



## User's Guide

### **RavTrack PC**

### **Real-time GPS Tracking Software**

**PC Compatible Version 3.2.7**

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## Documentation and Conventions

Section1

### General

This manual uses the following conventions to present information:

Convention (TypeFace)	Description
<b><i>bold italic</i></b>	Menu commands and button names
<b><i>bold italic sans serif</i></b>	Web GUI page links
<code>terminal</code>	Computer display text
<b>bold terminal</b>	User-entered text
<i>Italic</i>	Italic type indicates the titles.

Icon	Description
	Requests that you pay particular attention to a specified procedure or piece of information in the text. The NOTE message has a regular type style.
	Information shown here describes a difference between the Limited version of the program and the Full version of the program. .
	<b>CAUTION Icon: Suggest you review the referenced details and heed the instructions offered. The CAUTION message has a bold type style.</b>
	<b><i>WARNING Icon: Demands that you observe the actions given in the text. The WARNING message has a bold italic type style.</i></b>
	COMPASS Icon: Points the user to additional information concerning the topic under discussion. The COMPASS message has a regular type style.



## Overview of Major Capabilities

## Section2

### General

**RavTrack™ PC** by Raveon is a PC software application for displaying, tracking, alarming, and logging the activity of RavTrack Transponders.



This easy-to use PC application graphically shows the location and status of cars, trucks, people, or anything equipped with RavTrack Transponders. The displayed map may be any graphic image, bitmap, or .jpg. ESRI shape files may be imported and overlay on the image.

### RavTrack PC Features:

The features below are what make a RavTrack PC the right choice for real-time tracking:

- 1) **Real-time.** Position and status updates are available as quickly as every second. The installer may configure the system report interval, to whatever update interval he wishes, trading off latency of reporting for power-consumption and number-of-assists tracked.
- 2) **Simple.** A single PC is all that is required. No server, no Internet, no cellular carrier is needed. The map on the display may be any graphics image.  
One-click on an icon, and the user can see complete vehicle status including location, distance, heading, speed, I/O status, temperature, voltage, and radio signal strength.
- 3) **Geo Fencing.** Geo-fences are virtual boundaries you can draw on the map, and then create rules to trigger an alert when tracked object are in,

out, or speeding in the fence. They can also be used to create reports, specifying the geo-fenced area to include on the report.

- 4) **Custom Alerts.** The program may be configured to alert the operator when certain events occur. Operator alerts, audio alerts, and email notices are triggered by various transponder-specific events such as speeding, proximity to Points of Interest, Geo-fence violations, idling, and digital input status.
- 5) **One-Click Status.** Individual vehicle status, alerts, and rule status is only one click away. Easily identify which vehicles are violating your rules, where they are, and how long the condition has existed. With a couple more clicks, print an easy-to-read report.
- 6) **Database Driven.** The information on all units being tracked is stored in a table within a MS Access database or Microsoft SQL Server database. All movements and events are logged in a separate table. Users may create custom reports using Access, Crystal Reports, or other SQL tools interfacing with the data in real-time.
- 7) **Interactive Replay** *Historical location and status information can be retrieved from the log file, printed on a report, and played-back on the map. Replay includes fast-forward, rewind, pause, and single-stepping.* Replay information includes location, status, speed, heading, voltage, temperature...
- 8) **Google Earth Enabled** RavTrack PC may be configured to send the position and status information from the Tracked Object to the Google Earth program so that a Google Earth will show the location and status of the tracked objects.
- 9) **UHF Licensed Radio Channels.** RavTrack Transponders utilized licensed UHF radio channels. Unlike spread-spectrum system, the operator owns the right to use the channel. And UHF radio channels have 10X or more the communication range of unlicensed spread-spectrum radios.
- 10) **Low Cost Transponders.** The highly integrated M7 GX Transponder has a radio, modem, and GPS in one assembly. The per-unit cost is lower than any other UHF AVL product on the market. It is simple-to-use, so the cost in installation is very low. There is no cost for a wireless carrier or satellite provider.
- 11) **Secure.** All position transmissions are encrypted, so that only radios with the same pass-key code can communicate.  
The RavTrack PC program is also administrator-rights protected, allowing a view-only user mode, and total-control for the administrator.
- 12) **Advanced Features.** Advanced features are configured when the Transponder is installed. The RavTrack Transponders have alarm inputs, and status output pins for specialized applications.  
All RavTrack Transponders have the ability to send time, temperature,



voltage, altitude, I/O status, alarms, satellite signal quality, and radio signal quality in each transmission, so the system operator has enormous visibility on the status and location of his tracked objects.

- 13) **Advanced Reporting.** *RavTrack PC* uses the industry leading *Crystal Reports* to provide powerful and flexible reporting capabilities. Standard reports are included with *RavTrack PC*, and the user may create custom reports using *Crystal Reports* or *Microsoft Access*.
- 14) **Managed Alerts.** The operator may review individual alert conditions, and selectively acknowledge them. An easy-to-use alert list highlights alert conditions, and allows the operator to review, sort, filter, and acknowledge them.
- 15) **Multi-User** *RavTrack PC* may be run on multiple-computers at the same time, sharing the position and status information among the computers. Also, *RavTrack PC* allows individual login user names with pre-configured user-rights.
- 16) **User Groups** Tracked vehicles may be assigned to pre-defined User Groups. You can define the names and features of these groups to suite your system needs, and then reports, displays, and alerts can be applied to certain groups.

## **L/F** *RavTrack PC Versions*

Information shown here describes a difference between the Trial, Limited and the Unlimited license for the *RavTrack PC* program. The software activation key purchased from Raveon determines the level of functionality. The table below outlines the differences between the various versions of the *RavTrack PC*.

Version	Duration operation	Number of comm channels	Multi-user operation	Maximum number of tracked objects	TCP/IP comms	Logging location and status to disk
Trial	30 days	6	Yes	10	Yes	Yes
Limited	unlimited	1	No	Not limited	No	No
Unlimited	unlimited	6	Yes	Not limited	Yes	Yes

The **Trial** license of the *RavTrack PC* is strictly for short-term evaluation of the program to determine its suitability for a particular use. All features of the software are enabled, but only a maximum of 10 things may be tracked. The **Limited** license of *RavTrack PC* is for use on a stand-alone computer that does not share position/tracking information with other computers in its network. Typically the **Limited** version is used for in-vehicle display or simple position visualization. It

does not log to disk, print reports, or receive position reports over a network interface. The **Unlimited** license is suitable for dispatch, control centers, or anywhere that the computer running *RavTrack PC Unlimited* will be sharing its position/status information with other users.

Regardless of the type of license acquired from Raveon, one license may only be used on one PC. Multi-user systems must purchase one license per computer.

### **Legal Notice**

GPS tracking may be illegal in certain states and in certain circumstances. Raveon's tracking devices may not be used to violate the privacy rights of others, or in violation of local, county, state or federal statutes. In no way will Raveon Technologies Corporation, dealers or partners be held responsible for inappropriate use of these products.

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## Installation

## Section 3

### Recommended System requirements

#### **Desktops**

Pentium P4 Dual 2.6GHz processor  
2GB RAM  
5GB free hard disk space  
128MB graphics card (NVidia, Matrox or ATI recommended), UXGA (1600x1200) resolution display  
CD-RW combo drive  
19-inch CRT screens, resolution 1600x1200  
Windows XP Home with SP3, XP Professional with SP3, or any version of Vista  
Microsoft .NET framework 3.5 (Will be automatically installed if it is not on the target PC)

#### **Laptops**

Pentium M 1.7GHz processor  
2GB RAM  
5GB free hard disk  
64MB graphics card (ATI or NVidia recommended), UXGA (1600x1200) resolution  
CD-RW combo drive  
15-inch TFT internal screen plus 19-inch external display  
Windows XP Home or XP Professional with SP3, Windows Vista  
Microsoft .NET framework 3.5 (Will be automatically installed if it is not on the target PC)

#### **Server (Optional)**

If your server will LOG tables with more than 300,000 log entries at a time or your refresh rate in a multi-user environment will be faster than 10 seconds, we recommend you use a business-grade server to hold the LOG and TrackedObject database. Typical minimum requirements are:

Intel® Xeon® E55xx processor or faster  
4GB of RAM  
Server-grade hard-drives  
Supported Databases:  
1. Microsoft Server 2005  
2. Microsoft Server 2005 express (10GB database limit)  
3. Microsoft Server 2008  
4. Microsoft Access

### Program Dependencies



*RavTrack PC* is built using Microsoft's .NET foundation. The computer *RavTrack PC* is installed on must have Microsoft's .NET version 3.5 or higher. If .NET is not on the computer, the *RavTrack PC* install program will initiate a download of it first, before installing *RavTrack PC*.



*RavTrack PC* uses *Crystal Reports 10* to create and view reports. If Crystal Reports is not installed on the PC that *RavTrack PC* is being installed on, the

RavTrack PC install program will download it before beginning the installation of RavTrack PC. It will download the .NET version of Crystal Report for Visual Studio, and no end user-license is required for this version. It is not the full version of Crystal Reports,

### **Upgrade Note**

*RavTrack PC* 3.1 and higher version are not compatible with prior versions of the program. You must do a full install even if upgrading a previous version of RavTrack PC with a version number less than 3.1.

### **Installation Steps**

1. Visit [www.ravtrack.com](http://www.ravtrack.com) and go to the “Downloads” section of the website.
2. Log into the website. If you are a new user, create a user account.
3. Click on the RavTrack PC software program link to download it to your computer.
4. A ZIP file containing an executable program called *RavTrackPC.zip* will download to your computer.
5. Once the download is complete, open the .ZIP file and double-click on the file *RavTrackPC.exe* contained in the .ZIP file.
6. Run the downloaded .exe file, and follow the setup instructions.
7. RavTrack PC is now installed on the computer. Proceed with the first-time setup instructions.
8. If you will be using Microsoft SQL Server 2005 or 2008 as your database, install the SQL Server software first and create a “RavTrack” database, before running RavTrack PC.

### **Microsoft SQL Server Configuration**

By default, *RavTrack PC* uses a built-in Jet database engine which utilized databases in the Microsoft Access format. No additional database software is required, because the Jet database engine is included with RavTrack PC.

If you are going to use a Microsoft SQL Server 2005 or SQL Server 2008 database with *RavTrack PC*, then you will need to prepare the SQL Server first, before running *RavTrack PC*. Microsoft SQL Server requires expertise in database installation and administration.



SQL Server 2005/2008 installation is often very challenging for personnel not trained in Microsoft SQL Server management. Raveon highly recommends that professional IT consultants with proper experience and training setup and configure the SQL Server software.

Perform the following steps to install Microsoft SQL Server:

1. Install Microsoft SQL Server or SQL Server Express. *SQL Server 2005 Express* is available from Microsoft at no charge. It may be downloaded at: <http://www.microsoft.com/Sqlserver/2005/en/us/express.aspx>
2. Use the “*SQL Server Configuration Manager*” software program that is installed with MS SQL Server to configure the server. Be sure to enable the TCP/IP Client Protocol (*SQL Server Configuration Manager > SQL Native Client Configuration > Client Protocols > TCP/IP*).
3. Also download and install the “*Management Studio*” for SQL Server. The Express version may be downloaded at the same website as the SQL Server Express is downloaded from. To run Management Studio as an administrator, right-click on it when you start it, and say “*Run As...*” and then select the administration account to run as.
4. Configure the SQL Server Settings using *Management Studio*
  - a. Set the default transaction time-out to 600 seconds (*Tools> Options> Designers> Transaction Timeout*)
  - b. Add Logins for any user ID that will be using the database. (*Security > Logins* then right-click Logins and select “*New Login...*”) Add your user account and password here.
  - c. Create a database with the name “**RavTrack**”. You do not need to create any tables in the database, as *RavTrack PC* will create them the first time it connects to this database. Set the Server Role for the users to “serveradmin”.
  - d. Add the Logins or users that will use *RavTrack PC* software to the RavTrack database. To add Logins, expand the **RavTrack** database tab, **Security, Users**. Then right-click **Users** to add new users to the database.  
Set the new Login’s Default Database to RavTrack.
  - e. Once the Login has been added to the Databases Security, add the user to the RavTrack database. **Server > Databases > RAVTRACK > Security > Users**. Right-click Users to add the login to the RAVTRACK database.  
Very Important: Set the “**Database Role Membership**” for the Login to db\_datawriter, db\_owner, and db\_datareader.
5. If SQL Server was installed on a Windows XP computer, make sure the “*Simple File Sharing*” is turned off. To do this, open Windows Explorer, select **Tools > Folder Options > View**, and verify the **Use Simple File Sharing** box is not checked.
6. On the computer running SQL Server, make sure the directory services are running so that RavTrack PC workstations can discover the SQL Server. To see if the services are running on the SQL server computer, go to **Start > Control Panel > Administrative tools > Services**. The SQL “*Server Browser service*”, “*SQL Server*”, and “*SQL Server Active Directory Helper*” services should all be started. If they are not running, enable and start them.

### **RavTrack PC First-Time Setup**

Once the *RavTrack PC* software is loaded on the computer, you must configure a number of settings and add your tracked objects to the database.

Begin by running the RavTrack PC application. Select **Start** and then under All Programs, select **Raveon**, and then **RavTrack PC**.

This will start-up the *RavTrack PC* software. The first time the software is run, you will see a pop-up window showing the message:

RavTrack PC Trial Software License. Contact Raveon sales  
to purchase a license to use this product.

Click OK, and let the program begin normally. Once it begins, enter your license information. *RavTrack PC* will run for 30 days with the Evaluation license key that is automatically installed with the product.

### **Entering the License Key**

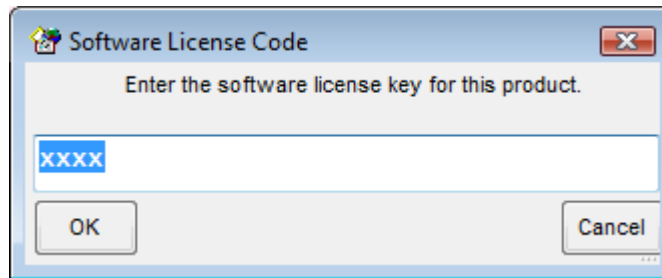
To use *RavTrack PC*, you must purchase a license to each copy you will be using. Contact Raveon sales ([sales@raveontech.com](mailto:sales@raveontech.com)) to purchase a license. Your license key will be emailed to you.

To enter the license key into *RavTrack PC*, start up the software and select **Help > About Ravtrack**.

On the **About RavTrack PC** window, there is a button labeled “**Modify License**”.



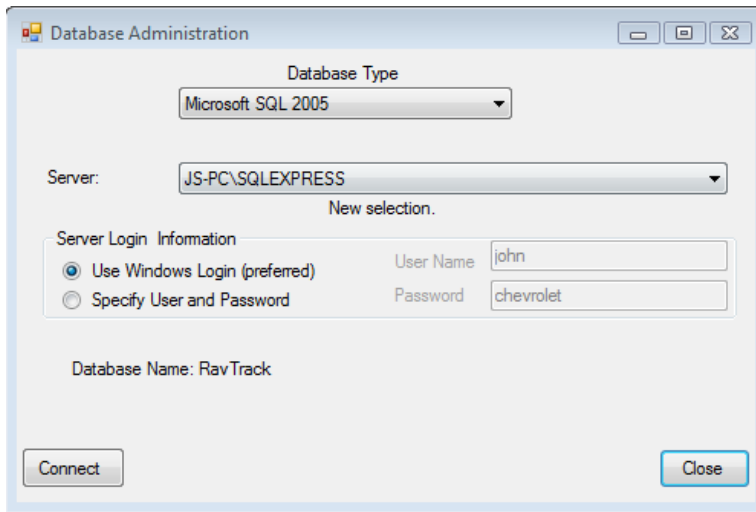
Click on the **Modify License** button. When the pop-up box appears asking for your license key, enter the license key that was emailed to you from Raveon.



Enter your license and press the OK button.

### **Changing to the SQL Server Database**

By default, *RavTrack PC* will run using the built-in Microsoft Access database. To reconfigure *RavTrack PC* to use a Microsoft SQL Server database, select **Tools > Database Administration** from the main RavTrack PC screen.



Set the Database Type to “*Microsoft SQL*”, and choose your server computer from the list of servers in the drop-down list. Then click ***Connect***.

Once *RavTrack PC* successfully connects to the SQL server, click ***Close***. If this is the first time that *RavTrack PC* has connected to the particular SQL database, you will get two warning messages. Click **YES** on both. The two warning messages are:

1. *Warning. Missing TrackedObject table. Do you want to re-create it?*  
Click **Yes** to create you new TrackedObject table in the RavTrack SQL database.
2. *Warning. Missing LOG table. Do you want to re-create it?*  
Click **Yes** to create you new LOG table in the RavTrack SQL database.

At this point, is it suggested you restart *RavTrack PC* by selecting ***File > Exit***. This will save the settings and exit the program. Then restart *RavTrack PC*.

You will need to give each computer user login rights to the SQL Server database before *RavTrac PC* will be able to connect to it. Consult your database administrator about adding the aproprate login accounts and users.

### **Admin User**

Upon installation, the default user is “admin” and the password for this user is “admin” (all lower case letters).

### **Crystal Reports**

On some computers, the *RavTrack PC* installer program has difficulty installing the Crystal Reports 10 for Visual Studio redistribution module. If the report feature of *RavTrack PC* fails due to Crystal Reports not installed, contact Raveon to obtain a Crystal Reports 10 redistribution installation utility to install Crystal Reports.



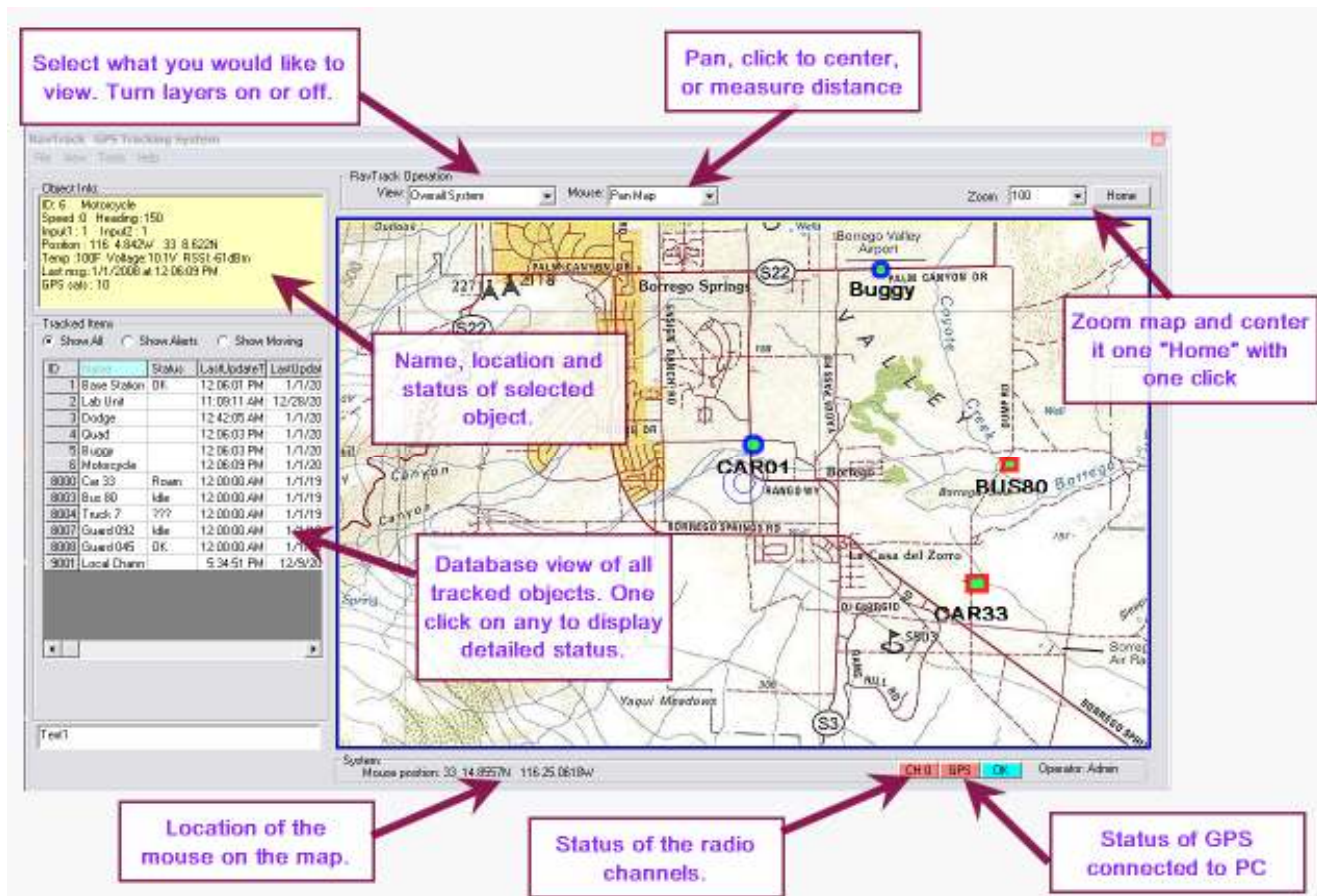
It can be downloaded from Raveon's server at:

[http://ravtrack.com/downloads/CRBasicVS2008\\_redist\\_x86.zip](http://ravtrack.com/downloads/CRBasicVS2008_redist_x86.zip)

If RavTrack PC is not installed on the C:\ drive of the computer, you will need to modify a registry setting for Crystal Reports. Perform these steps on the registry.

