IDA
CORPORATION

TRAKIT USA INSTRUCTION MANUAL

Welcome to training on IDA Corporation's TRAKIT GPS AVL Fleet Management System. This training is focused on basic operation of the TRAKIT system using a radio communications link.. You will get familiar with the fundamentals, know where to go if you have questions and be exposed to most of the features and functions of the system. Areas that will be covered are

Overview

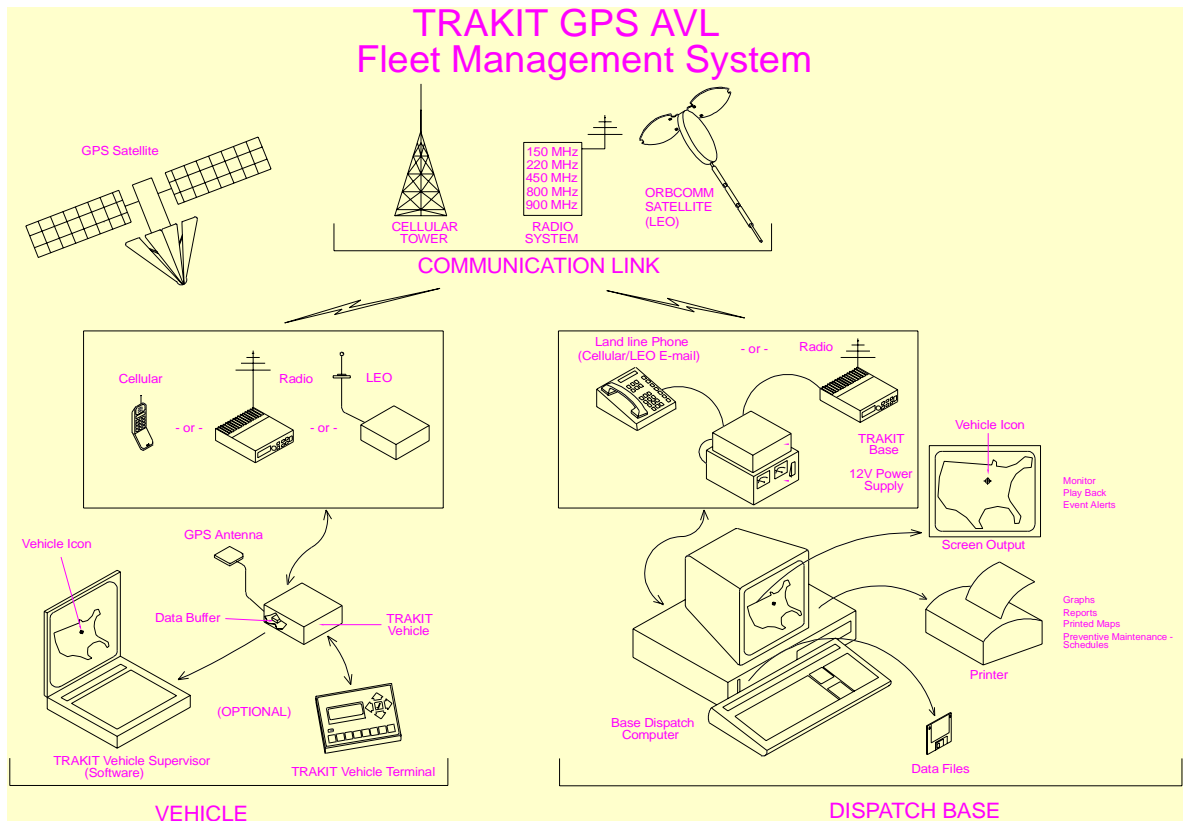Installation descripton (not installation training)

System Configuration
       Software and maps
       Vehicles

Operation

OVERVIEW
Elements of the system

TRAKIT GPS AVL
Fleet Management System

GPS Satellite

150 MHz
220 MHz
450 MHz
800 MHz
900 MHz

CELLULAR TOWER

RADIO SYSTEM

ORBCOMM SATELLITE (LEO)

COMMUNICATION LINK

Cellular   Radio   LEO

- or -   - or -

Vehicle Icon

GPS Antenna

Data Buffer

TRAKIT Vehicle

(OPTIONAL)

