is possible to perform wildcard searches to find out plates compatible with partial information. . The wildcard characters are:

- % corresponds to * (every substring of any length)
- _ means any single character
- [ab] means either a or b



Examples:

XYZ% search for every plate starting with XYZ of any length.

X_Z search for plates of length 3 with any character in the middle position

X[WY]Z search for either XWZ or XYZ

Mobile Plate Hunter 900

Vehicle ID: 1 Pending Alerts 0 Alerts Hazard

Hot list Hot list results Reports Report results

Match found 4008

Date	Plate	State	Reader
2006-02-24 17:28:49	96[00]AG	?	M-00
2006-02-24 17:28:49	396[00]AGK	?	M-01
2006-02-24 17:28:47	5JYM517	?	M-01
2006-02-24 17:28:47	5JYM517	?	M-00
2006-02-24 17:28:45	HJJKLMN	?	M-00
2006-02-24 17:28:45	HJJKLMN	?	M-01
2006-02-24 17:28:44	396[00]AG	?	M-01
2006-02-24 17:28:44	396[00]AG	?	M-00
2006-02-24 17:28:42	5JYM517	?	M-00
2006-02-24 17:28:42	5JYM517	?	M-01
2006-02-24 17:28:40	HJJKLMN	?	M-01
2006-02-24 17:28:40	HJJKLMN	?	M-00
2006-02-24 17:28:39	396[00]AG	?	M-00
2006-02-24 17:28:39	396[00]AGK	?	M-01
2006-02-24 17:28:37	5JYM517	?	M-01
2006-02-24 17:28:37	5JYM517	?	M-00
2006-02-24 17:28:35	HJJKLMN	?	M-00
2006-02-24 17:28:35	HJJKLMN	?	M-01

Lat 0 Long 0

Note

Export Close

Info 2006-02-24 17:42:11 LPR GPS

The previous figure shows an example of the Report Results page.

The performed query returned 4008 records. Every record is a row of the scroll-down table on the left pane. The record is made up of the following fields:

- 1) **Date.** Timestamp of the read.
- 2) **Plate.** Read Plate string. The presence of characters in brackets means that there are ambiguities in the string interpretation. 96[00]AG means that the third character may be either a 0 or an O. Usually both the possible strings 960AG and 96OAG are matched against the Hot List.
- 3) **State.** Normally the reader can't determine the State so the field is filled with a '?'. If there is a match in the Hot List (alarm), the State in the Hot List associated to the Plate is placed in the State field.
- 4) **Reader.** That field shows which camera provided the Read.



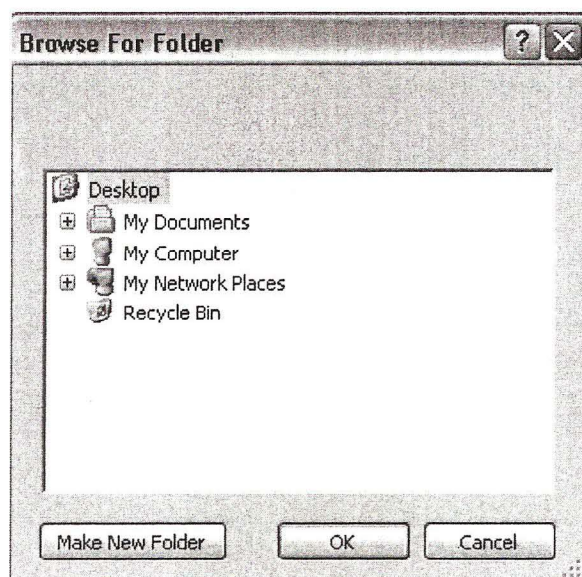
- *M-00* refers to the Right Hand camera
- *M-01* refers to the Left Hand camera
- *M-02* refers to the optional additional center video camera.

The right side of the page shows, for each selected read:

- 1) The image.
- 2) The GPS coordinates
- 3) The Alarm Description as available in the Hot List (alarms only)

Export Function

Every result page contains the EXPORT button, including the Shift Report and general Report pages. The buttons allow saving the result of the queries in a selectable folder. The following dialog box allows the Operator to browse for the desired folder.



The output files have the following naming convention:

Car_<CarId>_GeneralReport_<date><time>.txt is the output of the General Report Export.

Car_<CarId>_ShiftReport_<date><time>.txt is the output of the Shift Report Export.

Car_<CarId>_Query_Reads_<date><time>.txt is the output file for any Search operation on the Read database.

Car_<CarId>_Query_Alarms_<date><time>.txt is the output file for any Search operation on the Read database.

<CarId> is the Car Identifier, that is a 5-characters numeric string from 00001 to 99999.