- Using *Regedit*, find the registry sub-key that holds the **ConnectionDirectoryPath** in it. This will usually have a value of C:\
- Do not changed the **ConnectionDirectoryPath** value.
- Add a new entry in the same sub-key that holds the **ConnectionDirectoryPath** create a new entry called **ReportDirectoryPath**.
- Set the **ReportDirectoryPath** value to the drive letter where *RavTrack PC* resides. For example, if *RavTrack PC* is on the E: drive, set the value of **ReportDirectoryPath** to **E:\**.

## RavTrack PC Main Screen Overview

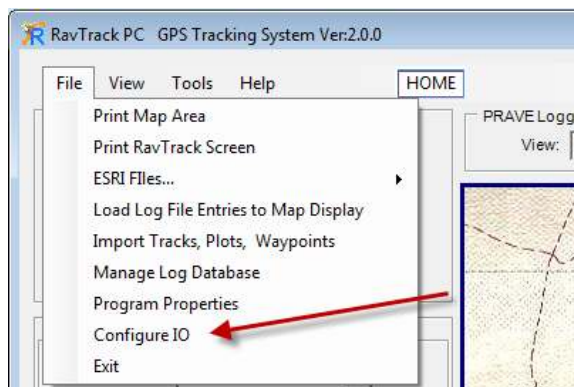


This is the main user-window for the *RavTrack PC* software program. You will note in the lower-right corner are buttons showing the status of the communications from the radio and GPS. When they show red, there is a problem with the radio communications set-up.



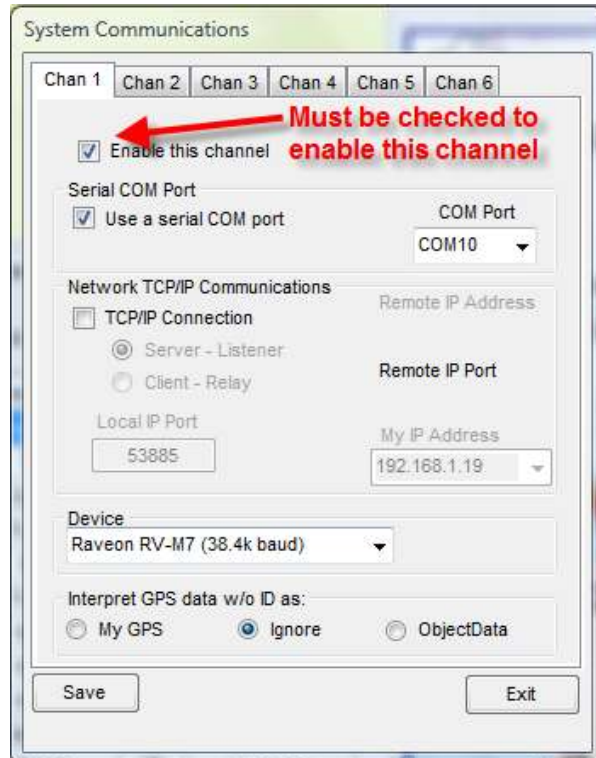
## Configure your Communications settings

From the main screen, select **File** and **Configure IO** as shown below.



This will bring up the configuration tabs for the communication ports. The RavTrack PC program has 6 communication “Channels”. The 6 channels are used to specify up to 6 different serial COM ports or TCP/IP connections on the computer that may be used for communications with a RavTrack radio transceiver.

The Limited version of the RavTrack PC only allows data communications using **Channel 1**. The Full version allows up to 6 simultaneous data ports to be used.



Make sure the “**Enable this channel**” item is checked. If it is unchecked, the software will ignore this channel.

### RS-232 Serial Communications

If you are using an RS232 serial port to communicate with the RV-M7 radio, check the ***Use a serial COM port***, and then select the **COM Port** port number that is connected to the RV-M7 transceiver. Note: In the pull-down list of COM ports, the ports listed are the valid ports that the software has detected on the computer.

Also, ensure that the device selected is the “*Raveon RV-M7*”.

### TCP/IP Communications: Server - Listener

If you are using TCP/IP to communicate with the RV-M7 radio, check the **TCP/IP Connection** and the **Server – Listener** button and then enter the local computer’s **Port Number** that is used to establish the connection. Raveon recommends using network port numbers 53885 – 53890 for the port numbers on the 6 *RavTrack PC* Communication channels.

Be sure to select the **Server – Listener** if you are receiving the position data into the computer via TCP/IP. The other option, **Client – Relay** is used to relay position information out of the computer to another remote server.

In the pull-down menu labeled “**Device Connected to COM port**”, select ***Raveon RV-M7 (38.4K baud)*** This is the device driver for the RV-M7 transceiver.



**Important!** If you are using the TCP/IP, **Server-Listener** feature, you must disable your firewall, or configure the FireWall to pass the Port Number you are using through it. On Windows based server’s, if you are using NAT, you should disable the Basic Firewall or configure a route/pin-hole in it for the port that *RavTrack PC* is using as a Server-Listener.

### TCP/IP Communications: Client - Relay

The **Client – Relay** communication option is available only on the Unlimited version of the software, and is used to relay position reports from one computer to another. To configure a computer running *RavTrack PC* to automatically send all of the position reports it receives via its RS232 serial connection or TCP/IP Server ports to a remote computer, select **Client - Relay**. There are 4 items to configure when setting up the **Client – Relay**.

1. **Local Port number.** Choose any appropriate un-used TCP/IP port number, but Raveon suggests one in the range of 53885-53890.
2. **Remote IP address.** Enter the IP address of the computer you wish to relay the position reports to. Note, the remote computer must be a Server – Listener.
3. **Remote Port number.** Enter the port number that the remote Server is listening on.
4. **My IP Address.** If the computer you are configuring has more than one network interface or IP address in it, select the IP address to use. .

## **Directory Structure on the PC**

When RavTrack PC is installed, a number of directories are created on the computer. They are:

There are data directories for maps, sounds, log files, and data. These directories are all located under one \Ravtrack PC\ sub-directory. The location of this sub-directory will depend upon the version of the operating system used on the computer where *RavTrack PC* is located.

### **On Vista Machines:**

C:\ProgramData\Raveon\RavTrack PC\...

### **On XP Machines:**

, C:\Documents and Settings\All Users\Application Data\Raveon\RavTrack PC\...

**... \RavTrack PC\Data\** This directory will hold all of the data files for the program if the program is configured to use the MS Access database. The database with for the tracked objects, the log file, the system databases are all stored in this directory.

**... \RavTrack PC\Maps\** This directory hold the maps used the the program. RavTrack PC installs with a world-map. Custom maps created by the program's user are stored in this directory.

**... \RavTrack PC\icons\** This directory has various icons that the user may edit and merge into their custom maps.

**... \RavTrack PC\Logfiles\** This directory holds the weekly program operation log file. This is not a database, but a text file describing general program operation, events, and errors. It holds the event logs for RavTrack PC, not the log file for vehicle movements.

**... \RavTrack PC\Reports\** This directory hold the Crystal Report files used by RavTrack PC.

**... \RavTrack PC\Sounds\** This directory holds sound files (.wav) that can be played when an alert is triggered.

If you cannot view the C:\ProgramData\... directory, perform the following steps so this directory is no longer hidden:

### **Windows Vista:**

1. Select Start > Computer.
2. Open the C: drive and locate the ProgramData folder. If you do not see the ProgramData folder, take these additional steps to make it visible:
  - a. Select Organize > Folder And Search Options.
  - b. In the Folder Options window, select the View tab.
  - c. In Advanced Settings, select Show Hidden Files And Folders.
  - d. Click OK to close the Folder Options window.

## **Windows XP Professional and Windows 2000:**

1. If you use Windows XP Professional, temporarily disable simple file sharing (if you use Windows 2000, skip this step and start with Step 2):
  - a. Select Start > My Computer.
  - b. Select Tools > Folder Options.
  - c. In the Folder Options window, select the View tab.
  - d. In the Advanced Settings, deselect Use Simple File Sharing.
  - e. Click OK to close the Folder Options window.

## **System Database**

### **RTsystem.mdb**

The RTsystem.mdb database holds configuration information about the RavTrack system.

It has 3 tables in it:

<i>Fences</i>	The records in this table hold information about the geo-fences that have been established, as well as points of interest and all user-created graphics and shapes on the map.
<i>AlarmRules</i>	As the table name implies, each entry in this table holds an individual alarm/alert rule. Alarm/alert rules specify the conditions that trigger alerts as well as the action to take if an alert is triggered. The rules processor in the RavTrack PC monitors the objects and verifies every position report against these rules, and generates alerts based upon the rules.
<i>RouteData</i>	As the table name implies, each this table holds the waypoints for routes.

## **Microsoft ACCESS Log and TrackedObjects**

If the program is configured to use the Microsoft Access database (default setting), then the Tracked Object database and the activity log are stored in MS ACCESS databases as described in this section.

### **TrackLog.mdb**

The TrackLog.mdb database holds the activity log for the RavTrack system. It has one table in it, the activity log:

<i>Log</i>	Records for each position/status received by the RavTrack PC program. The RavTrack PC program may be configured to store every reception in the log, store only data from moving objects in the log, or store nothing in the log.
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### **TheTrackedObjects.mdb**

The TheTrackedObjects.mdb database holds the ID-specific data for the tracked objects. This is the master database for the system, and is shared by all users. Data such as the unit ID, name, location, and current speed are stored in this database. It has one table in it, called the *ObjectData* table.

*ObjectData* Records for each tracked object. Any object such as a car, bike, truck, that has a GPS radio transponder on it will have an entry in this table, which maintains the current information about the object (location, speed, heading...) as well as a user-friendly name.

*LocationInfo* If reverse geo-coded address information is available, this table will hold the street, city, state, country and zip code of the location of each tracked object.

### Microsoft SQL Server Database

If the program is configured to use the Microsoft SQL Server database, then the activity log is stored in one table, and the tracked object information in a second table. A third table will hold the street-address location information for the tracked objects. All three tables are held in one SQL database called "RavTrack". There may also be numerous backup copies of the LOG table.

*Log* Records for each position/status received by the RavTrack PC program. The RavTrack PC program may be configured to store every reception in the log, store only data from moving objects in the log, or store nothing in the log.

*ObjectData* Records for each tracked object. Any object such as a car, bike, truck, that has a GPS radio transponder on it will have an entry in this table, which maintains the current information about the object (location, speed, heading...) as well as a user-friendly name.

*LocationInfo* If reverse geo-coded address information is available, this table will hold the street, city, state, country and zip code of the location of each tracked object.

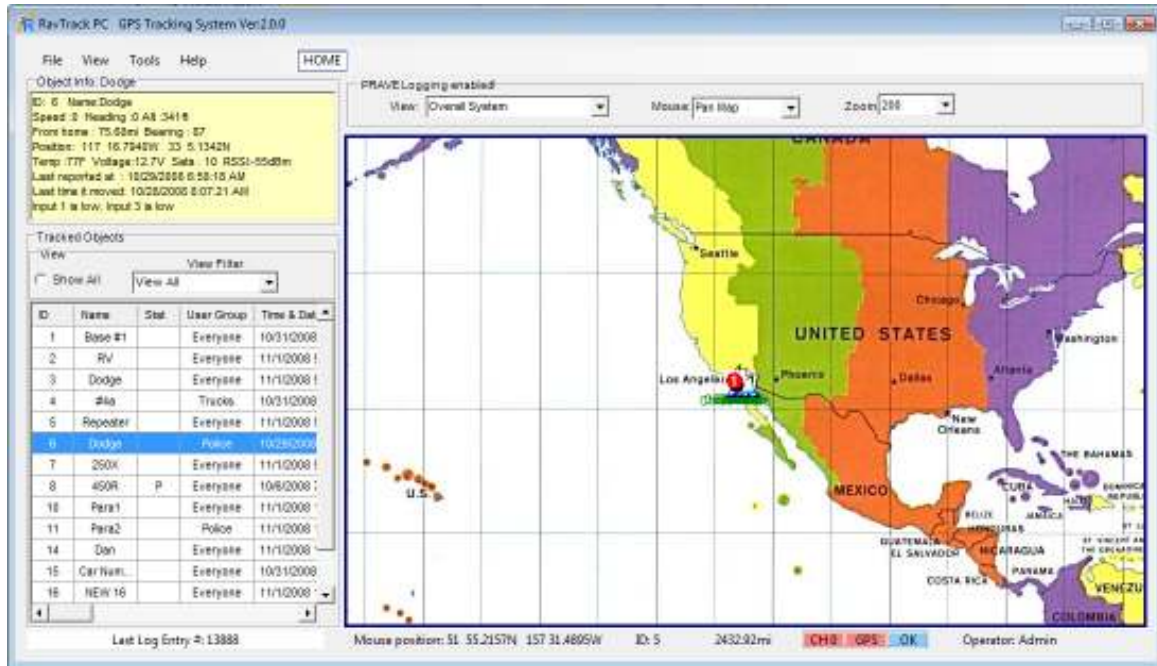
*LOG\_-xxxxx* Backup-copies of the LOG table. The date of the backup is in the table name. For example, the table LOG\_2009\_10\_27 was created October 27, 2009. .



## Main Screen Operation

### Section 4

The main screen for the factory default configuration will look similar to the picture below. RavTrack PC is shipped with a default world-map and 3 entries in the object database. All items that are tracked by the RavTrack PC are referred to as “tracked objects”. Typically these are cars, trucks, people, but to be general, throughout this manual, “Tracked objects” refer the things being tracked.



There are three primary functions of the main screen:

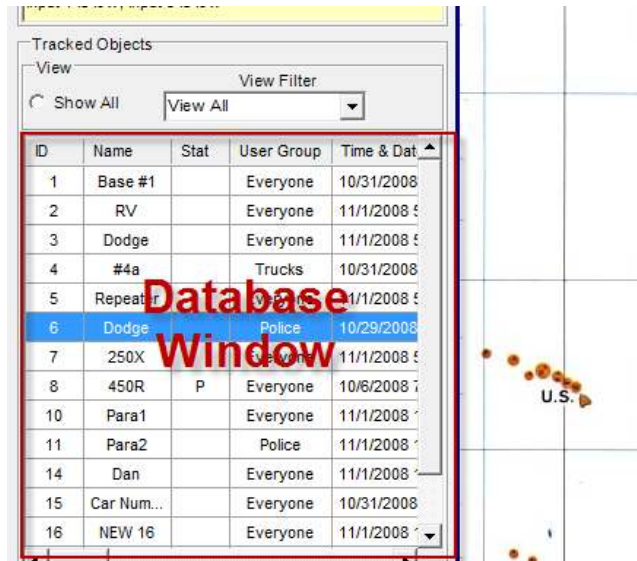
1. Display a map and on it, display the location of the tracked objects.
2. Display status and information for tracked objects.
3. Provide the user with quick-access to vehicle and system status.

The three areas of the main screen (map, database, information) may be resized depending upon what type of information the user wishes to see. This allows the user to customize the main screen to his or her needs.

### Database Window

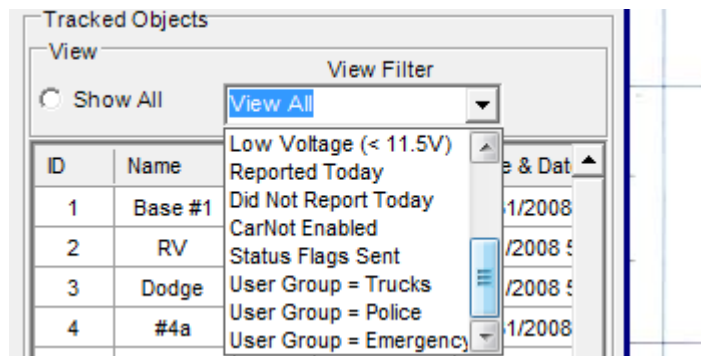
On the left side of the screen is the database window. This window shows the data for each tracked object. It is updated in real-time as new position and status information is received for each Tracked Object.





If the “*Show All*” button above the window is selected, then the window is displaying every object in the *Objectdata* database.

There is a drop-down list above the database window, and the use can select a filtered sub-set of the Tracked Objects to view.



Filters are provided for showing moving objects, stopped objects, speeding, and a host of other conditions.

Right-clicking the mouse on an item listed in the Database Window will bring up a list of shortcuts:

***Center***

To center the map on the tracked object that was clicked on

***Locate***

To draw circles around the tracked object so the operator can easily find it.

***Display on Map***

Enables the selected object to be displayed, if previously it had been configured as “not Displayed”

***Hide on map***

Remove’s the objects Icon from the map.

***Edit***

Pops up the Edit Object Data window for the selected tracked object.

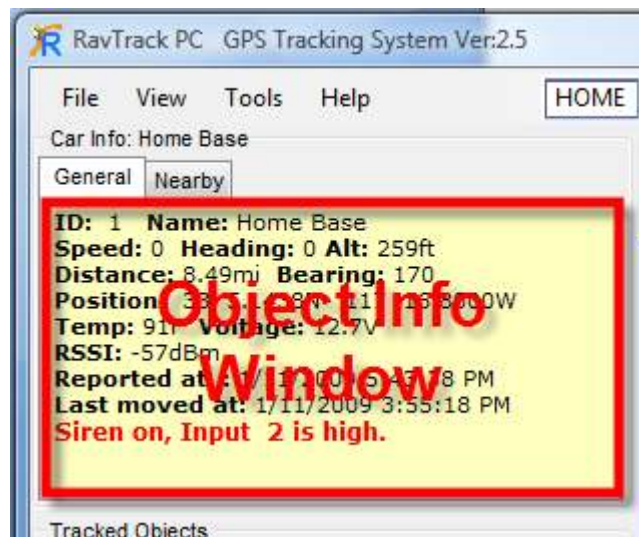
***Delete***

Deletes the object from the database. To select more than one object at a time, hold the shift key down as you click and drag the mouse across the rows you wish to select. This will allow you to delete multiple objects at one time.

You must be an administrator to ***Edit*** or ***Delete*** objects.

**Object Info Window**

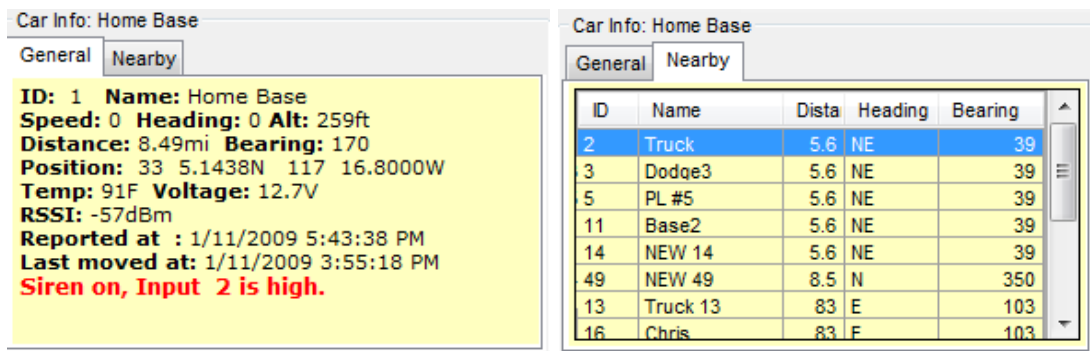
Above the Database window is the “Object Info” window.



The Object Information Window displays status and location information about a selected tracked object. Selecting an object for display its is done by right-clicking on the object in the database window, or right-click on its icon on the map.