TRAKIT Vehicle Supervisor (Software)

TRAKIT Vehicle Terminal

VEHICLE

Land line Phone (Cellular/LEO E-mail)   - or -   Radio

TRAKIT Base

12V Power Supply

Vehicle Icon

Monitor
Play Back
Event Alerts

Screen Output

Graphs
Reports
Printed Maps
Preventive Maintenance - Schedules

Printer

Base Dispatch Computer

Data Files

DISPATCH BASE

Vehicle Equipment

Equipment installed in the vehicle will include (at least) the TRAKIT vehicle device connected to the mobile radio. The TRAKIT vehicle device includes the GPS receiver, communications modem and a data buffer. A GPS antenna connects to the TRAKIT and is installed to have a clear view of the sky.

The radio has its own antenna and is used to send locations from the vehicle through the radio communications network to the base station.

Dispatch Base

At the base station the data is received by the base radio and sent to the TRAKIT base device. A computer with TRAKIT software connects to the TRAKIT base device to accept the data and process it. The data is used for display of vehicle icons over a digital

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map on the screen or for creating files to be archived or used for generation of a variety of operation and management reports.

# *Installation*

<u>*Vehicle*</u>

When the TRAKIT vehicle device is attached to the radio in the vehicle it is assigned an identifying number. This number is made up of a 3 digit GROUP NUMBER and a 3 digit ID NUMBER. This is how the system identifies the individual vehicles. This number is recorded in the software module along with other information about that particular vehicle

<u>*Dispatch Base*</u>

At the dispatch base station a TRAKIT base device is connected between the base radio and the computer. The TRAKIT base software is installed in the computer.

Software and Map

Map Functions
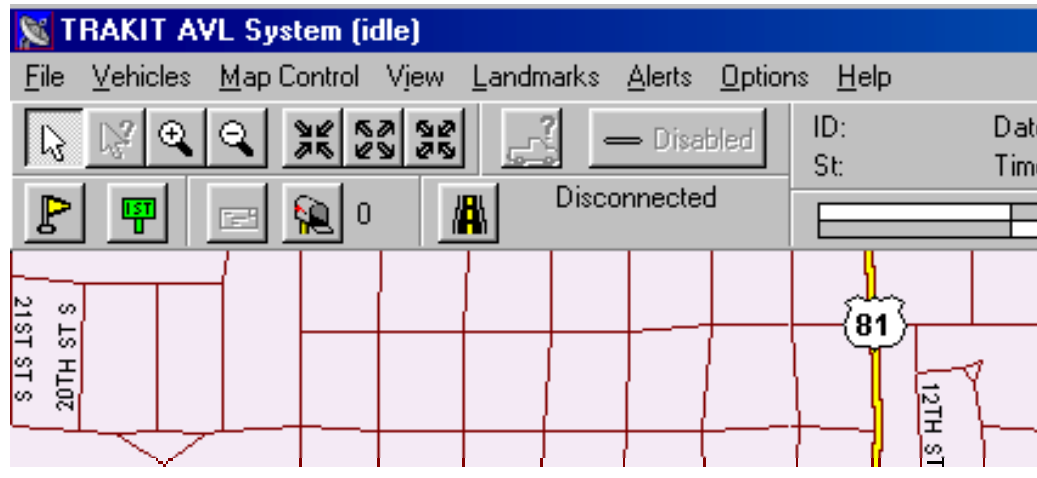
The map menus and buttons allow you to easily choose the function you want to perform or navigate around on the map. Click on these menu options to see the sub-menus.

File   Vehicles   Map Control   View   Landmarks   Alerts   Options   Help

Navigation

Point and center

The cursor is used to move the map. When you click the left mouse button (left-click) the map will readjust so that the point that you clicked is positioned in the center of the screen. This is a good way to pan the map either horizontally or vertically.

Zoom

There are several ways to have the map zoom-in or zoom-out.

From the menu bar you can click on VIEW. This will bring up a menu of zoom options.