<date><time> are the date and time of the Export operation.

The output files are Tab delimited text files, easily importable in any commercial Spreadsheet programs.

The Shift and General reports contains basically the same information of the relative tables. The result of any query contains a list of records. Each record is made up of the following fields;

1. Date of the read
2. Time of the read
3. Plate
4. State
5. Note, that is the Hot List description for alarms only
6. Latitude
7. Longitude

The record can also be directly imported on many commercially available mapping programs in order to visualize the read position on a geographical map.

Database Housekeeping.

Data (database records and images) shall automatically be erased after a configurable number of days. The data persistence must be selected during the software installation procedure.

It is possible to reset all statistics on-demand at any time by using a special tool, available in the following folder:

C:\Program Files\Elsag spa\Car System\LtbaData\Reset\Reset_Ltba_data.bat

Double-click on the above batch file and follow instructions.



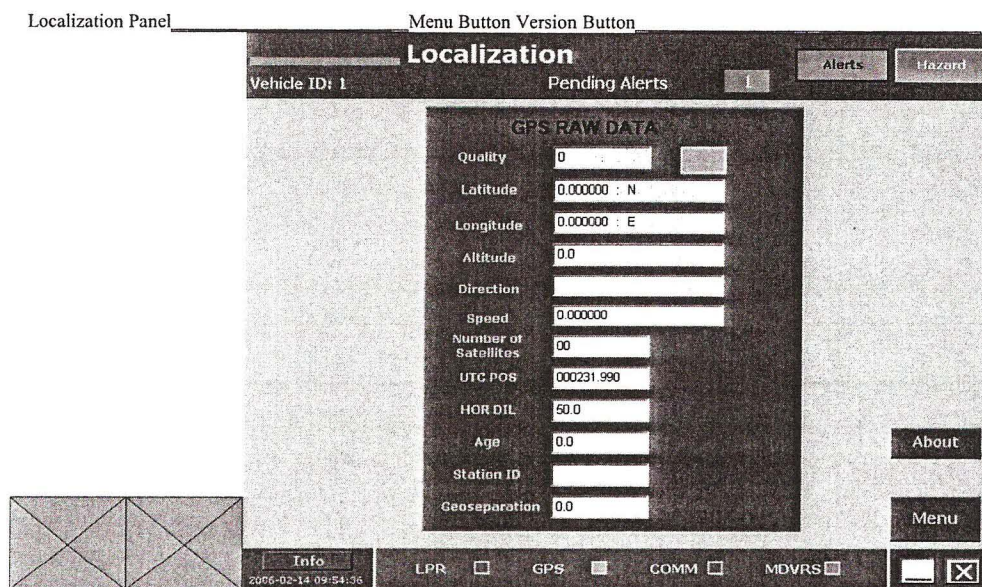
GPS – Localization

The application LOC Localization is developed in order to allow the customer to receive and monitor the localization data in NMEA format coming from a GPS receiver connected to the CAR PC through a USB or serial port.

The LPR system still reads plates and actively compares each to the hot list while the operator is in this mode.

To access to the Localization application, the operator selects the application button from the main window.

Once the application has started, the Graphic User Interface shows the following panel:



The application shows the following GPS information:

- **Quality:** GPS Quality: 0 = not valid, 1= GPS, 2 = DGPS (Differential GPS). On the right of this field is placed a diagnostic lamp that represents the quality the GPS signal (green = good, yellow = no signal, red = the receiver does not work or is not connected). It represents the same information shown in the diagnostic section;
- **Latitude:** Value of the latitude (North – South);
- **Longitude:** Value of the longitude (East – West);
- **Altitude:** gives mean sea level height (with respect to the Geode);



- **Direction:** express vehicle heading direction in degrees;
- **Speed:** in nodes;
- **Number of Satellites:** number of satellites in sight of the GPS sensor;
- **UTC POS:** UTC Hour;
- **HOR DIL:** Dilution Horizontal of Precision;
- **Age:** time in second from last modernization DGPS;
- **ID Station:** Identification of station DGPS (0000 - 1023);
- **Geosep:** Separation from geode.

Diagnostic

The diagnostic related to the localization service, shown in the bottom section of the application, allows the operator to understand if there is any problem about the Localization service and the GPS sensor.

The localization can assume the following status:

-  Grey: the device driver is not sending any information about the status
-  Green: the GPS sensor is working
-  Yellow: the sensor is connected but it isn't receiving information from enough satellites in order to give accurate information
-  Red: the device is not connected or is not working (check the communication Port)

Other controls

The **Version** button on the Localization application shows a message box with the information about the release of the software.

The **Menu** button closes the application and returns back to the main window.