This window can also be used to identify geo-fences, track-dots, and points-of-interest on the map by right-clicking on them.

There are two tabs in the Object Info Window. One tab shows the status of the currently selected object, and the other tab shows a list of the vehicles nearby to the selected vehicle as well as the distance and bearing to the other vehicles.






## Map

The map shown on the main-screen may be the stock world map shipped with the RavTrack PC software, or a custom-map. You may create your own custom map by using the built-in map calibration tools, importing a geo-tiff map file, or contact Raveon for assistance with creating a map for your particular application. Virtually, any graphic file may be converted to a RavTrack map file.

Maps are stored in a \Maps sub-directory. All maps used by the RavTrack PC program must be stored in the \Maps sub-directory after they have been calibrated. See the section entitled “**Directory Structure on the PC**” for information on where this directory is on your computer.

The on-screen map has a number of “Layers”. These layers are like transparent sheets stacked up, each having different type of information drawn on them. The operator may turn various layers on or off to help clarify the current location and status of the tracked objects.

 If the center of the screen is not on the map, the user may select **View, Go to map** from the main window. This will center put the map window at the upper-right corner of the map.

Maps are stored in the “.maplib” file format, and multiple maps be stored in one file. When using a .maplib file with more than one map image in it, the user may quickly switch between map images using the drop-down box on top the main *RavTrack PC* screen.



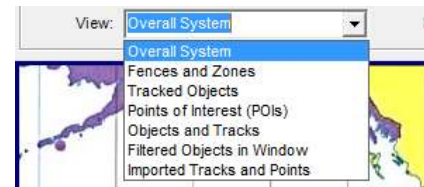
## Layers

The layers can be enabled or disabled, so that the map displays only the desired information. The standard layers with *RavTrack PC* are:

- Object Layer** This is the layer on the map that the icons for all tracked objects are placed.
- Fence Layer** This is the layer that “Geo-Fences” are drawn on. When a shape is drawn on this layer, it is assigned a name, and may be used by the rules processor to check if objects are inside the shape or not.
- Graphics Layer** The user may draw shapes or place icons on this layer to add graphics to the map.

- POI Layer** Points of Interest are named icons that the user may place on the map. The points may be used by the rules processor to generate operator alerts.
- Alarms Layer** When the rules processor detects a rule has been met, it places an icon on this layer to identify the location of the object which triggered the rule alert.
- Filtered Objects** Only objects that are currently listed in the Database Window will appear on the map, and if a filter is applied to the Database Window, then the same filtered objects will be displayed on the map.
- Imported Tracks** Only the track files and waypoints that were imported into RavTrack PC are on this layer. If the option “*Convert to RavTrack POI*” was used when a waypoint is imported, it is not placed on this layer, but instead placed on the POI Layer.

The operator may select various layers to be displayed or hidden by clicking on the **View** drop-down menu. The first selection is **Overall System**, and if selected, displays all layers.



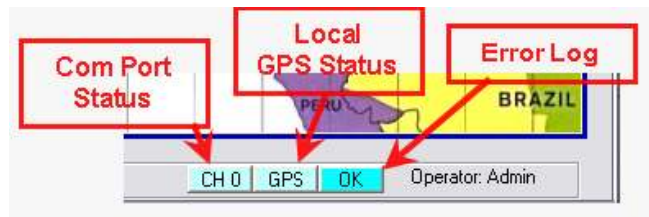
### On Screen Information

*RavTrack PC* is rich with on-screen information to make using it more informative. The user can easily see the geographic position of the mouse, the status of the radio communications, the status of any local GPS receivers, street location of tracked vehicles, and various map display options such as the zoom level and visible layers.


### Communication Status

To assist in monitoring the status of the communication port, or the diagnose problems with communications, a number of status buttons are located in the lower-right corner of the screen.

The color of all three buttons indicate their current status. Blue means that everything is OK, yellow mean possible problem, and red means a serious problem exists.



The **Com Port Status** button is blue when the communications port is working and receiving valid data. It will quickly blink darker blue at the moment it receives a valid position/status message from the connected device. If data stops coming into the port, it will turn yellow, and then later red if it appears all data has stopped coming into the port.

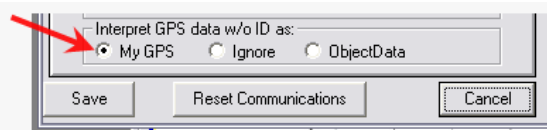
 The operator may double-click on this button to bring up a window that will display the list of communication ports, and their individual status.

The **Local GPS Status** button is blue when valid NMEA position messages are received into any of the 6 communication ports. RavTrack PC can accept standard NMEA \$GPGGA and \$GPGLL messages into any of the 6 Communication Ports. When either of these NMEA messages is received with valid position data, the Local GPS Status button is turned blue. If after a long time, no valid NMEA position message is received, then the **Local GPS Status** button turns yellow, and then later red indicating the local GPS may have failed or lost satellite visibility. The operator may double-click on this button to bring up a window that will display the list of communication ports, and their individual status.



**Note:** For the *RavTrack PC* to obtain a position fix using local GPS, the **My GPS** option in the **Interpret GPS data w/o ID as:** must be selected on

at least one Communications Port in the **Configure IO menu**. When this option is checked, any valid NMEA messages on this port will be interpreted as a local GPS position fix. The local position fix may be used to center the map and/or determine the “Home” location.



The **Error Log** button is blue if there are no system errors, and turns red if there are system errors. Clicking on this button will bring up the error log so that the operator can investigate the cause of the system error.

### Zooming and Home

In the upper right of the main screen is a zoom drop-down menu the operator may use to zoom in or out on the map. The zoom value is in percent.



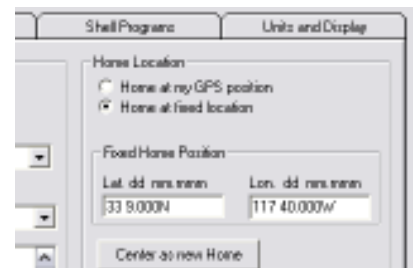
Alternately, the **Page Up** and **Page Down** keys on the keyboard may be pressed, and the map will zoom in/out appropriately.



**Hint:** If the map appears blank, zoom back (10% or smaller) until the map image appears in the map window of the main screen. To find a map if it is off-screen, select **View, Go To Map** from the main screen.

The RavTrack PC keeps track of a “Home” position. *Home* may be used for centering the map or referenced by the rules processor. For example, a rule may be configured to alert the operator if an object is too far from the *Home* position. Or, the RavTrack PC may be configured to automatically keep the map centered on the *Home* position.

*Home* may be either a fixed location, manually entered by the operator, or it may be the current position as reported by a local GPS receiver



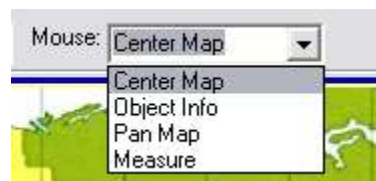
connected to a Communications Port. This may be configured on the ***Program Operation*** tab of the ***Program Properties form*** as shown on the right.

The Raveon RV-M7 series of GPS transponders will output NMEA position messages mimicking the messages from a standard GPS as well as \$PRAVE position/status messages from other transceivers, so that a separate local GPS receiver is often not needed.

### Mouse Operation

The current position of the mouse pointer is shown at the bottom of the screen. The position is shown in the dd mm.mmmm format, where dd is the degrees, and mm.mmmm is the decimal minutes.

The way the mouse interacts with the map may be changed by the operator. The operation of the mouse may be selected in the ***Mouse***: drop-down list on the top of the main window.



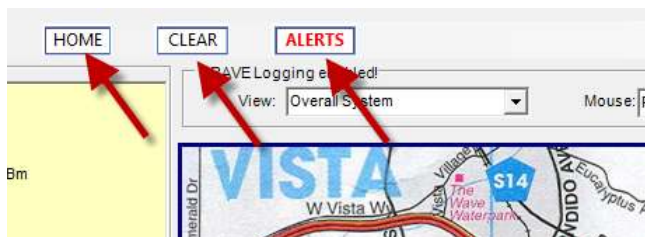
<b><i>Center Map</i></b>	Causes the map to center on any position that the user clicks on.
<b><i>Object info</i></b>	Is used to click on tracked objects, and then display their position/status.
<b><i>Pan Map</i></b>	Is the default mode, and allows the operator to click on the map, and pan its position (as long as “Center on my GPS position” is not enabled)
<b><i>Measure</i></b>	Brings up a distance measuring tool to make calculating distances easier.

If the user right-clicks the mouse on the map, the ID of the closest Tracked Object will be shown on the bottom of the screen, and the distance to it shown to the right of the ID.



### Smart Buttons

There are three smart-button that may appear on the top of the window above the map. They appear when the function they perform is active. The three buttons are: HOME, CLEAR, and ALERTS.



The **HOME** button will cause the map to be centered on the “**HOME**” location. IN the **FILE, PROGRAM PROPERTIES, Program Operation** tab, the user may configure home to be either at a fixed location, or at the position of the local My GPS data.

The **CLEAR** button will appear whenever there are track-dots on the map. RavTrack PC can place up to 10,000 track dot to show “breadcrumb trails” of where the tracked objects have been. Clicking **CLEAR** will erase them from the map. When the number of track dots gets above about 1000, the responsiveness of the map to pan and zooms may slow down, and clearing the track dots will alleviate this.

The **ALERT** button will appear with red lettering when a rule alert occurs. Clicking on the **ALERT** button will bring up a table showing all of the current and past alerts. An example of the table is shown below.

Active Alerts

ID	Time of Alert	Car	Rule Name	Cleared At	Active	Ack	Acknowledged At	Type of Alert
7	11/25/2008 7:10 PM	RavPack	Low Battery Voltage		<input checked="" type="checkbox"/>	<input type="checkbox"/>		DC VOLTAGE
20	11/25/2008 7:11 PM	NEW 20	At Raveon		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	11/25/2008 7:16 PM	GEO FENCE
21	11/25/2008 7:11 PM	NEW 21	At Raveon		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	11/25/2008 7:16 PM	GEO FENCE
30	11/25/2008 7:11 PM	NEW 36	Low Battery Voltage	11/25/2008 7:16 PM	<input type="checkbox"/>	<input type="checkbox"/>		DC VOLTAGE
30	11/25/2008 7:16 PM	NEW 36	Low Battery Voltage		<input checked="" type="checkbox"/>	<input type="checkbox"/>		DC VOLTAGE

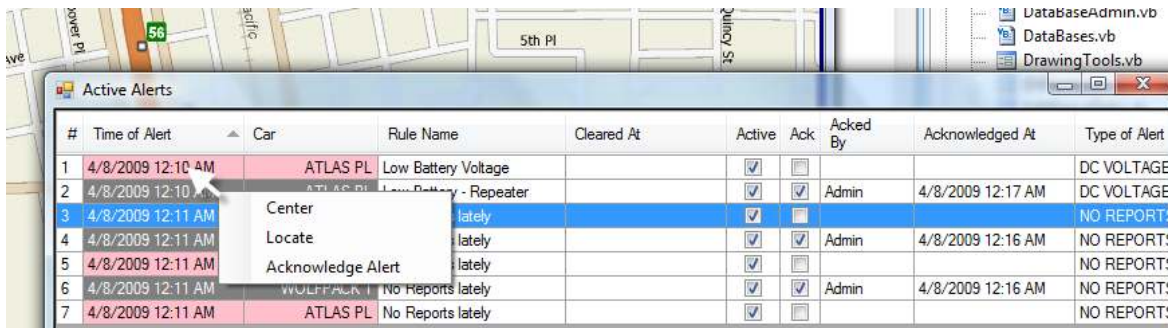
Operator clicked to acknowledge the alert

Remove Cleared Alerts    Acknowledge All    Show alerts for these rules: Show all    Exit

The operator may click on the **Ack** checkbox to signify that the alert is acknowledged. Acknowledged alerts change from red background to grey. Once the alert condition is gone, the row in the table will change to a white background, and the **Active** checkbox will not be checked. The operator may click the **Acknowledge All** button to check all **Ack** checkboxes. The operator may click the **Remove Cleared Alerts** button to remove alerts from the list that are no longer active.



There are three short-cuts available to the operator by right-clicking on a vehicle in the list of alerts. The shortcuts are ***Center***, ***Locate*** and ***Acknowledge***. These shortcuts assist the operator in locating alerting vehicles, and acknowledging them.



### ***Jump To***

Use the quick ***Jump To*** drop down list is on top the main screen to quickly move the map center.



In the drop-down list is each POI defined on the map, and by selecting one of the POIs from the ***Jump To*** drop down, the map will re-center on the selected POI.



## Program Configuration

### Section 5

To configure the various options within the RavTrack PC program, select **File**, and then **Program Properties**. This will bring up a form with 6 tabs.



The operator must be logged in as an Administrator to change the configuration of the RavTrack PC. To log in as an administrator, select **Tools, Login** and enter the administrator password.

The default user name and password is “**admin**” and “**admin**”, all lower-case letters. To change the password, enter the current password in the **Password** text field, check the **Change Password** box, and enter the new password into the required text boxes. Then click **OK**.

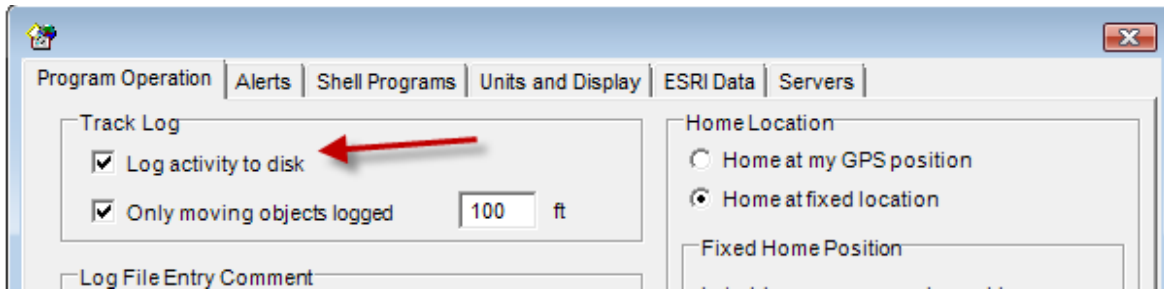


When an user stops and restarts the *RavTrack PC* program, the *RavTrack PC* keeps the user logged in with the same privileges even if the program is stopped

and re-started. This may be disabled in the *Program Properties* window described later.

### System Log Database

On the *Program Operation* tab, the user may enable the Track Log. The Track Log is a database that holds position and status information about the objects that have reported. Select *Log activity to disk* to enable saving position/status reports to the log database file.



On busy systems, the log database may grow quite large, so there is an option to limit the logging of position/status report from object to only those from moving objects. Click on *Only moving objects logged* and enter the distance they must move if only position/status information about moving objects is to be saved to the log.

### Current Map File

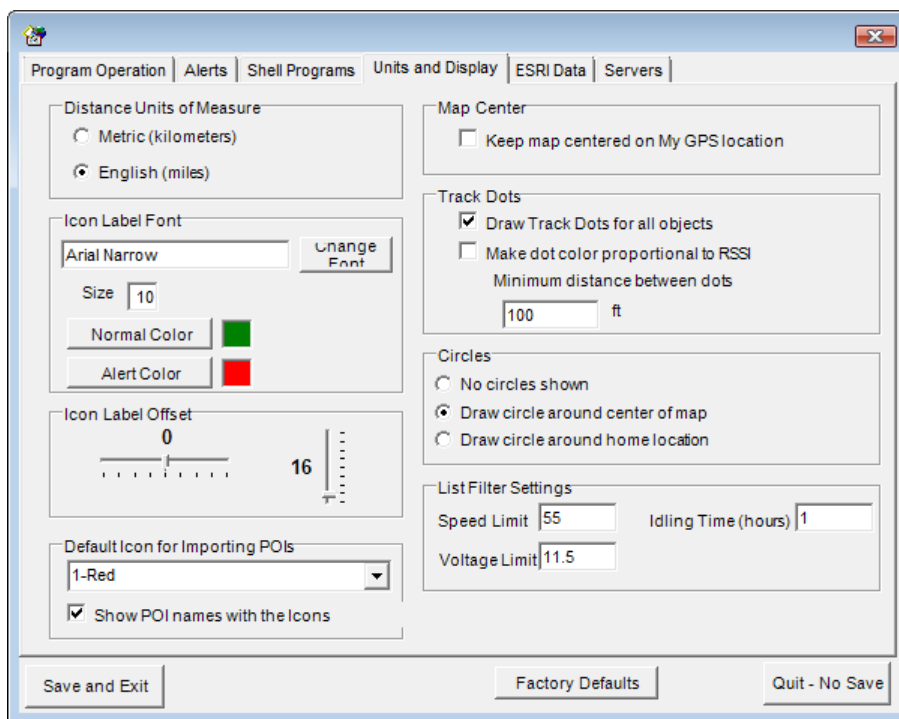
The user may easily switch between maps using the *Current Map File* list. All .maplib type files that are stored in the /maps subdirectory are listed in the file list box.

To change the currently displayed map, select a new .maplib file, and then click *Save and Exit*

### Units and Display Options

The Units and Display tab allow the operator to select how some aspects of the RavTrack PC display information.





### **Metric or English Units**

The program can display speed and distance in either Metric or English format. Log entries in the Log database as well as status entries in the tracked objects database are stored using the selected format.



Use caution when changing the units or measure and later analyzing the data. If the system of measurement was set to one type and then data was stored in the database, when it is changed to another format, the databases still holds the old data in the old units of measure, and thus data recalled from them may be displayed incorrectly. For example, if the program is set to metric, and an object was recorded going 100km/hour, the speed is saved in the LOG table as 100. This simplifies the reporting for anyone using the log file, because the unit of measurement in the log is the same as set in the program. But if the program is later changed to English units and the log file is retrieved, it will show the speed as 100 *miles per hour* for the previous entry.

### **Icon Font**

Use the **Icon Label Font** drop-down list to choose the font and font size when labeling object icons on the map.

### **Circles**

To put a set of circles on the center of the map, select ***Draw Circles around center of map***. TO put them around the HOME location, select ***Draw Circles around home location***.

## Track Dots

Track dots are a powerful way of showing where tracked objects have gone. The RavTrack PC can display up to 10,000 track-dots at one time. If Track Dots are enabled, position/status reports are stored along with a dot when it is placed on the map at the location of the object.

The color of the dot for a particular Tracked Object is configured when the Tracked Object is added to the program.

To make the color of the dot proportional to the radio signal strength, select ***Make Dot color proportional to RSSI***. The dot colors will then correspond to the following signal levels:

• - Violet	0 to -40dBm
• - Light Violet	-40 to -50dBm
• - Dark Blue	-50 to -60dBm
• - Light Blue	-60 to -70dBm
• - Green	-70 to -80dBm
• - Yellow	-80 to -90dBm
• - Orange	-90 to -100dBm
• - Red	-100 to -110dBm
• - Dark Red	-111 and lower

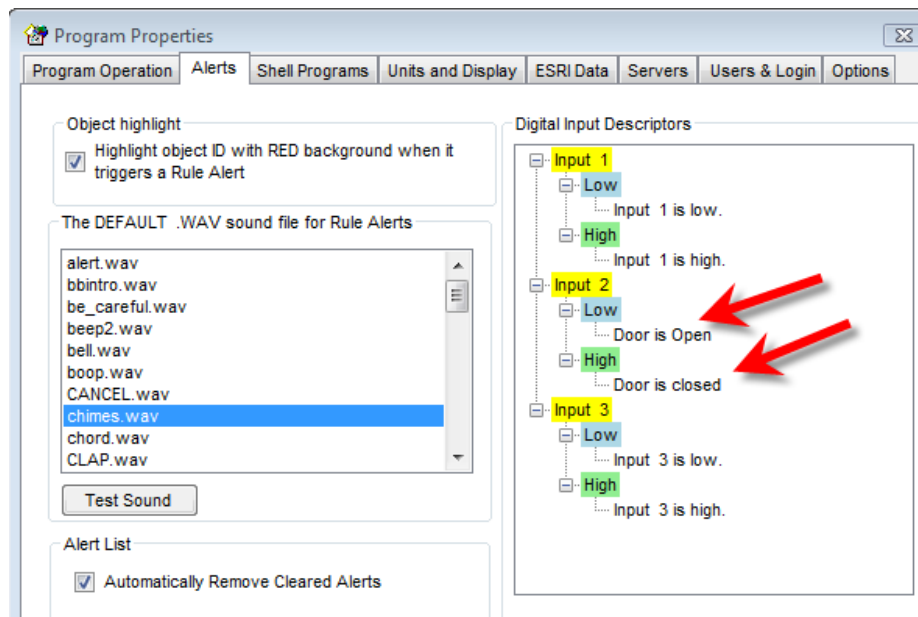
Left click the mouse on any dot on the screen, and the Object Info box will display the ID, Name, and status of the object that cause the dot to be placed.