View
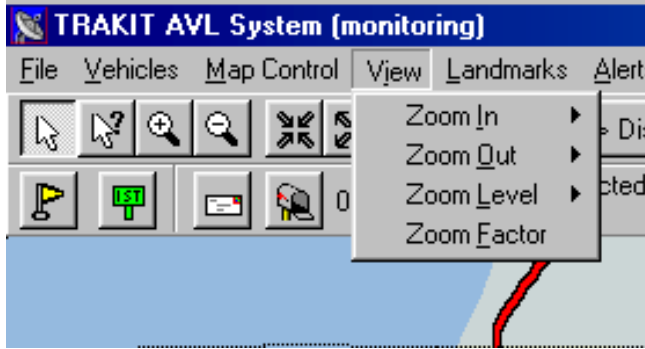
Or, you can select one of the zoom speed buttons in the row directly under the menu bar
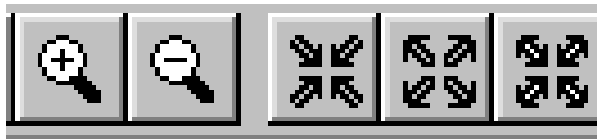
Left-click on the magnifying glass buttons to zoom in (+) or zoom out (-) and then place the cursor at some position on the map. The map will zoom and at the same time center on the position where you put your cursor. The next two buttons do not require placing the cursor on the map. The screen will stay in position and just zoom. Left-click on the last button and you will zoom in to the smallest level. Left-clicking this button again and you return to the level you came from.
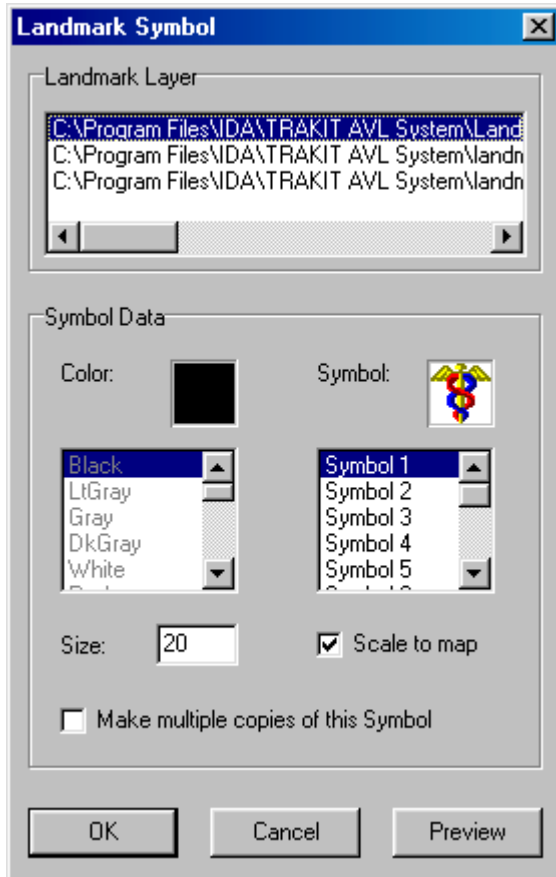
Landmarks