RavTrack PC has a 10000 dot memory, and once the 10000 dots are placed, the oldest one is re-used for new receptions, and the previous information stored in the dot is erased. This does not affect the TrackLog database file. The log retains all position reports in it, and erasing a dot does not erase the database entry in the TrackLog.

## Naming the Digital Inputs

Most GPS transponders have some digital input capability. To make using the program easier, each digital input may be assigned a name or description. To assign the various inputs a user-friendly name, select ***File > Program Properties*** and then click on the ***Alerts*** tab. On the Alert tab is a list of all of the digital inputs, and the descriptions for each input. Double-click on a description and type in the text to change it.

By default RavTrack PC allows up to three digital inputs. Each input may have a “high” state and a “low” state. The high state is when the input is a positive voltage, and a “low” state is when the input has no voltage on it, or is connected to ground. You may assign descriptions to the high and low states, based upon how your inputs are used. For example, if input number 2 of the transponder is connected to a door-open sensor, you could name the low state “Door is Open” and the high state “Door is Closed”.



Once you have named your inputs, you must enable the use of the input signal for each individual tracked object that uses it. Some tracked objects may not use digital inputs and others may use them. Each individual tracked object may be configured to also monitor certain inputs and others may ignore the digital inputs. This is configured in the individual tracked object's configuration. To enable or disable digital inputs for a particular tracked object, edit the Tracked Object's information by either double-clicking on the tracked object in the database window, or select **Tools > Edit/Add Tracked Objects**. Find the record for the tracked object you wish to configure, and check the **Digital Input Bits Used** input for each input bit that is used on this individual transponder.

NEW 6 NEW 6

User Group  
Everyone

Last Reported Information  
Last reception 12/16/2009 11:08:01 AM  
190730 (UTC)  
Location: Lat: 33.1455  
Lon: -117.2297  
Heading: 222  
Velocity: 1km/h  
Altitude: 171m  
Voltage: 10.3  
Temperature: 34  
RSSI: -80dBm  
Bearing: 161degrees

Digital Input Bits Used  
☐ Input 1  
☒ Input 2  
☐ Input 3

### **Adding and Editing Tracked Objects**

The individual configuration information for each tracked object is stored in a table in the RavTrack database called *TheTrackedObjects*. There is one entry for each ID. The ID is the ID of the transponder. The user may assign a name to this ID, as well as assign the ID to be a member of a group.

From the main menu toolbar, select **Tools > Edit/Add Tracked Objects**. This will bring up the **Edit Object Information** window. An alternate method to bring up this window is to double-click on a particular row in the database window of the main screen.

**Edit Object Information**

ID:  < Prev Next >

NEW 3  *Its Name*

User Group:

☒ Enabled

☒ Displayed on Map

☒ Store reports to the LOG table

☒ Place Track Dots along path

Icon for this object:

☒ Rotate Icon in Direction of Travel

Color of Track Dot:

Last Reported Information

Last reception: 12/26/2009 7:17:14 PM  
31718 (UTC time)

Location: Lat: 33.08575  
Lon: -117.28014

Heading: 0

Velocity: 0km/h

Altitude: 101m

Voltage: 12.4

Temperature: 25

RSSI: -53dBm

Bearing: 35degrees

Digital Input Bits Used

☐ Input 1

☒ Input 2

☒ Input 3

Click on the Prev/Next buttons to scroll through the IDs in the tracked object database.

To assign or change the name of a tracked object, type the name that is associated with the ID in the name box.

The following options may be configured for each individual ID in the tracked object database.

**Enabled.** Check if you want RavTrack PC to display and process this ID.

**Displayed on Map.** Check if you want this ID's icon on the map. Clear the check if you do not.

**Store reports to the LOG table.** Check if you want position/status reports from this ID stored to the LOG table. Note, Logging must be enabled in the Program Configuration for any logging to occur.

**Place Track Dots along path.** Check if you want track dots (snail trail) on the map to show where this tracked object traveled.

**Rotate Icon.** Check if the position of the object's icon on the map should rotate around in the direction of travel. Uncheck if you always want the icon oriented in its default position.

If the ID is to be assigned to a particular group, use the drop-down list to select the group. Assigning it to a group facilitates the displaying of different groups and reporting on tracked objects by group.

Once you configure a particular ID, click the ***Save*** button to store it to the database.

To delete the ID from the database, click ***Delete***. To add a new ID, click on ***Add New***.



## Program Operation

## Section 6

### Special Keys

- F2** = Center map on selected object, and draw circles around it
- F3** = Draw circles around selected object to locate it
- F4** = Center map on the HOME location
- F5** = Toggle range circles on/off
- F6** = Find nearest POI to the currently selected tracked object
- F7** = Find nearest Tracked Object to the currently selected Tracked Object
- F9** = Clear the alert flag for the selected tracked object
- F10** = Pop up a status box for the currently selected Tracked Object
- F12** = Reset measured distance to 0 (when measuring)
- [ctrl] F9** = Clear all alert flags for ALL tracked objects
- ESC** = Close the window
- PageUp** = Zoom in on the map
- PageDown** = Zoom out on the map

### Mouse Operation:

**Right Click** Put mouse over any object on the map, and right click to display information about that object. The information will appear in the Object Info window of the main window.

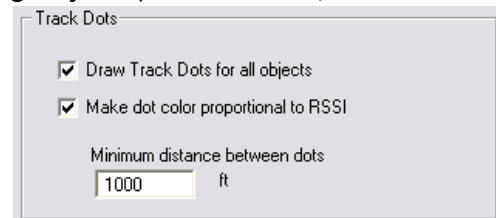


**Left Click** Single left click on an object in the database window to see information on that object. Double click on an object in the database window to bring up a form to view its status and edit its name, dot color, and digital input port descriptors.

### Track Dots

To enable track dots (snail trail of dots behind moving objects), select **File, Program Properties**, from the main window.

On the Units and Display, tab, enable the Draw Track Dots for all objects checkbox. Also check the **Make dot color proportional to RSSI** if you wish the dot color to change with radio signal strength. Note, the Radio Signal Strength (RSSI) displayed by RavTrack PC is the strength received at the radio connected to the computer running RavTrack PC. If a repeater is used in the system, the RSSI



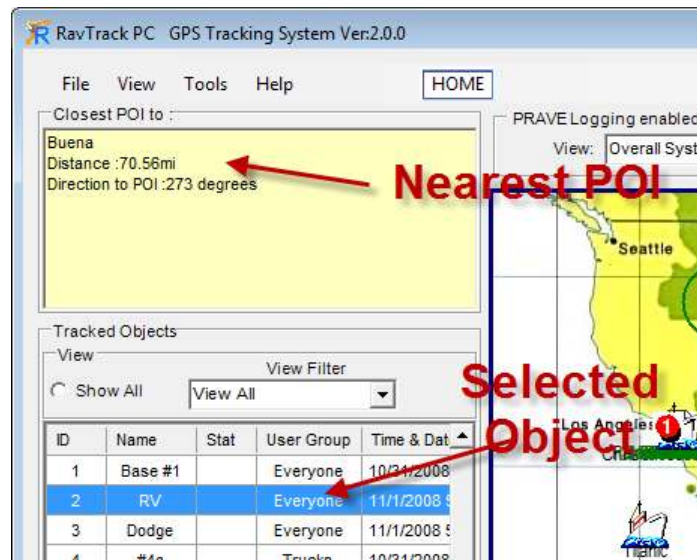
reported will be that of the repeaters signal strength when the tracked object reporting is using the repeater to send messages to the RavTrack PC.

Set the ***Minimum distance between dots*** to any value you would like. There is a limit to the RavTrack PC's track dot memory, so setting the distance between dots to a larger number will allow longer trails.

### **Locating Nearby POIs or Tracked Objects**

Pressing the **F6** key when a tracked object is selected in the Database Window will display the nearest Point Of Interest (POI) to the selected object. POIs are placed on the map by the user to identify specific locations.

Pressing the **F7** key when a tracked object is selected in the Database Window will display the nearest other tracked object to the selected object. This is very useful when trying to locate other nearby vehicles or personnel.



### **Pop-Up Vehicle Information Boxes**

To pop-up Information box for a particular Tracked Object, click on the Object's icon or row in the database window. Then press F10, and a status box will pop up. If an Alert is currently active for the particular Tracked Object, the caption in the Vehicle Information box will be Red. If the vehicle is moving, the background of the ID box will turn light green. If the vehicle breaks the speed limit set in the ***Program Properties***, then the background of the ID box will turn light red.





The user may pop up as many as 20 Information boxes on screen at any one time.



## Creating a Map

### Section 6

All map files used by RavTrack PC will have an extension of “.maplib”. For example, the default map is called worldmap2.maplib. Using the *MapManager.exe* program, the user may import custom maps, images, plans, into RavTrack PC, and have them converted to a .maplib file. The *MapManager* program is a utility by Franson Technology, Inc., and is used to calibrate maps into .maplib files. It is integrated into RavTrack PC, and is accessed from the **Tools** menu.



The first time the Map Calibration Tool is accessed, MapManager.exe will be installed on the PC. Simply follow the dialog box prompts to install it. RavTrack PC executes a program called *GPSToolsXPRunTime.exe* to install *MapManager*.

*MapManager* is used to calibrate a graphic image, turning it into a .maplib file. Graphic files are imported into *MapManger*, calibrated, and then stored as .maplib files. If *geotiff* images are imported, then calibration is not required, because *geotiff* images and maps already have calibration data stored in the file. Graphic images that are imported as maps, such as *jpeg*, *gif*, and *tiff* images, will have to be calibrated before use. Calibration consists of entering three known geographic latitude/longitude points on the image.

Along with the map image, you may also add your own custom icons to the .maplib. Icons are used to show the location of tracked objects on the map, or to designate Points of Interest (POIs) on the map. RavTrack PC comes loaded with many stock icons, but you may also add your own using the **Map Creation Tool**.

### Executing MapManager

In the **Tools** menu, click on **Map Creation Tool** to create a new .maplib map or open an existing map. This will cause RavTrack PC to execute another program called *MapManager.exe*. *MapManager* is the program used to import maps, calibrate them and save them in the .maplib format. When *MapManager* creates a .maplib file, it contains the graphic image or the map, its calibration data, and any additional icons created for use in the specific map.

Import your map graphic or file into the MapManager tool, and follow the calibration instructions. The graphic file to be converted into a map is loaded by selecting **Map, New Map...** from the MapManager main window.

Once this selection is made, a calibration wizard will run, and ask a series of questions to assist with the map calibration.

**Step 1**            Selects the map datum. Select your country/region from the drop down list, and then choose the map datum you will use. In the USA, currently the most common map datum is WGS-84. The datum will be in Longitude/Latitude.

**Step 2,**           Choose the map projection. Most projections are Cartesian.

*Step 3, 4, and 5* Require the user to click on known location on their image, and enter the latitude and longitude of these points. These three calibration points are used to calculate all other points on the map image. It is best to choose these three points on far sides of the map from each other.

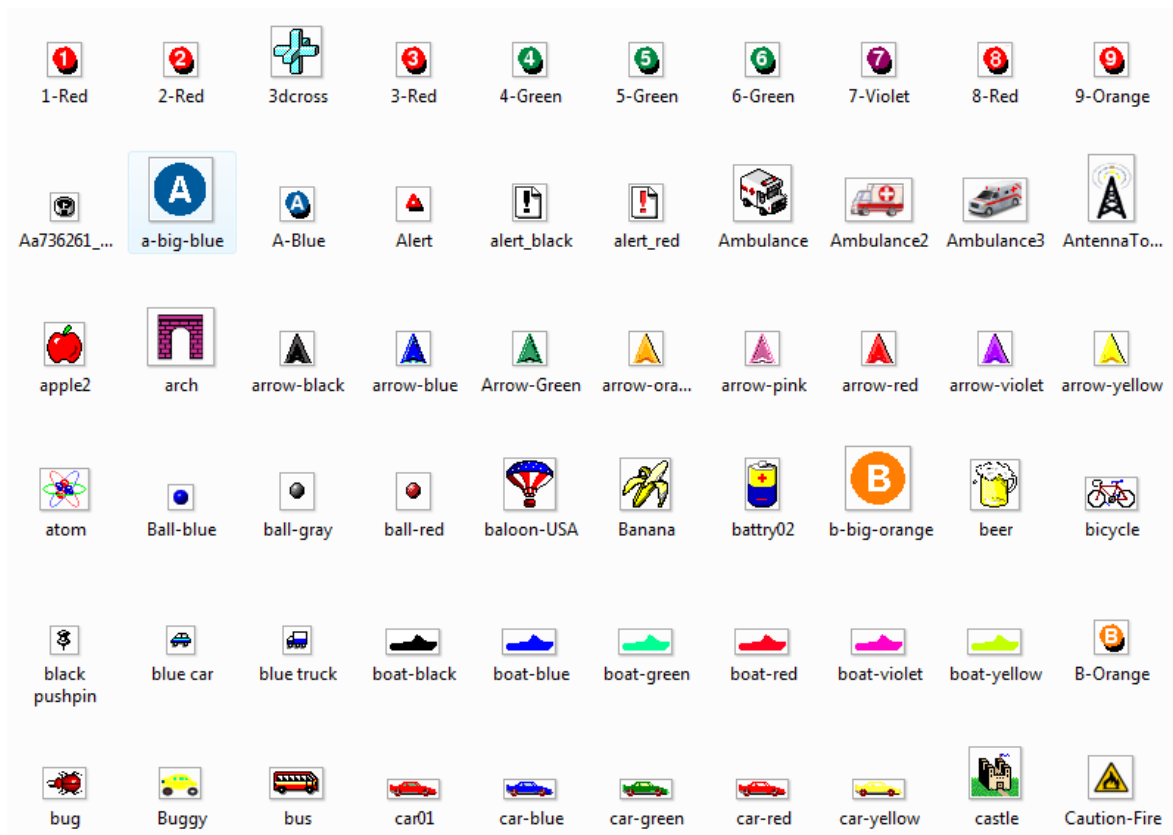
You may also load icons into the .maplib map. Raveon has provided stock icons in the RavTrack PC program, and a large library of additional icon graphics can be found in the /icons subdirectory.

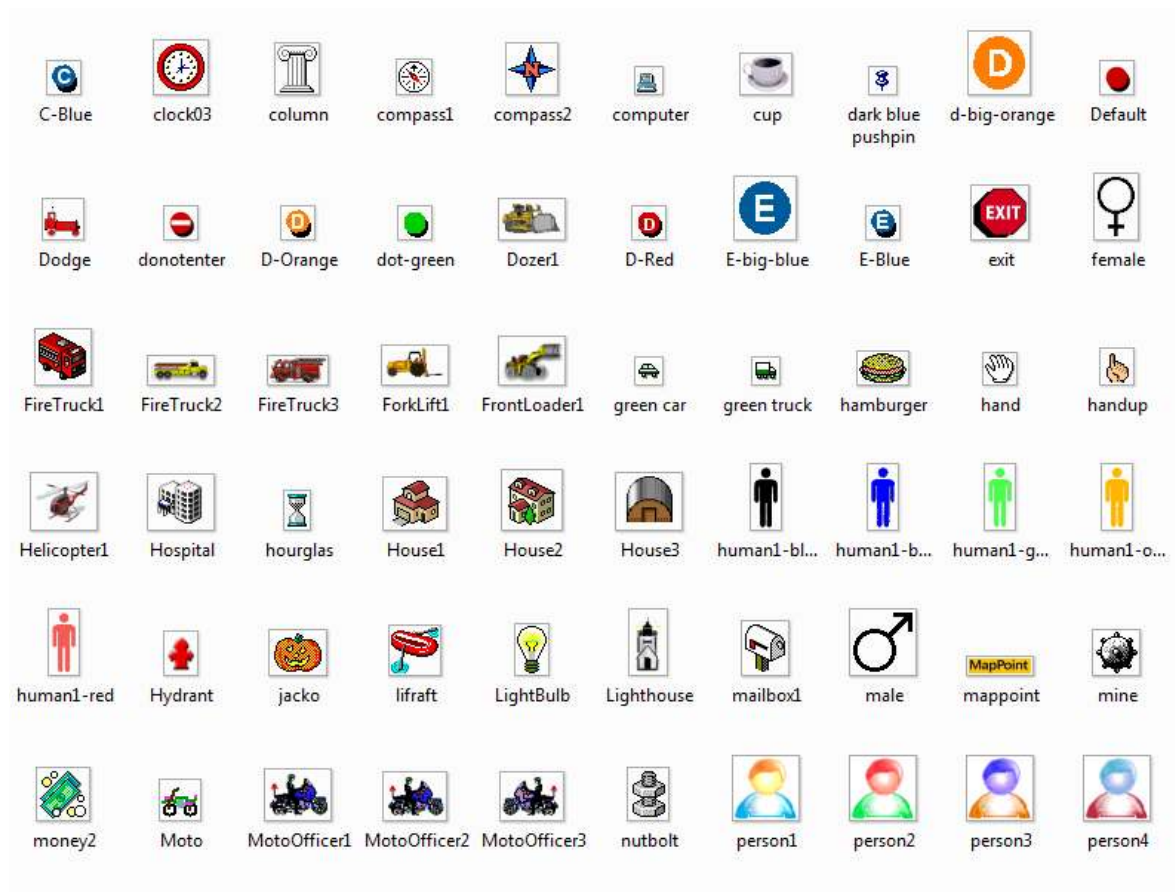
Save your calibrated .maplib file in the /maps subdirectory.

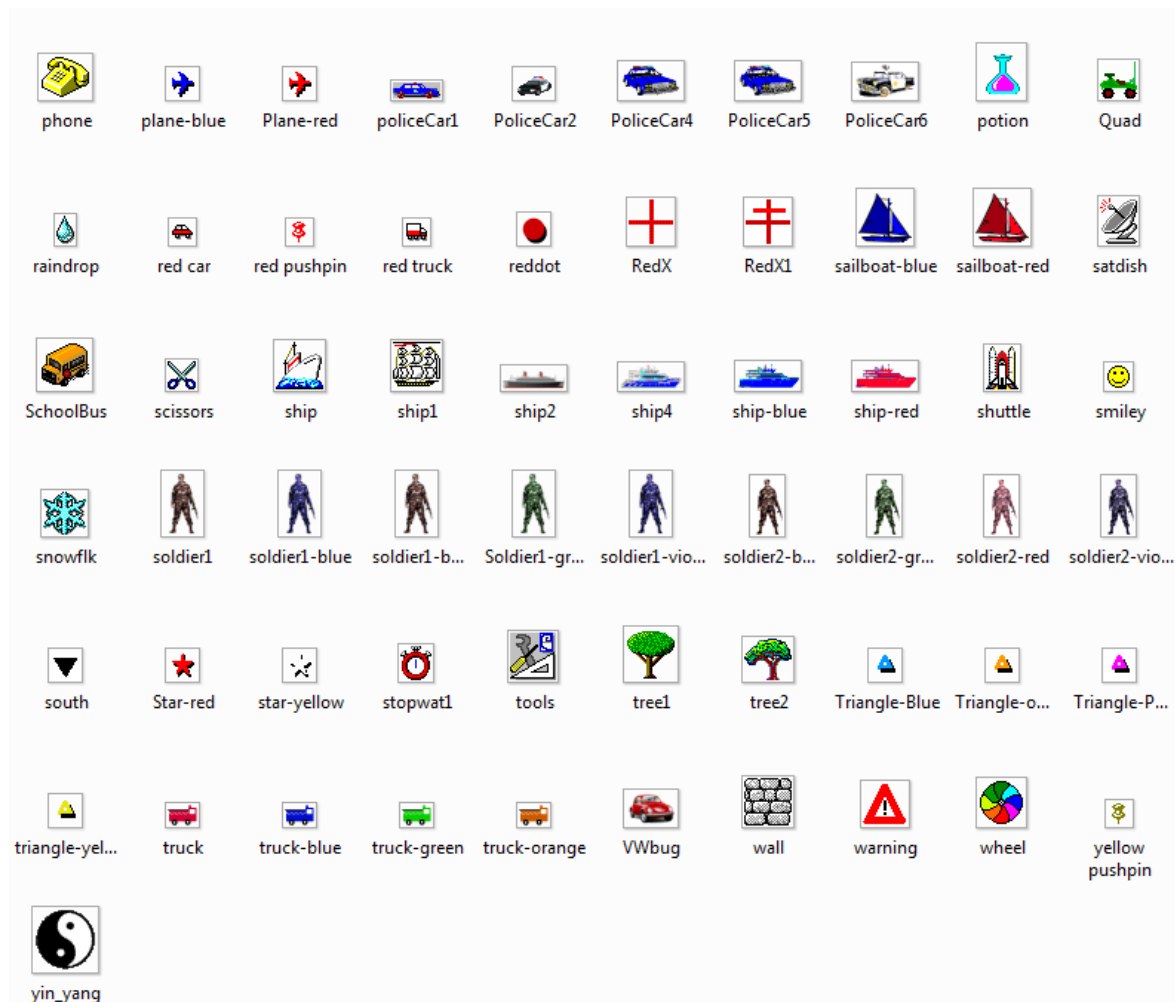
## Icons

Icon images are stored together with the map in a .maplib file. When the user creates a map, they also may load icons into the .maplib file for use with the map.

Supplied with RavTrack PC is a rich set of quality icons stored in the file *StandardIcons.maplib*. This file is merged with the currently selected map whenever the RavTrack PC begins. This merging of files is transparent to the user, and the end result is a larger list of icons to select from in *RavTrack PC*. When an icon is assigned to an object, a drop-down list of available icons is shown, and this list include the icon loaded in the current map's .maplib file along with all the icons from the *StandardIcons.maplib* file. The standard icons included with RavTrack PC always contain at least these icons:





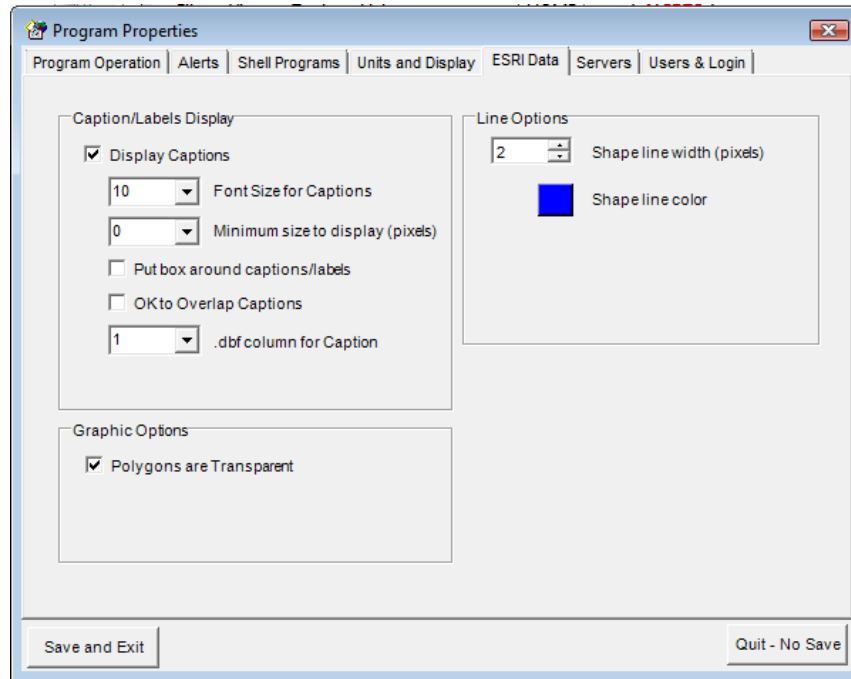



The icon named **default** has a special usage. If the Auto-Add feature is enabled, and a position/status is reported from an object that is not in the database, it will automatically be added to the Tracked Objects database, and assigned the **Default** icon.

### Overlaying an ESRI Shape File

From the RavTrack PC main screen select **File, ESRI Files..., Load ESRI Shape File**. This will bring up an open file dialog box to allow you to select the file to load. *RavTrack PC* will assume the file extension of the shape file is **.shp**.

Once the file is loaded, it will be displayed on the map. The color and default shape settings may be configured by the user. To set the ESRI default settings, select **Program Properties, ESRI Data**. The **ESRI Data** tab is shown below. The user may configure the font size of the shape captions, as well as various shape file options.



 The map datum of the ESRI shape file loaded into *RavTrack PC* must match the map datum of the currently displayed base map.



## Drawing Tools

### Section 7

To draw graphics on the map, or place points of interest (POIs), use the drawing tools built into RavTrack PC. Select Tools, Drawing Tools to bring up a small window that displays the drawing tools.

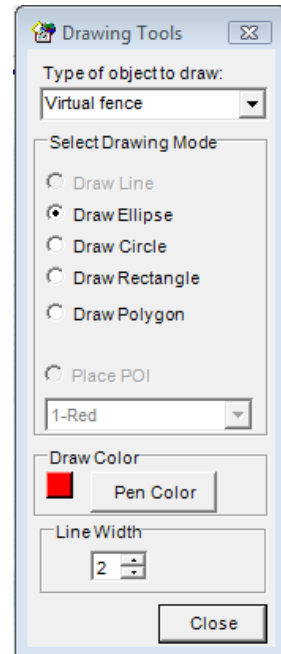
There are three primary uses of the drawing tools.

3. **Draw geo-fences for use in alerts and alarms.**
4. **Draw lines and graphics on the map.**
5. **Place points of interest (POIs) to show the location of specific places that may also be used in alerts and alarms.**

The layer on the map that the object is drawn on is very important. The *Map Graphic* layer is for graphics only, and any object placed on it is for visual purposes only. No point or object on the map Graphic layer can be used as a geo-fence or POI.

Circles, squares, and ellipses shapes placed on the *Virtual Fence* layer are given names when they are created. The shapes may be used for alerting and alarming when tracked objects move into or out of the area defined by the shape put on the Virtual Fence layer.

Points are specified on the map by placing an icon at the location using the Place POI function. If a POI icon is placed on the *Points of Interest* layer of the map, the POI may be used to trigger alerts and alarms. If it is placed on any other layer, it will not be used when checking for rule alerts.



### Placing a simple graphic on the map

Select the layer *Map Graphic* from the pull-down menu.

Select the shape you wish to draw (line, Ellipse, Circle, Rectangle, POI Icon). When drawing a shape, the color of the pen may also be selected.

Click on the map, and draw the shape.

### Creating an Electronic Fence (Geo-Fence)

Select the layer *Virtual Fence* from the pull-down menu.

Select the shape you wish to draw (Ellipse, Circle, or Rectangle). When drawing a shape, the color of the pen may also be selected.

Click on the map, and draw the shape.

When the shape is complete, RavTrack PC will prompt the operator to give the shape a name. This named shape may be used when creating alert rules related



to this fence. Fence names used in geo-fencing are not case sensitive. Carlsbad and CARLSABD will be treated as the same fence name.

### **Deleting a Graphic From the Map**

To delete any POI, fence, or shape placed on the map, right-click on the graphic item. Its location and information will be displayed in the Object Info window.

Press the Del button to delete it. You must be logged into the program as Administrator to delete shapes, graphics, POIs, and fences.

To delete POIs and Fences, you may also open a list of the POIs or Fences from the **View** menu, select the POI or Fence you wish to delete, and press the delete button.

### **Drawing Polygons**

Polygons may have up to 15 sides. Select “Draw Polygon” on the Drawing Tools menu, and then click on the map to draw the polygon. When you are finished drawing the polygon, press the *Enter* key. If the polygon was drawn on the Virtual Fences layer, then you will be prompted to enter a name for the fence you just created.



## Section 8

A LOG table is a table stored in a database that holds historical information about the location and status of the tracked objects. The LOG table may be stored in either an ACCESS database or an SQL database.

ACCESS: The file name is *TrackLog.mdb* and it is in *Microsoft Access* format. The table in this database file is named LOG.

MS SQL: The log table is named LOG. It is in the *RavTrack* SQL database.

Following is a list of the fields stored in the log file for each position/status reception from a tracked object.

Field Name	Data Type	Description
EntryNum	Number	Sequential entry number in the log
ID	Number	Object ID number. 0000 - 9999
Name	Text	The Name of this Object at the time this record is stored
EntryType	Text	The reason for this LOG entry.
Status	Text	Status Code. Also the rule ID if this entry is due to a rule trigger.
EntryTime	Date/Time	The PC's time of the last updated position received from this object
Longitude	Number	The longitude of the last position received
Latitude	Number	The latitude of the last position received from this object
Alerts	Text	Warnings and alerts based upon Rules. BLANK = none.
Speed	Number	The object's estimated speed, based upon last two reported positions
Altitude	Number	The objects altitude
Direction	Number	The object's estimate direction, based upon the last two GPS reports
Satellites	Number	Number of satellites in view
UTCtime	Number	The UTC time received over the air
Voltage	Number	The device's DC voltage
Temperature	Number	Temperature of the device
RSSI	Number	Signal strength of the transmission
Inputs	Number	The digital Inputs
RuleNumber	Number	The Rule ID/number if this is an alert entry
Description	Text	A description field for this entry
Spare1	Text	A spare data field
Spare2	Text	Another Spare field

The LOG table holds the data for the log entries. The field in the LOG table named "EntryType" identifies the type of entry in this log file. The valid types are:

- Update** A position/status update was received over the radio from a tracked object, and this is the log entry for that event.
- Alert** A rule was triggered and this is the log entry for the alert.
- Clear** A tracked object had been triggering a rule alert, but the event has cleared.

Additionally, a text file is created and various system activities related to the *RavTrack PC* operation and its actions are recorded in it. The system log file is called RT-w-yyyy.txt where w is the current week number, and yyyy is the current year. Every week a new system log file is created.

The RT- system log files are stored in a subdirectory under the ...\\RavTrack PC\\Logfiles directory.

Any text viewing program may be used to review the system log file. These are provided for system and installation debugging purposes.

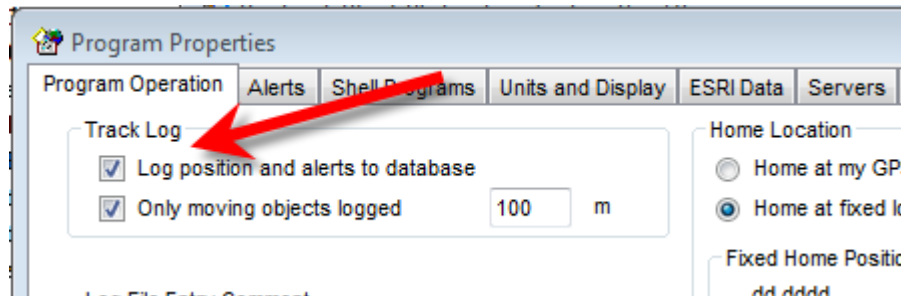
## **Enabling Logging of Tracking and Alert Activity**

Logging RavTrack PC GPS tracking activity to the LOG table is a two-step process.

1. Enable the logging feature in RavTrack PC.
2. Enable logging for the individual tracked object

To enable *RavTrack PC* to store GPS position data, status, and alerts in the LOG table, from the main screen, select ***File, Program Properties***. From the Properties screen, check ***Log position and alerts to database***.

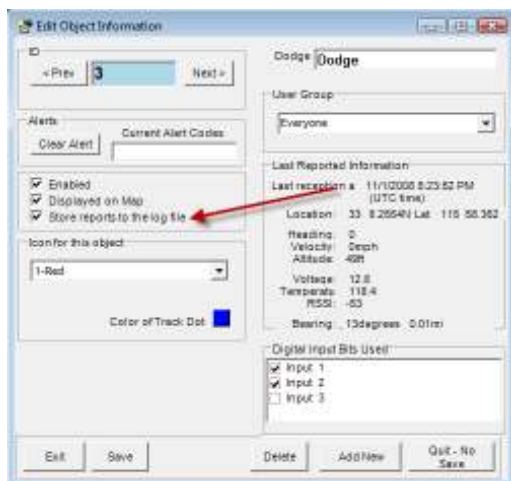
If you only wish to log objects that are moving(recommended), also check ***Only moving objects logged***, and specify the minimum distance an object must move before its location and status are stored to the LOG table.



Once logging is enabled, it still must be enabled for the individual tracked objects. Then a tracked object is first defined, the default logging is enabled.

To enable/disable logging of individual objects, configure this by first double-clicking on the object in the database window, or select ***Tools, Add/edit tracked objects***.

Locate the object in question, and check ***Store reports to the log file*** to enable logging for this object. If checked, every time the object transmits a position/status, the specifics of the transmission are stored in the LOG table.



### Log Table Size Limitation

All databases have size limitations, and because the LOG table can grow over time to be quite large, the user must be aware of the size of the LOG table, and manage it properly by “Pruning” it to remove old data, and periodically backing it up.

For Microsoft ACCESS LOG tables, the table should be limited to about 100,000 entries. For Microsoft SQL Server the LOG table should be kept to 400,000 entries. These are not “*Hard*” limits, and the actual limit will greatly depend upon the performance of the computers running the database software. A high-performance business-class server should have no trouble processing 1,000,000 LOG table entries.

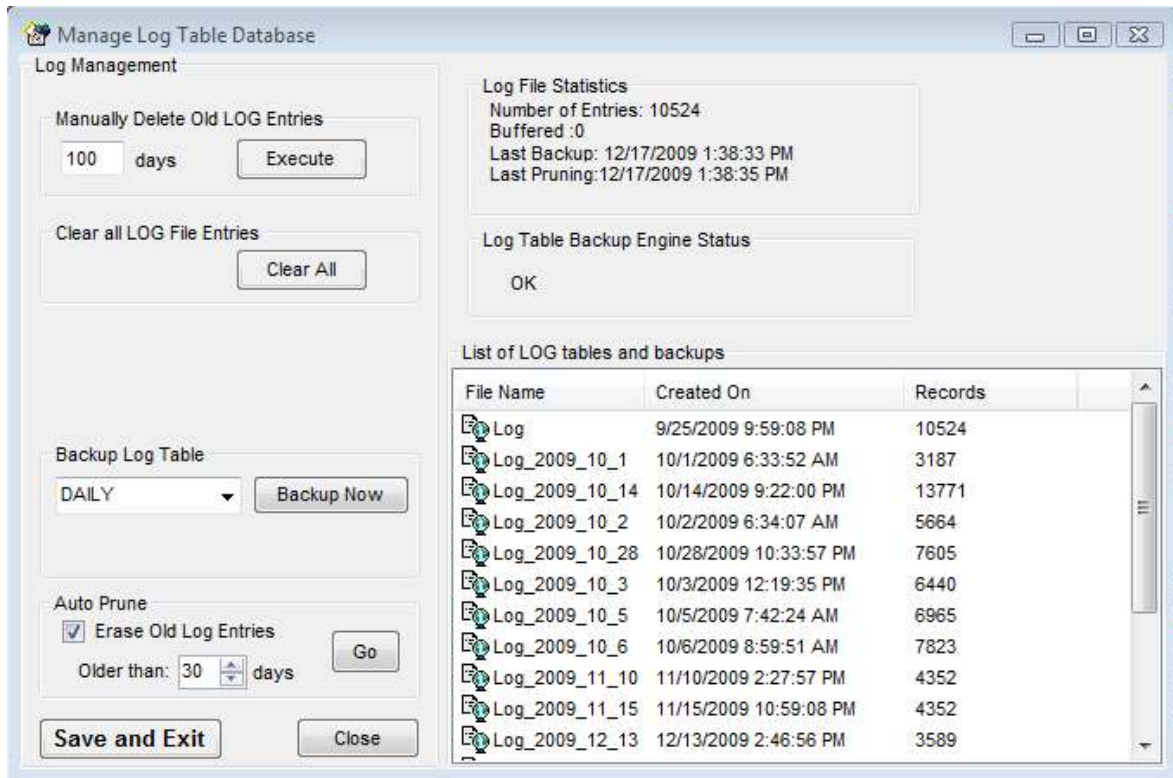
Below is a table to help you estimate the number of LOG table entries that *RavTrack PC* will make per day, week, and month. This will help you configure how often *RavTrack PC* should prune the LOG table.

Number of Tracked Objects	Update Rate (seconds)	Usage per day	Log Only Moving?	Log Entries per day	Log Entries per week	Log Entries per month
10	10	24	no	86,400	604,800	4,233,600
10	10	24	Yes	8,640	60,480	423,360
10	30	8	Yes	960	6,720	47,040
50	10	24	no	432,000	3,024,000	21,168,000
50	30	24	Yes	14,400	100,800	705,600
50	60	8	Yes	2,400	16,800	117,600
200	30	24	no	576,000	4,032,000	28,224,000
200	60	24	Yes	28,800	201,600	1,411,200
200	120	8	Yes	4,800	33,600	235,200

### Log Table Management

All LOG table entries are sequentially numbered. This facilitates management and reporting. To erase some or all of the entries in the LOG table, select ***File, Manage Log Database*** from the main screen. A window will pop-up that will allow you to review and configure how the LOG table is managed.

A *RavTrack PC* user must be either an Administrator or have the rights to “Manage the LOG table” assigned to the user to open this Log Table Management window.



The window “List of LOG tables” will show you the LOG table and the number of records in it, as well as a list of backup-copies of the log table. The backup copies have the date they were created in their name, such as Log\_2009\_10\_1. This table was created October 1<sup>st</sup>, 2009. The main LOG table that holds the current log information in it is simply called LOG.

Use the ***Manually Delete Old LOG Entries*** selection to erase old log entries and reduce the size of the log database.


To erase all entries in the log file, select ***Clear All***.

To delete an old log table, right-click on it, and select ***Delete***.

Note, each entry in the log file uses approximately 300 bytes of disk space in an ACCESS database, or 1000 bytes in a MS SQL Server database.

Microsoft Access databases do not release spare disk space, even when an entry in a database is deleted. A special process called “***Compacting***” must be done after an entry is deleted to free-up the disk space. Click on the ***Compact Now*** button to free-up the disk space for log entries that have been deleted. This will often free up 50-80% of the log file disk space, and not delete historical information.

### **Backing Up the LOG Table**

 Only one computer on a *RavTrack PC* system should be configured to automatically backup the LOG table. All others should have their backup option set to “Manual”.

Configure automatic backups using the “**Backup Log Table**” drop-down list on the Mange Lot Table window. **Daily, Weekly, Monthly, or Manual** may be selected. At the interval you select, RavTrack PC will copy the LOG table to another table named LOG\_xxxx where xxxx is the date of the copy.

The main LOG table must not grow excessively large, so it periodically should be “Pruned”. Pruning removes old entries. Use the **Auto Prune** feature to automatically have RavTrack PC remove old log entries from the LOG table.

### **Third-Party SQL Table backups Software**

On *RavTrack PC* systems with a large number of vehicles or vehicles that report very quickly, the LOG table may get large quickly. In this case, Raveon recommends that a third-party table backup program be used so that the SQL database does not get excessively large.

Configure your backup software to periodically backup the LOG tables, and once they are backed up, delete the old ones from the SQL database so they do not consume resources. Then, if the historical log data is ever needed, you can restore the appropriate log table back to the database so it can be reviewed or replayed.

The following is a list of possible third-party SQL backup software vendors.

#### **Quest Software**

<http://www.quest.com/sql-server/backup-and-recovery.aspx>

#### **SteeleEye Technologies**

<http://www.steeleye.com/>

#### **Red-Gate**

<http://www.red-gate.com/index.htm>

### **Displaying and Replaying Historical Information**

To display the position/status of log file entries on the map, select **Tools, Load Replay Log File on Map**. Enter the range of log-file entries you wish to display.

**Replay Position Data from Log**

**Date Range**

From: Thursday, December 17, 2009 12:00:00 AM

To: Thursday, December 17, 2009 11:59:59 PM

**Comment Filter** (leave blank to see all in range)

**ID Filter**

☐ Only load the IDs within this range:

1 to 9999

**Load Log Data For a Single One**

☒ Only load data for this object

20 20X

**Parameter Filter**

☒ Enable

Speed > 55


**GeoFence Filter**

Geofence Filter ☒ Raveon

Begin Exit

Begin by selecting the date-range you wish to load the log entries from. If you only wish to load entries for specific Tracked Objects, or a range of them, select the appropriate option.

Each log entry has a comment stored with it. The comment that was stored with the entry was defined on the **File, Program Properties** window, in the box labeled **Log File Entry Comments**.

 A powerful feature is the ability to only retrieve log entries with specific comments. To retrieve only the log entries which contain certain text in the comment field, enter the comment text to filter by in the **Comment Filer** text box.