Landmarks are icons you can place anywhere on the map to use as reference points or to provide you with additional information about a certain point on the map. There are numerous icons to choose from and you can manage them to represent anything that serves your purpose.
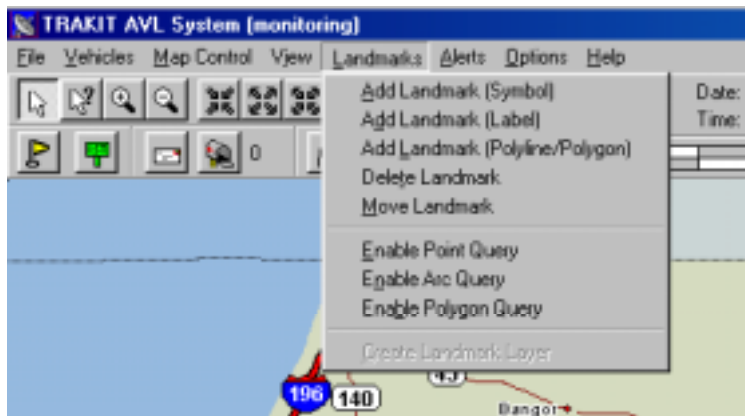
Select LANDMARKS from the menu bar. This will bring up a menu for creating and maintaining the landmarks. When you select ADD A LANDMARK SYMBOL you will go to the LANDMARK SYMBOL box
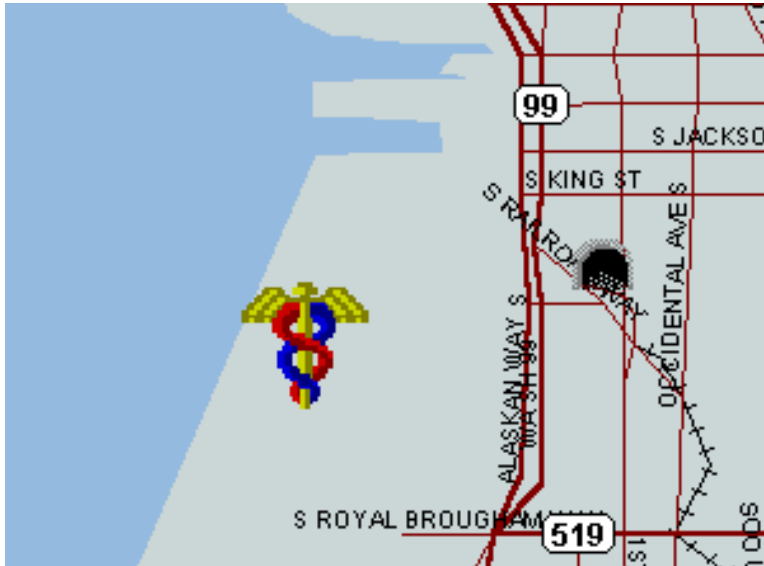
Landmarks
      Add Landmark Symbol

The LANDMARK LAYER is a file that is created. If a landmark layer has not been created for you see CREATE LANDMARK LAYERS in these instructions. You can have numerous landmark layer files open at any one time. You may want certain landmark layers visible at different times. For that you would manage which landmark layers were visible or invisible. To do this see MAP PROPERTIES in these instructions.

After selecting the landmark layer file you can choose the landmark Symbol you want to use. There are many to choose from. If the Symbol shows in black you can change the color. If the Symbol shows in a color already you cannot change the color. You can set the Size by points. You may want to experiment with Sizes to become familiar with how .big or small the numeric value will make the landmark. By checking the Scale to map box the landmark will dynamically change in size to match the zoom level. If you want the landmark to stay the same size no matter what the zoom level, leave this box unchecked. You can create multiple landmarks on the map at one time if you check the box Make multiple copies of the Symbol.

Position the cursor on the map where you want to place the landmark. Left-click once to place the landmark.
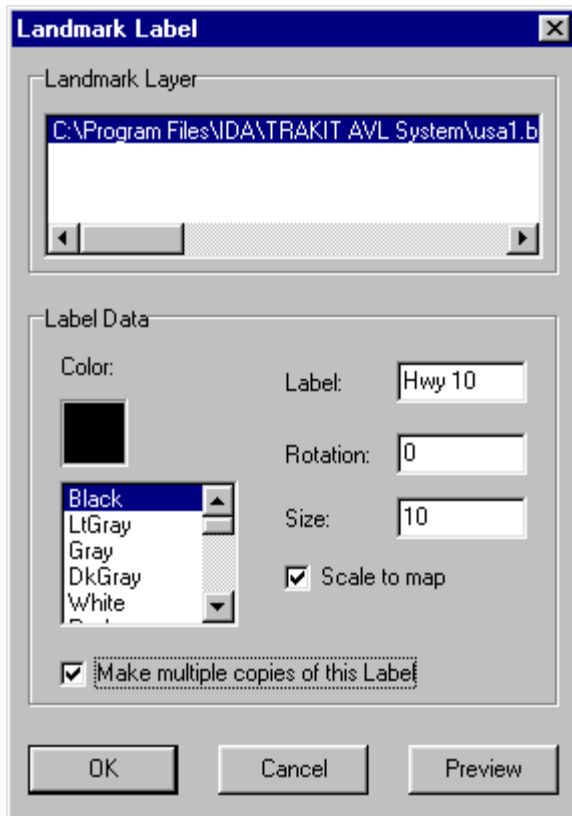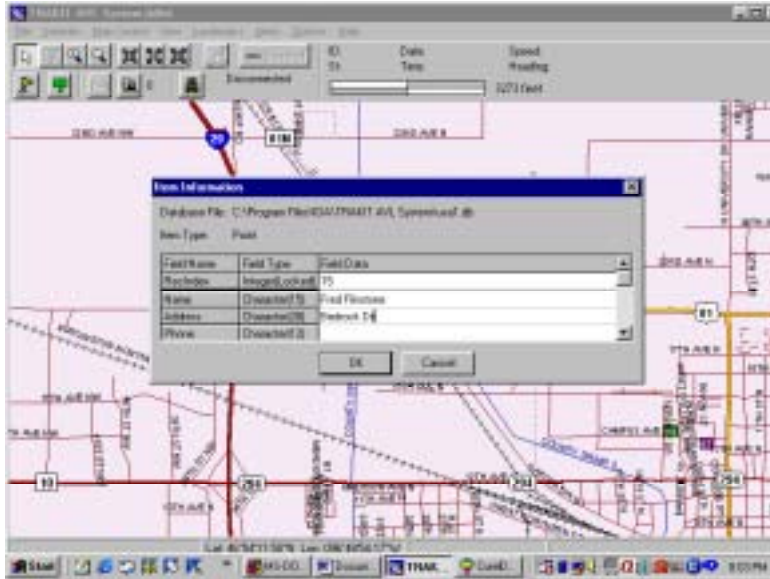
Labels