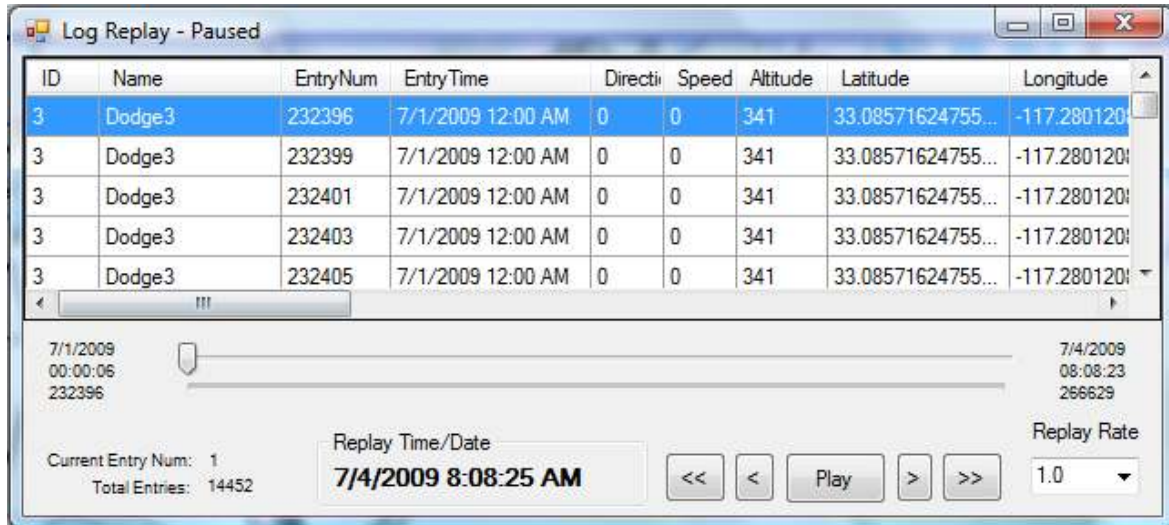
You may also limit which log entries are retrieved by using a parameter filter and/or a geofence filer. Often, it is best to only retrieve log entries for vehicles that are moving (speed > 0). The geo-fence filter is used to retrieve log entries from vehicles that are within a certain geo-fenced area.

When a log entry is retrieved, the RavTrack PC program will put a dot on the map at the location of the log entry if the particular Tracked Object has **Place Tracked**



**Dots**” enabled. Up to 10,000 track dots may be displayed as dots on the map, and thus up to 10,000 log entries may be displayed. If more than 10,000 are recalled, then the last 10,000 loaded will be displayed.

A playback Window will pop-up, displaying the data from the log as selected. The



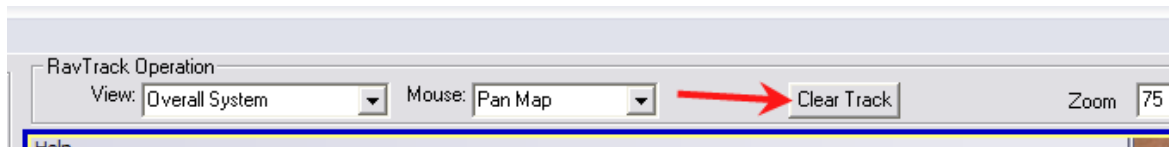
The **Log Replay** window displays a table that holds the information about each log entry that was retrieved from the log. The user may click on any row, and the tracked objects on the map will automatically reposition themselves to the location in time that was clicked.

The Play button is used to automatically re-play the historical data. The rate it is replayed may be adjusted with the **Replay Rate** drop-down selection. The single arrows ( < and > ) are for single-stepping through the table. The double arrows ( << and >> ) are for jumping 20 log entries forward and backward in time.

As the log is replaying, the virtual time of the replay is displayed in the Replay Time/Date box.

The log file dots on the map are linked to the log file, so the user may right-click on a dot, and the RavTrack PC program will display the location and status information in the **Object Info:** window that was stored with that particular log entry.

Whenever log file dots are displayed on the map, a **Clear Track** button will appear on the top of the main window. Click this button to erase the log entries from the map.



When a log file is recalled, the current position shown on the map of any tracked object recalled from the log will be the last one recalled from the log. As soon as

*RavTrack PC* receives a new position from the Tracked Object, it will move its icon to the current position.



Note, whenever the **Log Replay** window is open, *RavTrack PC* no longer displays the current vehicle locations. It is displaying historical data. Once **the Log Replay** window closes, *RavTrack PC* will automatically resume displaying the live data.



## Alerts and Alarms

### Section 9

Alerts are triggered events caused by tracked objects meeting (or violating) pre-set rules. *RavTrack PC* has provisions to trigger alerts based upon:

#### Electronics Fences (Geo-fences)

*Inside the fence*  
*Outside the fence*

#### Parameters

*Idle Time*  
*Speed*  
*Voltage*  
*Missing (no reports)*

#### Digital Inputs

*Input is high (positive voltage on it)*  
*Input is low (0 volts on it)*  
*Any combination of the above on any combination of inputs*

#### Distance

*Distance from home*  
*Distance from a Point of Interest*

### Identifying Alert Conditions

There are three ways the operator will notice that an alert is triggered.

1. The red Alert button appears on the top of the main window.
2. The Tracked Object's ID will be highlighted in red in the database window.
3. The Tracked Object's icon text will change to the alert color.

### Reviewing Alert Conditions

Clicking on the Tracked Object's entry in the database window, while holding the shift key down will display the object's alert status in the Object Info window.

Clicking on the Alert button on the top of the screen, or selecting View, Current Alerts, from the main toolbar will bring up the Alert Table. The Alert table lists all of the alerts, as shown below.

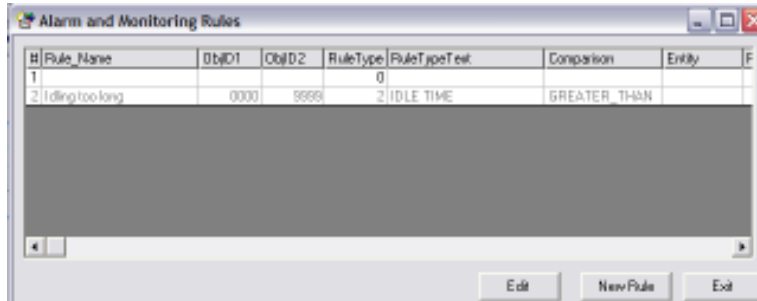
Active Alerts									
Eve	Time of Alert	Car	Rule Name	Cleared At	Active	Ack	Acked By	Acknowledged At	Type of Alert
1	12/11/2008 10:35 PM	TT31	Low Battery Voltage		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RavTrack...	12/11/2008 10:35 PM	DC VOLTAGE
2	12/11/2008 10:36 PM	Base #1	No Reports lately	12/14/2008 6:14 PM	<input type="checkbox"/>	<input type="checkbox"/>			NO REPORTS
3	12/11/2008 10:36 PM	Base#2	No Reports lately	12/14/2008 6:14 PM	<input type="checkbox"/>	<input type="checkbox"/>			NO REPORTS
1	12/14/2008 6:14 PM	Base#2	At Henderson		<input checked="" type="checkbox"/>	<input type="checkbox"/>			GEO FENCE
2	12/14/2008 6:14 PM	Repeater1 Primary	Low Battery Voltage		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Admin	12/14/2008 6:40 PM	DC VOLTAGE
3	12/14/2008 6:14 PM	Repeater1 Primary	Low Battery - Repeater		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Admin	12/14/2008 6:40 PM	DC VOLTAGE
4	12/14/2008 6:14 PM	Base 1	No Reports lately		<input checked="" type="checkbox"/>	<input type="checkbox"/>			NO REPORTS
5	12/14/2008 6:14 PM	Base#2	No Reports lately		<input checked="" type="checkbox"/>	<input type="checkbox"/>			NO REPORTS
6	12/14/2008 6:14 PM	Dodge33	No Reports lately		<input checked="" type="checkbox"/>	<input type="checkbox"/>			NO REPORTS

Remove Cleared Alerts    Acknowledge All    Show alerts for these rules: Show all    Exit

## Setting up an Alert

To configure an alert, select ***Tools, Alarms and Rules.***

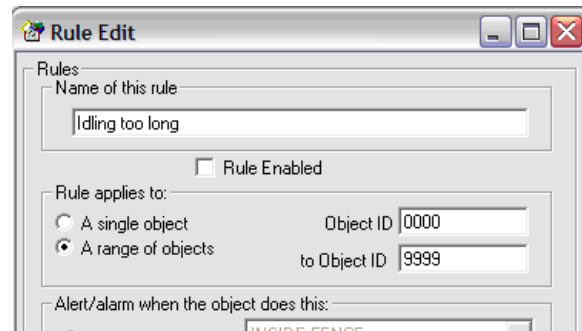
This will bring up a small window with a list of all of the current alerts configured in the system. Each alert is given a rule name by the user who created the alert.



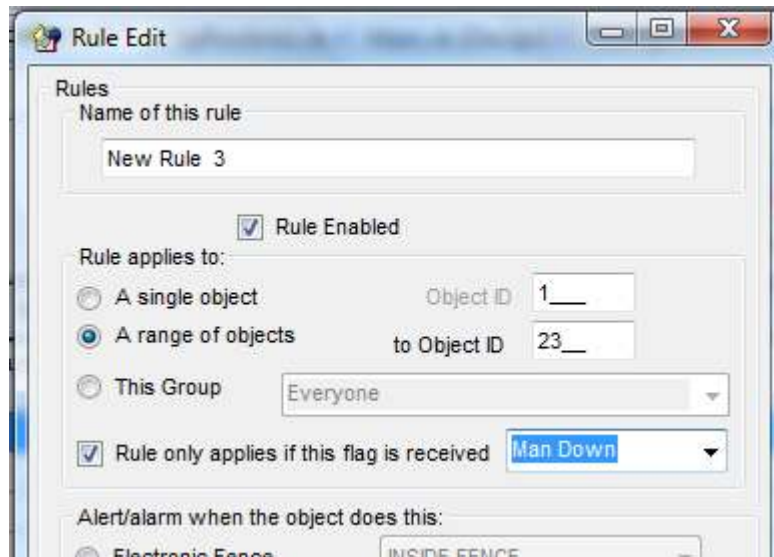
To create a new rule, click the ***New Rule*** button. To edit an existing rule, double-click the rule in the list or select it, and click ***Edit***.

Enter the name for the rule in the ***Name of this rule*** text box. The name of the rule will appear in an alert box if the rule is triggered, and the operator of the program needs to be notified.

- Use a name for the rule that the operator will understand. For example, instead of calling a rule “*Rule A*”, call it “*Speeding Rule – Object is exceeding the preset speed limit.*” This will allow the operator to better understand the situation that triggered the rule.



In the ***Rule Applies To box***, select the range of object IDs that this rule will apply to. Every time an object reports its position and status, the *RavTrack PC*'s rule processor checks the position and status against all rules that apply to the object. A rule will apply only if the reporting object's ID is within the ID range specified in this box.



Various models of location transponders can transmit “Flags” indicating certain conditions such as a proximity flag, vibration flag, collision flag, and others. These flags are product-dependent, and not all Raveon products support all flags. If an alert rule is to only apply to Tracked Objects that have a certain flagged condition, check the “Rule only *applies to this flag...*” box. In the example above, the rule will apply only to vehicle #6, when his vibration warning flag is set.

There are three basic types of rules, and the user must select which one to perform. Under these three basic types, are a variety of variations. If more than one type of rule should apply to a tracked object, create another rule for each additional rule type desired. The rule types are:

#### **Parameter Monitoring**

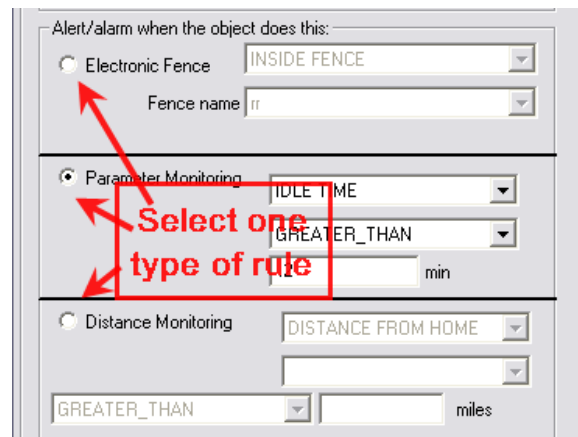
- Speed*
- Voltage*
- Idle Time (not moving)*
- Missing (No position reports received)*

#### **Digital Inputs**

- Input is high (positive voltage on it)*
- Input is low (0 volts on it)*
- Any combination of the above on any combination of inputs*

#### **Distance Monitoring**

- Distance from a POI*
- Distance from Home*

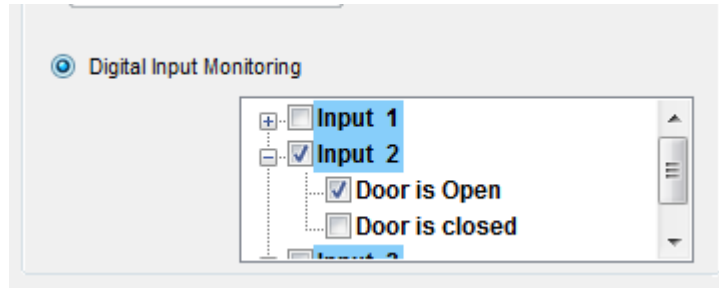


Once the rule type is selected, select the appropriate logic for the rule, and any required parameters.

## Digital Input Alerts

An alert may be triggered when a digital input meets a certain condition. Digital inputs are “0” or “low” when there is no voltage on them. Digital inputs are called “high” or “1” when there is a positive voltage on them.

To enable an alert using the status of the digital input on a tracked object, first click on the ***Digital Input Monitoring*** button on the Rule Edit form.

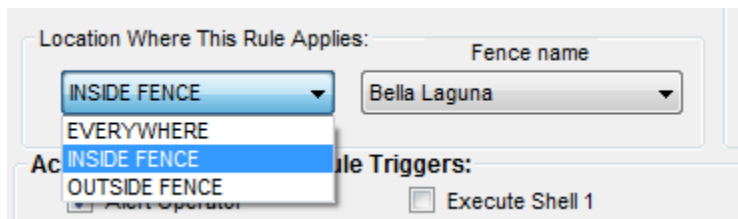


The put a check in the box corresponding to each input that should be monitored. Once you check the input numbers, then check the condition for the alert based upon that input. For the example above, input number 2 will be used to trigger an alert. The alert will trigger when input 2 is low (Door is Open). Note that the user had previously configured input number 2's high and low states to mean “**Door is Open**” and “**Door is Closed**”. The actual text assigned to the high and low states is not important.

## Geo-Fences

For Geo-Fences, a fence must first be drawn on the “*Fences*” layer of the map, and then given a name. Once a fence is drawn on the map, a geo-fence rule may be created using the named fence. The rule may include any Parameter, Input, or Distance rule, but when the geo-fence option is selected, the rule will only be checked if the tracked object is inside or outside the designated Geo-Fence area.

To configure an alert to apply only inside or outside a geo-fence, select the type of geo-fence from the drop-down list in the “***Location Where This Rule Applies***” box. The select the geo-fence name.



If you do not want any geo-fence to apply to the rule, select ***EVERYWHERE***.

## Time and Day of Week

The time of day and day of week that a rule applies to may also be defined for each rule you set up. By default, rules apply all-day every day. Change ***the Time***

**Limit** to set the time of day the rule applies to, and uncheck individual **Days of the Week** that the rule should not apply to.

The screenshot shows a configuration window with three sections. The first section, 'Time Limit', has two radio buttons: '24 hours a day' (selected) and 'Only between'. The 'Only between' option has two time pickers set to '12:00:01 AM' and '12:00:00 PM'. The second section, 'Days of the week', has checkboxes for each day of the week, all of which are checked. The third section, 'Location Where This Rule Applies:', has a 'Fence name' label and two dropdown menus. The first dropdown is set to 'INSIDE FENCE' and the second is set to 'Bella Laguna'.



Note: If two fences on the map have the same name, a rule alert may not be triggered even if the tracked object is inside or outside of either fence. Do not use the same name for two different fences.

## Actions

When a rule's conditions are met, a variety of actions may be taken. The possible actions are:

The screenshot shows a configuration window titled 'Action to Take When the Rule Triggers:'. It has several sections. The first section has four checkboxes: 'Alert Operator' (checked), 'Log when event triggers.' (checked), 'Execute Shell 1' (unchecked), and 'Execute Shell 2' (unchecked). The second section, 'Play a Sound File', has a 'Play sound' checkbox (checked) and a 'Sound File to Play' dropdown menu set to 'doorbell.wav'. There is a 'Test Sound' button next to it. The third section, 'Send Email When Rule Triggers', has a 'Send Email' checkbox (unchecked) and a text field for 'Email Address(s) to send to (separate with ; )'. At the bottom of the window are three buttons: 'Save Rule', 'Delete Rule', and 'Exit'.

### Play A Sound

The sound files to play and the shell programs to execute are configured in the **File, Program Properties, Alerts** menu and the **File, Program Properties, Shells** selections.

If a rule is set to play a sound whenever it is triggered, the configured sound will be played when a rule is triggered but it will not be played again for at least 5 seconds, even if another rule is triggered.

### Highlight the Icon Label

To have an object that triggers an alert be highlighted in red in the tracked objects window, select **File, Program Properties, Alerts**, and check the **Highlight object in RED when it triggers a rule alert** box.

### Send an Email or SMS

To have an email sent or SMS message sent when a rule is triggered, select Send Email. Whenever the rule is triggered, an email will be sent to the email address



as configured in the ***File, Program Properties, Servers*** tab. The email will show the ID, name, location, and the description of the alert condition.

You may enter an email address or addresses where this rule will be sent to. If multiple email address are entered, separate them with a semicolon “;”. If you do not enter any email address in the rule’s email address box, then the email will be sent to the default email address as specified in the programs configuration.

#### Enter the Alert into the LOG table

If you would like an entry to be made into the main log table (RavTrackActivity database, LOG table), then select either or both of the ***Log the rule event*** check boxes. This will cause the program to put an entry in the log file when a particular rule is first triggered by a particular tracked object. One entry is made when the rule is first triggered. Continuous triggering of a particular rule type (distance, geo-fence..) will not create another entry in the log file until the trigger event clears and then re-triggers. For example a unit with a speeding trigger and then entering a geofence while speeding will cause two entries in the log file. One for the speeding and one for entering the fence. If the unit is in one geo-fenced area, and enters a second area, another entry will not be made. If the unit is in one geo-fence, slows down, and then speeds up to cause another speeding alert, a third entry will be put in the log file noting that the speeding violation is occurring again.

#### Execute Shell Program

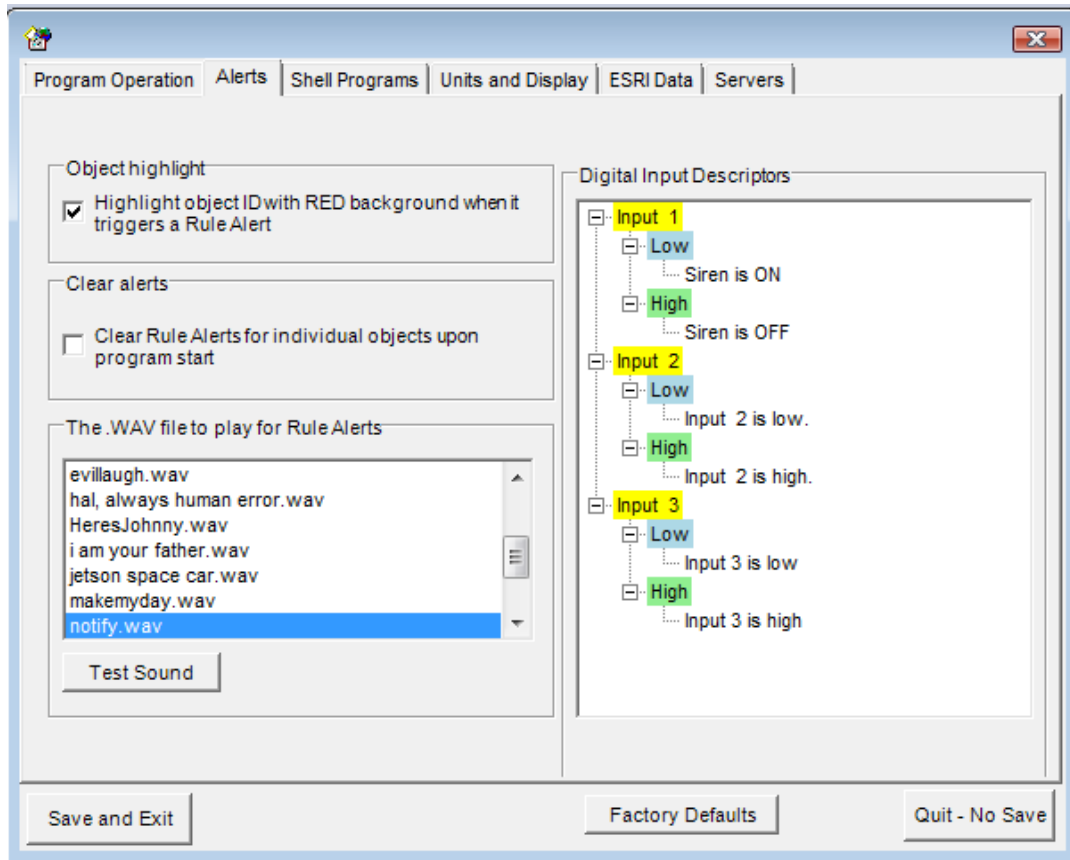
A “Shell” program refers to a software program outside of *RavTrack PC*. It is called a shell because if *RavTrack PC* is to execute it in a parallel thread, causing it to run along with *RavTrack* . If you would like to execute a software program when an alert is triggered, click on one or both of the ***Execute Shell X*** boxes to enable the specific shell program. The actual shell program to run is configured on the ***Program Properties > Shell Programs*** tab. Up to two different shell programs may be configured.