Labels are text strings that you can put on one or many positions on the map. They can be used to label a landmark or to apply custom annotation to the map. To create a label left-click on ADD LANDMARK LABEL from the LANDMARK menu. The LANDMARK LABEL box will appear.

Landmarks
       Add Landmark Label

Landmark Label   ✕

┌─ Landmark Layer ──────────────────────────────┐
│ C:\Program Files\IDA\TRAKIT AVL System\usa1.b │
│   │
│ ◄ ▓▓▓▓▓▓   ►   │
└───┘

┌─ Label Data ──────────────────────────────────┐
│ Color: │
│   Label: │Hwy 10│   │
│   ████████   │
│   Rotation: │0│   │
│   Black   ▲   │
│   LtGray   Size: │10│   │
│   Gray   │
│   DkGray   ☑ Scale to map   │
│   White   ▼   │
│   │
│ ☑ Make multiple copies of this Label   │
└───┘

        OK   Cancel   Preview

The landmark label is assigned to a landmark layer just like a landmark symbol. In the
Label box, type the text label that you want to put onto the map. You can rotate the label
to present the label in any attitude desired on the map. The Size can be set. A selection
can be made from a variety of colors.   By checking the Make multiple copies of this
Label box multiple labels can be applied to the map at one time. The Scale to map box
will make the label change in size with the change in zoom level. Not changing this box
will cause the label to remain the same size no matter what the change in zoom level.

Point & Click Data Feature

The TRAKIT system has a unique feature called Point & Click Data Feature. This feature provides for a database to be associated with map landmarks. When the landmark layer is created you can set up a set of file fields that, when landmarks are put onto the map the operator can enter data in each of the fields. You can have several landmark layers active at the same time, each with a unique set of data fields. One could have names and addresses of customers. Others could have numbers of tanks with tank capacities. Others could have special instructions that when a driver approaches the reference point the dispatcher can advise the driver of the instructions. You can also control when each landmark is displayed or not displayed on the map.

When the Point & Click data feature is enabled (see Create Landmark Layers), and you go to place a landmark on the map you will see the ITEM INFORMATION dialog box for you to enter data.

To close the ITEM INFORMATION box left-click on OK. The landmark will remain on the map at the position where you put your cursor.

To see the data that is associated with each landmark left-click on ENABLE POINT QUERY from the LANDMARK menu.

Landmarks
> **Enable Point Query**

This will change the cursor to an arrow with a + sign. Left-click on the landmark. This will bring up the ITEM INFORMATION box with the data associated with that landmark. While the box is on the screen the data in the fields can be changed. This means that these databases can be maintained on-screen.

The databases used with the Point & Click Data Feature are .db files. These files are commonly maintained by Microsoft Access, Paradox, dBase and many other database manager-type utilities. The files can be manipulated and updated outside of TRAKIT. This means that updates from outside files like accounts receivable, sales or notation files could be easily accessible by the Point & Click Data Feature.

Create Landmark Layers

Each landmark symbol and landmark label must be attached to a landmark layer. You may want to spend some time analyzing how management of landmark layers will benefit your application. You can turn layers on or off depending on the presentation you wish to have on the screen at any given time. Each landmark layer can be associated with a custom database that provides the Point & Click Data feature. For this feature you determine the fields of data in the database. These fields can then be maintained on-screen by using the Enable Point Query function.

To create a Landmark Layer go to LANDMARKS, CREATE LANDMARK LAYER

Landmarks
      Create Landmark Layer

Create fields of the file by left-clicking on Add Field. In the Field Information box the Name will indicate the next field number available. You can change this to any field name you wish. You can indicate the Type and size (Width) of the field. Field Indexed is reserved for advanced users. By clicking on Create you will have created the landmark layer.

Visible control
You can control whether or not the landmark will be displayed on the map. When setting up the Point & Click Database Data structure include a field called "visible". Indicate the field Type as "logical". This field acts like a toggle switch by turning on or off (True or False) the display of this landmark.

Map Properties

You can manage landmark files in the Map Properties box. Get there by MAP CONTROL, MAP PROPERTIES.

Map Control
    Map Properties

Map Properties dialog box:

Map Name: C:\PROGRAM FILES\IDA\TRAKIT AVL SYSTEM\default.bmm

Map Description   AVL System Map

Attached Layers
Enhanced USA Map - Do not delete!
C:\Program Files\IDA\TRAKIT AVL System\Landmark.bll - Landmark Layer
C:\Program Files\IDA\TRAKIT AVL System\landmark2.bll - Landmark Laye
C:\Program Files\IDA\TRAKIT AVL System\landmark3.bll - Landmark Laye
Zone Layer - Do not delete!

Delete   Top   Bottom   Layer Info

OK   Cancel
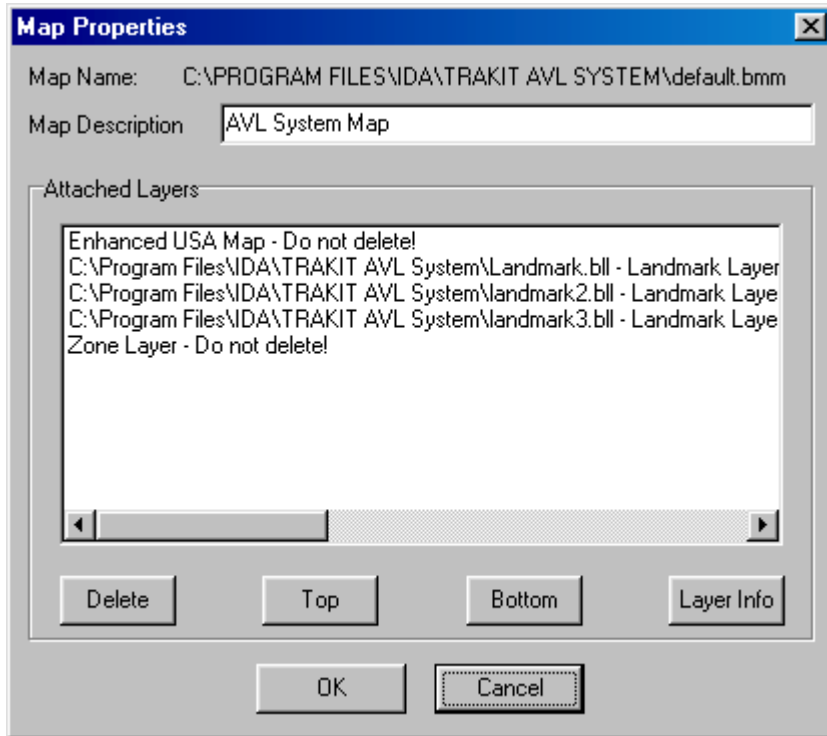
Double-clicking on a landmark layer brings up the Layer Properties box. Under Layer Controls you can indicate in the Layer Visible box if you want the layer to be used on the map. Other parameters in the box are reserved for advanced users only.