#### Global Alert Settings

When an alert triggers, there are a number of configuration settings that can determine how it is handled. From the main screen, select ***File, Configure***, and then select the ***Alerts*** tab.

If you would like the color of the object’s name on the map to change to red whenever it is triggering an alert, select this option.

The names for the digital input conditions may be changed. Click on the Digital Input Descriptor to change, and type the new description. For example, if the Input #1 high descriptor is set to “Siren On”, and a rule is set to alert the operator whenever the input 1 is high, then the operator will see the text “Siren On” whenever the rule is triggered.



## Alert Processing

When an alert is triggered, the rule triggering event is stored in a table and it is tagged as being “Active”. When the alert clears, it remains in the alert table, but the “Active” tag is removed.

## Email Alerts

Setting up email alerts is a two-step process. Step 1 is to configure the email server and account information that will be used to send the email. RavTrack PC will work with most SMTP mail servers. Step 2 is to enable the email alert for the individual alert that will issue the email.

To configure the email server, select **File, Program Properties, Servers** to display the email server configuration settings.

The screenshot shows a configuration window titled "RavTrack PC" with a tabbed interface. The "Servers" tab is selected. The window contains the following elements:

- Tracked Object Database File Location:** A text box containing "C:\Working\RavTrackSource\RavTrackPC.NET\bin\data\" and a "Change Directory" button.
- Email Server Settings:**
  - ☒ **Email Client Enabled**
  - SMTP Host (Mail Server):** "mail.somedomain.com"
  - ☐ **Use SSL**
  - Port Number:** "25"
  - SMTP Host Login:** "LoginName"
  - Password:** "\*\*\*\*\*"
  - Email Address to send to:** "someperson@somedomain.com"
  - Show email as From:** "name@somedomain.com"
- Buttons:** "Send Test Email", "Save and Exit", "Factory Defaults", and "Quit - No Save".

Check the "Email Client Enabled" checkbox. Enter the DNS name or IP address of the email server in the SMTP Host box. Port 25 is a typical email port number, but consult your email service provider to verify this. Enter your email account login username in the SMTP Host Login box. Enter your email account password in the Password box. Enter the email address to send the emailed alert to in the "Email Address to send to" box. Enter the email address you wish the recipient to see as being the sender in the "Show email as From" box. Once the email server is configured, click Save and Exit.

In the alert rule, check the "Send Email" checkbox. You can edit any alert rule by viewing the alert list (***Tools, Alarms and Rules***), and then double-click the alert you wish to edit. Check the Send Email on the alert rule.

To send an SMS alert, simply configure the "Email Address to send from" to be the SMS email address of the mobile device. Typically the SMS email address is the phone number followed by the domain. For example, an SMS to a wireless device on the Cingular network with phone number 760-555-1212 would have an SMS email address of 7605551212@cingularme.com.



## Multi-User Operation

### Section 10

*RavTrack PC* may be run on multiple computers, all monitoring, tracking, alerting, logging, and reporting on the activity of the system.

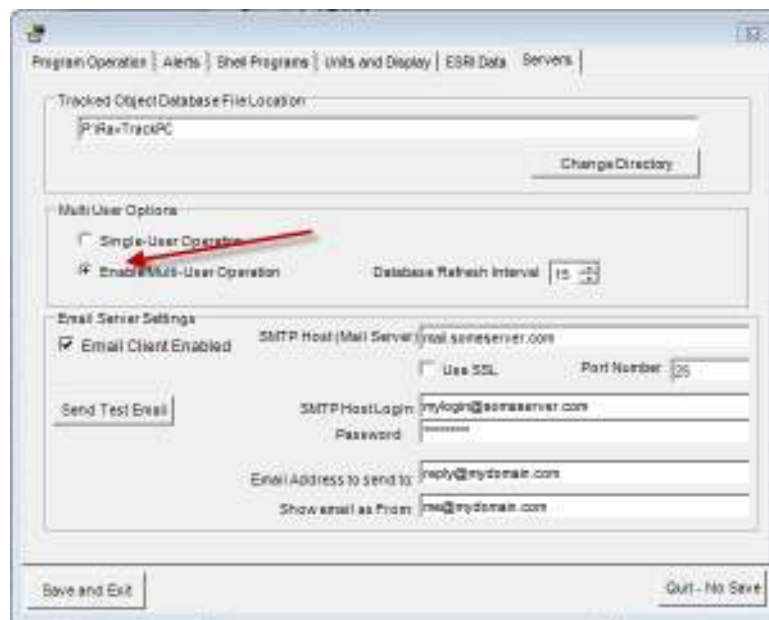
Multi-User systems require that the database with the name “*TheTrackedObjects*” be stored on a server or shared computer that is accessible from all PCs in the system.



*RavTrack PC* uses a time/date field in the database to synchronize the various workstations running *RavTrack PC*. It is very important that the time and the date on all of the PC in the system be correct, to within 20 seconds of each other.

On *RavTrack PC* systems using Microsoft ACCESS databases (default), the “*TheTrackedObjects*” database is stored on the local hard drive in the default location of ...*\Raveon\RavTrack PC\Data* directory. To configure a PC for multi-user operation:

1. Share the *C:\Program Files\Raveon\RavTrack PC\Data* directory, or copy the file to a shared directory on a server.
2. Select **File, Program Properties, Servers** and change the “*Tracked Object Database File Location*” to the common shared directory where the “*TheTrackedObjects*” database is stored. In the example below, it was stored on a server’s *P:* drive in the *RavTrackPC* subdirectory.
3. Select **File, Program Properties, Servers** and click on *Enable Mutli-User Operation*.



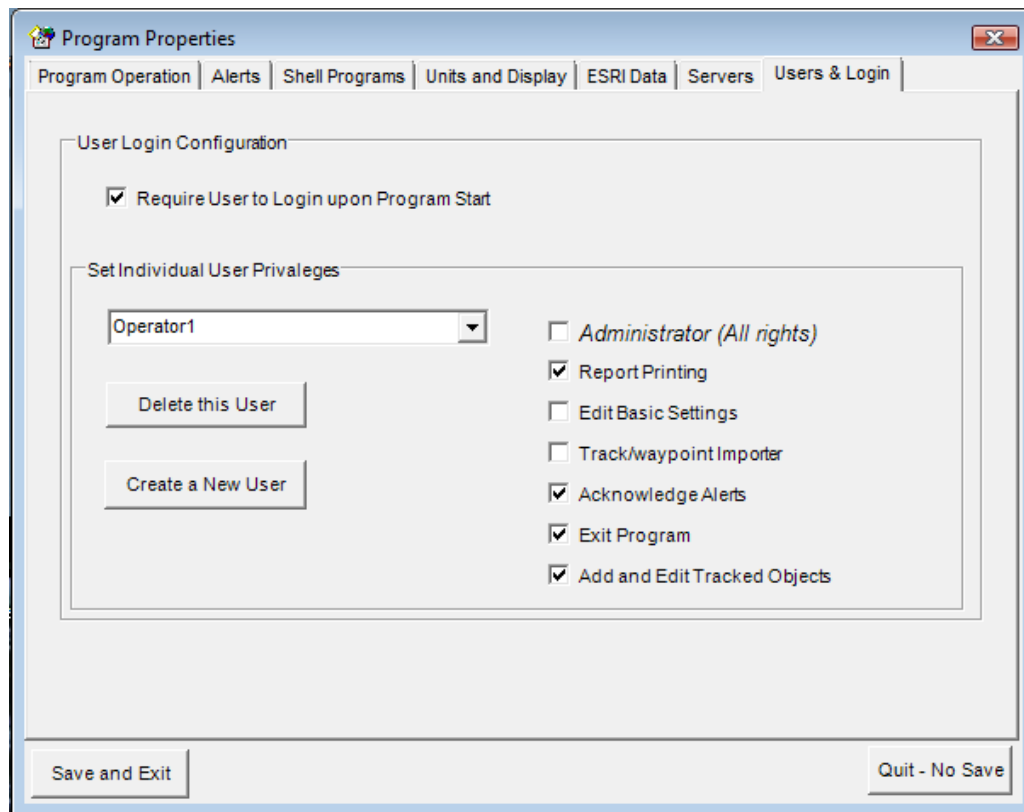
Multi-User systems will periodically synchronize the Tracked Objects on the map and tracked object database window with the data in the shared *TheTrackedObjects* database file. How often this is done may be set in with the “Database Refresh Interval”. During refresh, the PC may respond a bit slower, so it is best to do this as infrequently as possible. Raveon suggests every 60 seconds.

When ***Multi-User Operation*** is enabled, *RavTrack PC* will periodically send a query to the database server asking for a list of all new position information. When new position/status information is returned from the database server, this new information will be processed as new position/status reports, checked against the rules, and logged to the LOG table as appropriate.

### **User Privileges and Login**

By default the user named “admin” is the master system operator and administrator. When a user is logged into *RavTrack PC* as admin, he/she may be able to perform and all functions. Other users may be setup within *RavTrack PC* to allow the program to be operated by individuals with restricted rights.

To configure users, the person setting up other users must be an “Administrator”. Select ***File, Program Properties, Users&Login*** and then create another username. Once the new username is created, click on the various user rights that should be assigned to the new user.



To ensure that the user logs into RavTrack PC when the program starts, enable the “***Require Users to Login upon Program Start***” option. This will cause the login box to appear every time the program starts. If this option is not enabled, then the program will start using the same user name and privileges as when it was stopped.

	<i>Admin</i>	<i>Report Print</i>	<i>Edit Basic</i>	<i>Importer</i>	<i>Ack Alerts</i>	<i>Exit Program</i>	<i>Add / Edit</i>	<i>Manage LOG</i>
<i>Load a log file to the map</i>	■			■				
<i>Load ESRI Shape Files</i>	■			■				
<i>Import Track Files and waypoints</i>	■			■				
<i>Configure the I/O</i>	■							
<i>Run Reports</i>	■	■						
<i>Clear Imported tracks and waypoints</i>	■			■				
<i>Clear Alerts</i>	■				■			
<i>Edit Tracked Objects</i>	■						■	
<i>Delete Tracked Objects</i>	■						■	
<i>Change maps</i>	■		■					
<i>Change label colors and font</i>	■		■					
<i>Change comment for log file</i>	■		■					
<i>Exit the program using the “File, Exit” option</i>	■					■		
<i>Edit, add, delete Rules</i>	■							
<i>Modify Program Properties</i>	■							
<i>Delete GeoFences</i>	■							
<i>Manage the Log Database</i>	■							■



## Printing

## Section 11

### Printing Reports

From the main screen, select **View**, and then **Reports**.

Select the report you wish to print, choose the filtering options, and then click the mouse on the **Create Report** button.

A preview of the report will be generated on screen. Click on the printer button on the report-preview screen to send the report to a printer.

Besides the built-in reports, you may create your own reports using either crystal reports or Microsoft Access. The built-in reports are:

1. *List all tracked objects, summary*
2. *List all tracked objects, detailed*
3. *List all tracked objects with alerts*
4. *List all moving tracked objects*



5. *List all idling tracked objects*
6. *List historical log entries*
7. *Daily Usage Report*
8. *Weekly Usage Report*
9. *Monthly Usage Report*

### **Filtering Reports**

By default, the report will use all records from the applicable table. But, many reports may be filtered. You may Geo-fence filter a report, to only include objects within a certain geofence. You may parameter-filter reports, only including objects that have certain parametric values such as excessive speed or idling. You may input-filter a report, and include only objects with certain inputs triggered such as a door open or siren on. You may group-filter a report, to have it include only information about vehicles in a certain User Group.

### **Reports from the Historical Log file**

If the selected report used data from the historical log file, a ***Replay on Map*** button will appear on the bottom of the RavTrack Report Builder window. Click this button to bring up the Log Replay window. All entries listed on the report will also be replaying on the map.

### **Screen and Map Printing**

To print a copy of the whole RavTrack PC window, select ***File, Print RavTrack Screen*** from the main window.

To print a copy of just the map area of RavTrack PC, select ***File, Print Map*** from the main screen.



## Importing Waypoint/Track Files

### Section 12

#### File Formats

The user may import data from other programs into Ravtrack PC. There are three types of data to import: Track Points, Waypoints, and \$PRAVE messages.

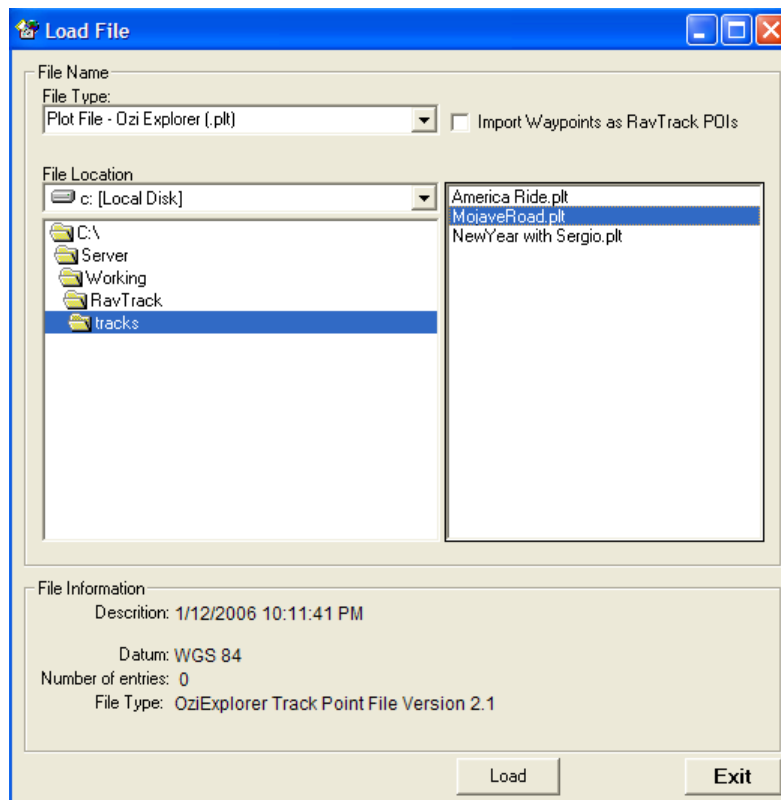
**Track Points** These are data points created in other programs which show the direction of travel. Currently RavTrack PC can import track points stored in the .plt file format of Ozi Explorer.

**Waypoints** Waypoints are preset points stored in a GPS to assist in navigation or creating routes. Currently RavTrack PC can import waypoints in the Garmin .upt format.

**\$PRAVE messages** For debugging remote system, RavTrack PC can read a text file that has \$PRAVE messages stored in it. It will import the \$PRAVE messages as Track Points onto the map.

#### File Selection

From the main screen, select **File, Import Tracks, Plots, Waypoints**. The following screen will appear.



Select the File type to import, the directory of the file, and then choose the file to import. If you would like RavTrack PC to convert the imported data to RavTrack Points Of Interest (POIs), then check that box before clicking on Load.

If the file format you wish to import is not supported by RavTrack PC, consider using the commercially available GPS tools *Ozi Explorer* or *GPSTBabal* to convert the format into one that is supported.

Currently, RavTrack PC can import files in these formats:

<b><i>Originator</i></b>	<b><i>Extension</i></b>	<b><i>Type</i></b>
Garmin	.upt	Waypoint list
Ozi Explorer	.plt,	Track plot
Ozi Explorer	.wpt	Waypoint list
Garmin	.gpx	Waypoints or POIs
Raveon	\$PRAVE messages	Raw position messages

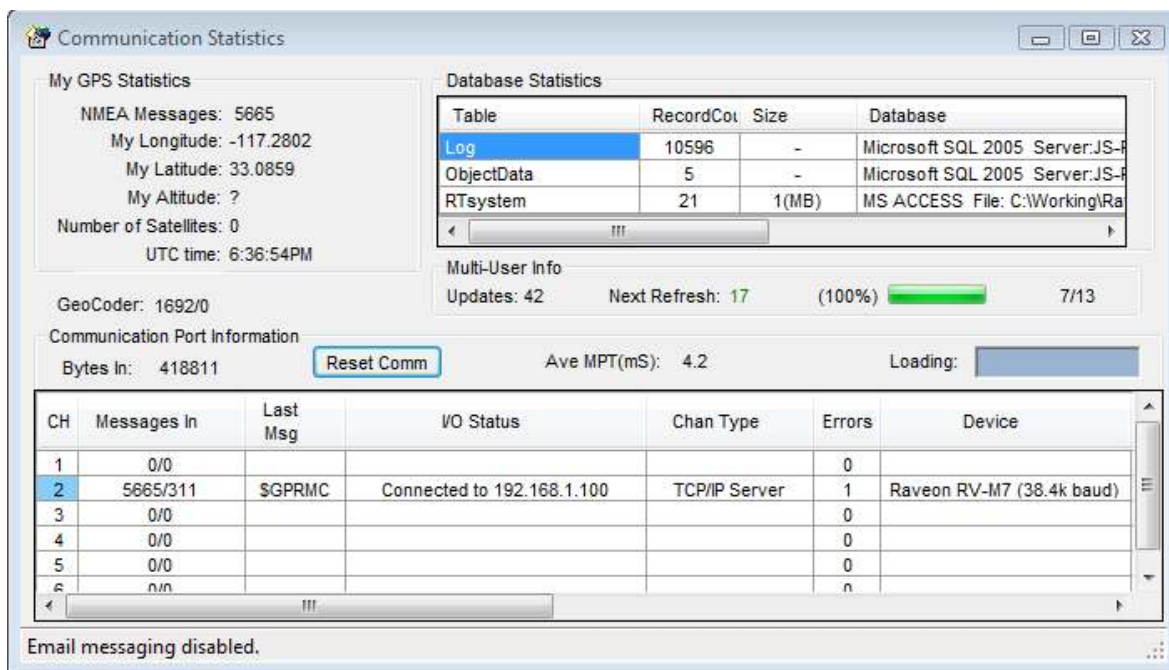


## Communication Statistics

### Section 13

#### Communication Statistics

A Communication Statistics window is available to see an overview of how the Communication Ports are configured and working. From the main screen, select View, Communication Stats to bring up a screen that displays how the radio communications is working. You may also click on the GPS or CH x buttons on the bottom of the main screen to bring this up.



RavTrack PC has the ability to send and receive data through up to 6 communication “Channels”. Statistic for each channel are accumulated, and displayed on the Communication Statistics window.

#### **Messages x/y**

The first number is the number of NMEA GPS messages and the second number is the number of over-the-air position messages received in via this channel.

#### **Last MSG**

Shows the first few characters of the last message that came in the channel.

#### **I/O**

Describes the status of I/O used on this channel.

#### **Chan Type**

Describe the type (RS232, TCP/IP..) of communication channel. Blank if the channel is not used.

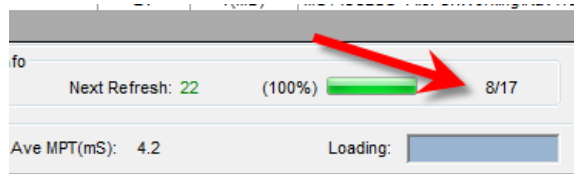
#### **Errors**

Counts the number of communication errors detected on this channel.

<b>Device</b>	The type of radio device connected to this channel.
<b>Tries</b>	The number of times that the <i>RavTrack PC</i> software tried to initialize the communication channel.
<b>OS Thread</b>	Each communication channel runs on a separate thread in the Windows operating system. This lists the status of the threads.
<b>Settings</b>	Describes the specific communication settings for the channel.
<b>Messages Out</b>	Counts the number of messages sent out of this channel.
<b>Local IP addr</b>	The IP address used by this channel, if TCP/IP is used.
<b>Sender</b>	If TCP/IP Server is enabled, and another RavTrack PC computer is sending position data to this one, then the Sender field displays information about the client computer.

The *Ave MPT* is the Average Message Processing Time. This is the average time it takes your computer to process one position report. MPTs of greater than 10mS indicate the computer may not be fast enough to handle the RavTrack messages.

The two numbers to the right of the green progress bar are the database “get” and database “put” times. (get/put).



The *get* time is the number of milliseconds it took *RavTrack PC* to retrieve new updates from the database. The *put* time is how long it took RavTrack PC to put the new position reports it received into the database. Note that RavTrack PC performs all database access in a multi-tasking background thread, so this time does not reflect the speed of operation of *RavTrack PC*. It is a measure of how fast the database server responds as well as the speed of the computer *RavTrack PC* is running on.

### TCP/IP

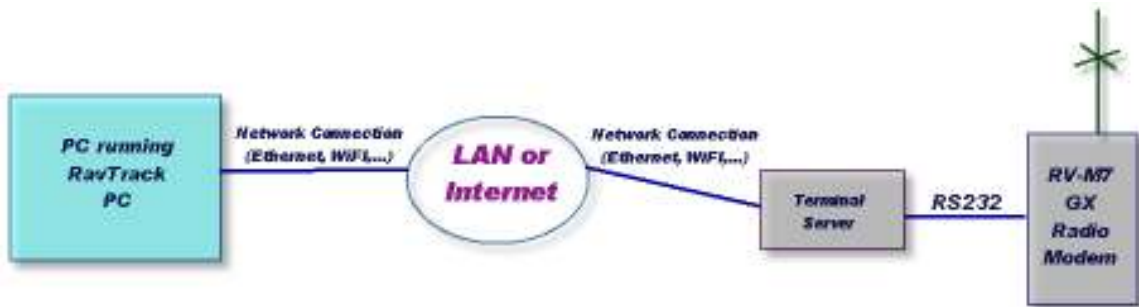
Each of the 6 RavTrack Communication channels may be configured to operate as a TCP/IP Server, using the TCP/IP protocol and a local network connection. TCP/IP clients and Telnet clients may connect to RavTrack PC's TCP/IP Server, and communicate with RavTrack PC using TCP/IP via a network connection instead of directly connected to the PC via an RS232 serial port.

There are two ways to connect radios to the RavTrack PC. 1)Rs232 and 2)TCP/IP socket.

### *RS-232 Connection to PC*



### *TCP/IP Connection using Terminal Server*



A *Terminal Server* is a device that converts RS232 serial data into Ethernet packets. Once the serial data from the M7 is converted to Ethernet, it may be sent over any LAN , WAN, or the Internet. Terminal servers are an excellent way to expand the coverage of your system, by allowing M7 base stations to be remotely located around a wide area, all feeding the position and status data from the Tracked Objects, back to a central computer running *RavTrack PC*.

RavTrack PC operates as a TCP/IP Server, so the remote terminal server must be configured as a "Client". For a list of terminal server vendors, please contact Raveon Sales or visit our web site.



## Google Earth Integration

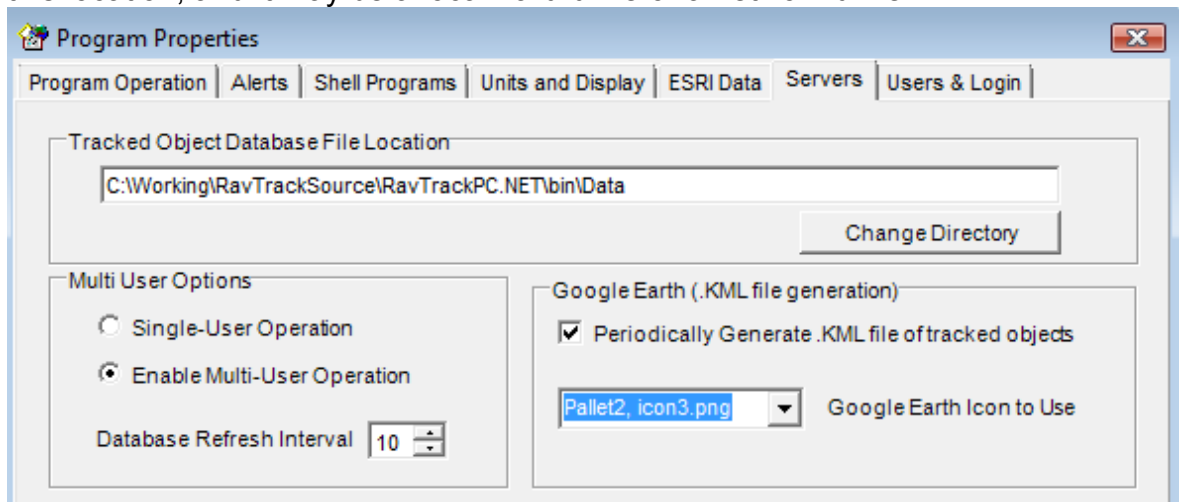
## Section 14

### Overview

RavTrack PC may be configured to send the position and status information from the Tracked Object to the Google Earth program. It passes the position and status information from RavTrackPC over to Google Earth using a .kml file. The .kml file type is used by Google Earth to exchange position and map information.

Enabling the Google Earth interface is a two-step process:

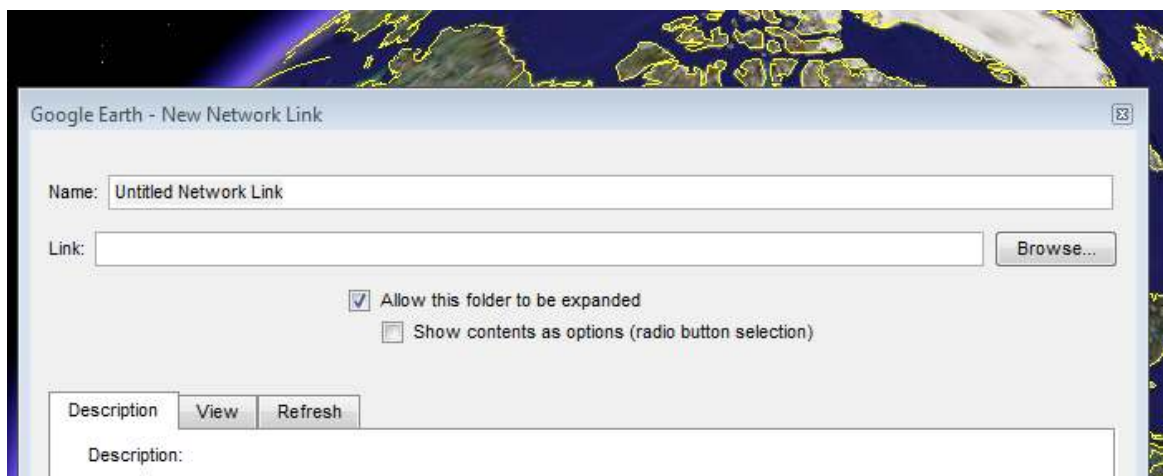
1. Configure RavTrack PC to periodically create and store .kml files by selecting **File, Program Properties, Servers** from the main RavTrack PC window. Check the “Periodically Generate .KML file...” box. You may also select the Google Earth icon to be used when displaying the tracked objects. The .kml file will be stored in the same location as the *Tracked Object Database File Location* shown on the **Servers** tab. You may change this location, and it may be a local hard-drive or a network drive.



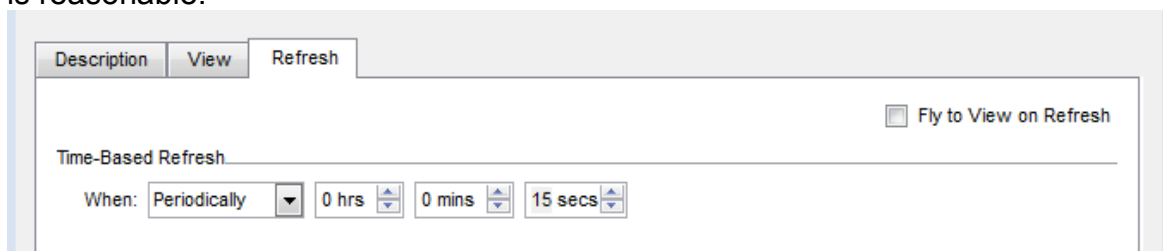
2. Install Google Earth, and start it up. From the Google Earth main screen, select **Add, Network Link**. This option is used to create a link to a .kml file on a network, or the local computer. Give the new network connection a name.

Next to **Link:**, click on the button labeled **Browse...** and select the .kml file that RavTrack PC is periodically saving. The .kml file is in the directory you defined in step 1. Its name is *TheTrackedObjects.kml*.





Click on the Refresh tab, and configure Google Earth to periodically retrieve the .kml file. The refresh interval will depend upon the speed of your network and the number of users, but an interval of 15seconds to a minute is reasonable.



Once *RavTrack PC* and *Google Earth* are configured, the process of exchanging the .kml file will take place automatically and the icons will appear on the earth for each Tracked Object that is enabled in *RavTrack PC*. If the Tracked Object has an alert, the icon used in Google Earth will be red, otherwise it will be the default color.



With no-cost version of *Google Earth* that may be freely downloaded, Google has disabled many of their icons that are ideal for tracking vehicles. Their icon list is shown below, but you may find that vehicle icons will display as pins or drops unless you purchase the upgrade to *Google Earth Plus*. Please consult the *Google Earth* License terms of use for information about using it to plot the location of your vehicles.

The standard Google Earth Icons, are show below There are 4 pallets (2-5), and 64 icons in each pallet.

	pal2	pal3	pal4	pal5		pal2	pal3	pal4	pal5
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
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30					60				
31					61				
32					62				
					63				



## Microsoft MapPoint Integration

### Section 15

#### Overview

RavTrack PC may be configured to send the position information from the Tracked Object to Microsoft's MapPoint 2010 program. It passes the position information using Microsoft's MapPoint APIs. MapPoint is run in parallel to RavTrack PC, and tracked objects will be shown on both the RavTrack PC window and the MapPoint window.

MapPoint may also be configured to reverse geo-code the locations of the tracked objects. This process determines the street address, city, and state that the object is located in. The address location information is the passed back to *RavTrack PC*, displayed to the user, and also stored in the activity log.

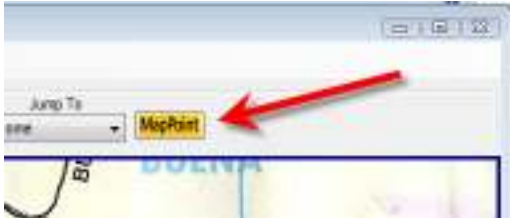
Use of MapPoint 2010 is optional, and is not required for RavTrack PC to operate.

#### Using MapPoint 2010 Maps

Install MapPoint 2010 on the computer that is running RavTrack PC. A 60 day evaluation copy is available from Microsoft. Only MapPoint 2010 has been tested with *RavTrack PC*, although older version of MapPoint may work.

Enable the MapPoint feature within *RavTrack PC* by selecting **File > Program Properties > Options > Microsoft MapPoint 2010**.

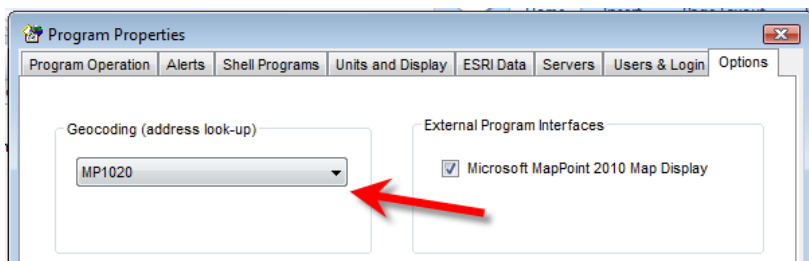
Click Save and Exit. Once this option is enabled, the MapPoint button will appear on the main screen. Click this button to pull-up a MapPoint map.



You will see vehicle icons on the MapPoint map at the location of each tracked object.

#### Reverse Geo-Coding

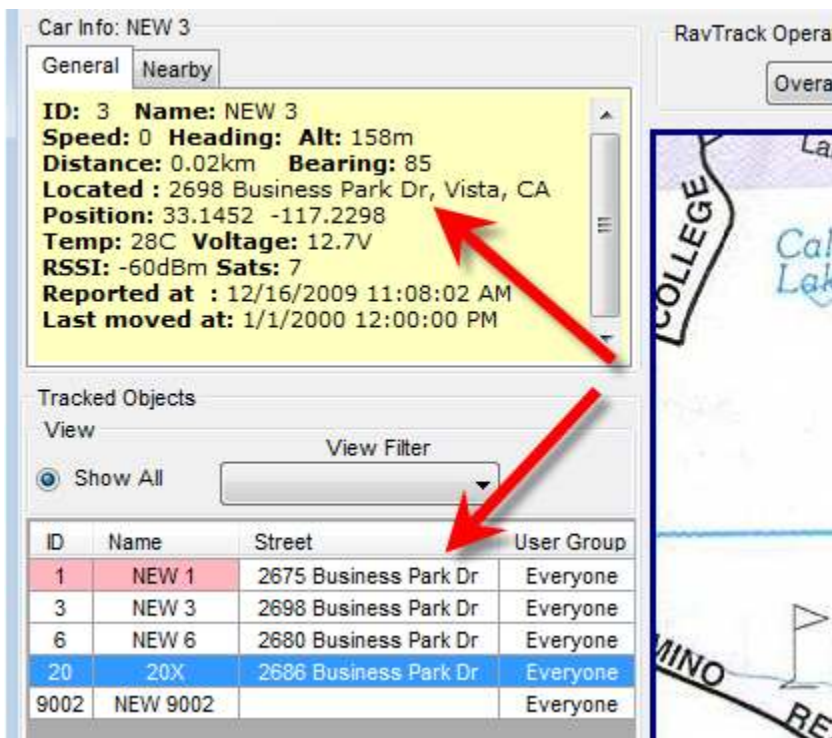
To display the actual street address of a tracked object on *RavTrack PC*, *RavTrack PC* needs a program that can look-up an address based upon the latitude and longitude of an object. MapPoint 2010 can be used for this. To enable reverse Geocoding, select **File > Program Properties > Options >** from the main menu.



In *the Geocoding* drop-down box, select **MP2010** to turn on reverse geocoding, or **NONE** to turn it off.

When geocoding is enabled, RavTrack PC will use MapPoint 2010 to look-up street address. MapPoint 2010 must be installed on the computer running RavTrack PC for this to work. If it is not installed, an error will be thrown if geocoding is enabled.

Once enabled, street address information is available to the user in both the object info window and the tracked object database.



The address is also stored to the LOG table, and is available for use on reports.



## *RavTrack PC Revision History*

## Section 16

The following is a list of major changes that have been done to the RavTrack PC software.

### Version 1.1.2 February 7, 2008

Initial Beta release of the firmware  
Activation code is 1R3A5-129RT

### Version 1.2.0 February 17, 2008

Temporary Beta release of the firmware  
Activation code is 1R3A5-129RT  
Improve alert configuration and operation  
Improved admin login-logout. Recalls settings upon restart

### Version 1.4.0 May 1, 2008

First production release of the firmware  
Added F5, F6, F7 functions  
Changed Alert Logging. Rule Alerts may now be put into the main activity LOG file.  
Allow imported .wpt files in Garmin format to be converted to internal POIs.  
Added ability to change the color of an Object's name if it triggers an alert.  
Added report generation for Tracked Objects and the LOG file.  
Added TCP/IP Winsock server option to communication ports  
Added ability to select and delete multiple POIs from the database  
Added ability to name the digital input conditions.  
Added F7 key. Display location to nearest tracked object to selected object.  
Added F6 key. Display nearest POI to selected object.  
Added **Advanced** button to Configure IO window.  
Added ability to read-in the log file, and position the tracked objects as they previously were.

### Version 2.0 October 1, 2008

2.0Beta. Re-written in Microsoft .NET and integrated Crystal Reports  
Added support for ESRI shape files  
Added User Groups for displaying, geo-fencing, and alerting by group

### Version 2.2 November 24, 2008

Multi-PC support added.  
Alert Table view added.

### Version 2.3 December 18, 2008

Multiple User Login support added.  
KML file saving for integration with Google Earth  
Added support for Alerting when Speeding in a Geo-Fence

### Version 2.5 April 7, 2009

Modified Licensing rights. Trial, Limited, Unlimited. Trial has 30-day limit.  
Added tabs to Object Info window, showing closest tracked objects in a list.  
Added support for Personal Locator flags. (Mandown, Alert, Critical Alert)  
Actions by users logging in/out are now recorded in a text file.

### Version 2.6 May 10, 2009

Improved speed of database access and reduced CPU load during updates.

### Version 2.7 July 4, 2009

Improved communication statistics and information.  
Added TCP/IP Client - Relay feature  
Added Log Replay feature  
Added Log Replay to Report Viwer

Added Geo-fence filter to report generator.  
Each individual rule may have a separate sound file associated with it.  
Added Terminal Window capability to Communication Status.

### Version3.0 Dec 18, 2009

Added support for Microsoft SQL Server 2005 database  
Added automatic Log Table backup engine  
Added Automatic Log Table pruning  
Added ability to create Log-based reports from the active log, or a backup Log file  
Added support for multiple-maps embedded within one single .maplib file  
Added main-window drop-down selection of multiple maps  
Added reverse-geocoding (address look-up) using Microsoft MapPoint 2010  
Street address is now included in log entry  
Added support for Microsoft MapPoint 2010. Display labeled Icons and list vehicles  
Added ability to geo-fence filter reports  
Added ability to limit alerts to specific times  
Added ability to limit alerts to specific days of the week  
Users can specify specific geofenced areas to create reports on the activity within them  
Added Daily, Weekly, and Monthly vehicle usage reports  
Added quick drop-down list of user-configurable locations on the map to jump to  
Added option to rotate each tracked object's icon in the direction of travel.  
Added ability to have multiple email address destinations  
Added ability to have different email addresses for different alerts  
Added graphical/checkbox to configuration of alerts based upon digital inputs  
Alerts may be triggered on digital inputs low, high, or any combination.  
Added human, soldier, boat, and ship icons.

### Version 3.1Jan 20, 2010

Added ability to select which user group(s) are to be displayed, using a drop-down list.  
Added "Manage Log" rights to user accounts.  
Moved the location of the /data, /maps, /sounds, /logfiles from the ProgramFiles directory to the default user data directory on the computer.  
Added support for Microsoft SQL Server 2008.  
Added ability to individually select which layers to display on the map.  
Added more system status information into the System Event Log File.  
Added support for Microsoft SQL Server 2008.





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## Section17

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#### ***Raveon Technologies Corporation***

1750 Bella Laguna Ct

Encinitas, CA 92024

js@raveontech.com



## *End User Registration Form*

**Section18**

To be eligible for upgrades and notices of improvements to *RavTrack PC*, please register your software with Raveon by mailing or emailing in the following information.

Your Name: \_\_\_\_\_  
Company Name \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
State: \_\_\_\_\_  
Postal Code: \_\_\_\_\_  
Email Address: \_\_\_\_\_  
License Code: \_\_\_\_\_  
Current RavTrack PC Version: \_\_\_\_\_

Send the above to:

***Raveon Technologies Corporation***

990 Park Center Drive, Suite C

Vista, CA 92081

Phone: +1-760-727-8004

Fax: +1-760-598-8004

Or Email it to your account manager at Raveon.

Raveon also appreciates any suggestions you may have for improvements to this product. Please let us know about any ideas or suggestions you have.

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**For More Information**

For more information about this or any other Raveon product, call in the U.S.A. 1-760-727-8004 or visit us a [www.ravtrack.com](http://www.ravtrack.com).

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