Layer Properties

Layer Name: C:\Program Files\IDA\TRAKIT AVL System\Land

Layer Description   Landmark Layer

Layer Controls

☑ Layer Visible   ☑ Memory Based

Minimum View Scale   0

Maximum View Scale   1000000000

Extent Area

North-West X: -180.00   South-East X: 180.00

North-West Y: 90.00   South-East Y: -90.00

[OK]   [Cancel]

Additional Map Views

Besides the main full-screen map view up to two additional views can be displayed on the screen. To show the additional views left-click on MAP CONTROL on the menu bar, then select either or both of MAP VIEW 1 and MAP VIEW 2.

Map Control
      Map View 1 (or) Map View 2

Each of the map views can have independent zoom levels. Each of the views can be programmed to follow a vehicle. This is a good way to follow several vehicles at street-level zoom or to monitor a vehicle at street-level and wide-area zoom levels at the same time.

Vehicle Info List

The Vehicle Info List is a box that is displayed on the screen showing the text address and other information about each position received from each vehicle. The box can be sized and placed anywhere on the screen. Initiate the Vehicle Info List by selecting SHOW VEHILCE INFO LIST from the VEHICLES menu

Vehicles
    Show Vehicle Info List

Alert Zones

You can set up zones on the map to detect if vehicles enter or leave specified areas on the map. To Work with zones select ALERTS from the menu bar, then ZONE. To make a new alert zone select NEW.

Alerts
    Zone
        New
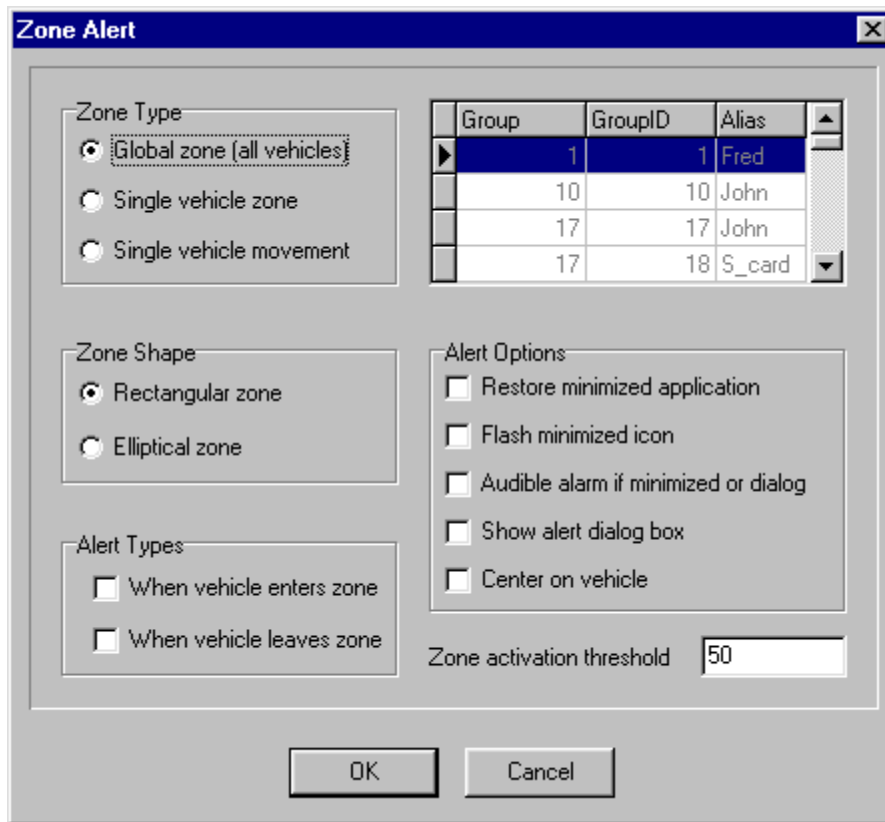
Select a zone type. You can set the zone to apply to all vehicles, a single vehicle or to detect the movement of a vehicle. If for only one vehicle select that vehicle from the vehicle identification box. The Zone activation threshold is the number of meters that the vehicle will enter or leave the zone before the zone alert will be triggered.
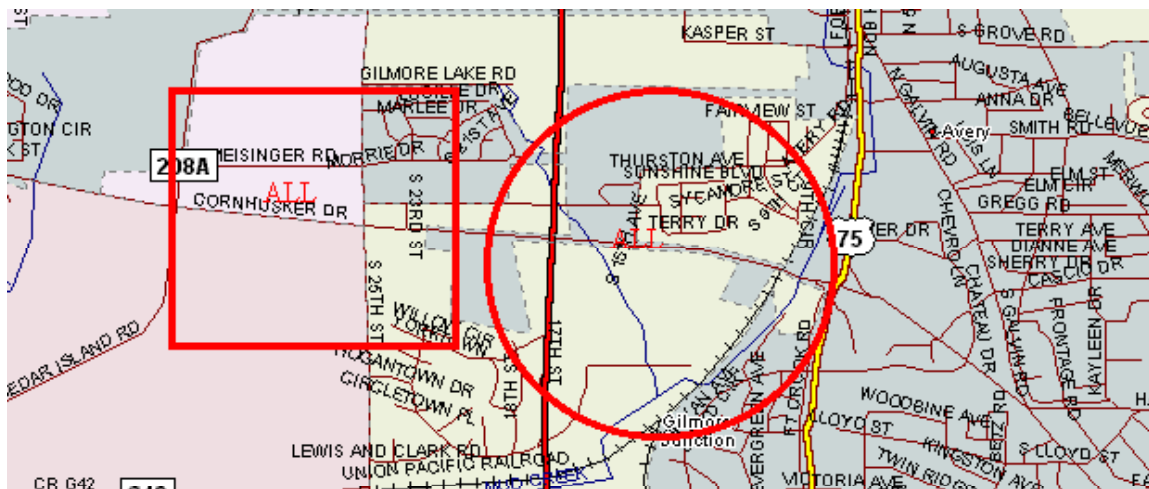
Position and size the zone by clicking and dragging across the map. Left-click to confirm position and size of the zone.   If the zone does not show on the map, check the ALERTS, VIEW, OPTIONS menu selection.

Alerts
> **View**
>> **Options**
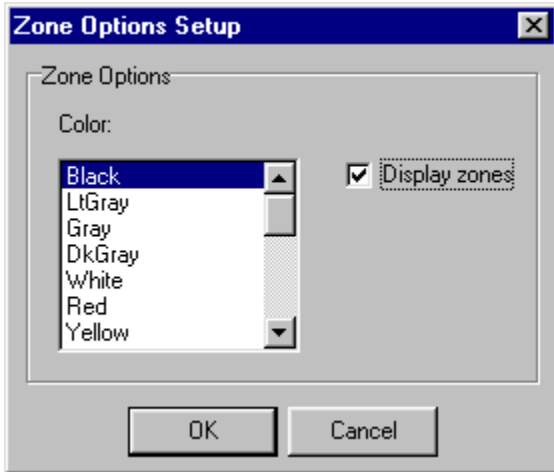
Make sure the Display zones box is checked. This is also where you can select the color of the zone lines.

Map Control- Display Options

Map Control
　　　Display Options
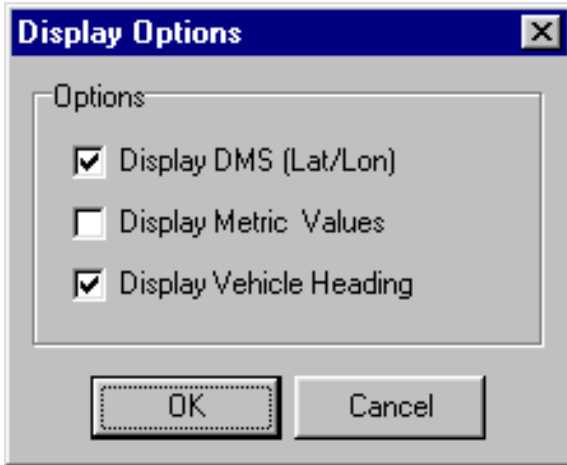
Use this box to change the display of DMS (Degrees, Minutes, Seconds) and metric values as well as tell the system to indicate the direction of travel of the vehicle icon by pointing the icon in that direction.

Grid Lines, Grid Tics

You may want to set up additional reference points to make the job of dispatching easier. Grid Lines and Grid Tics can help. Select these options from the MAP CONTROL menu.

Map Control
　　　Grid Lines (or) Grid Tics

Grid Lines
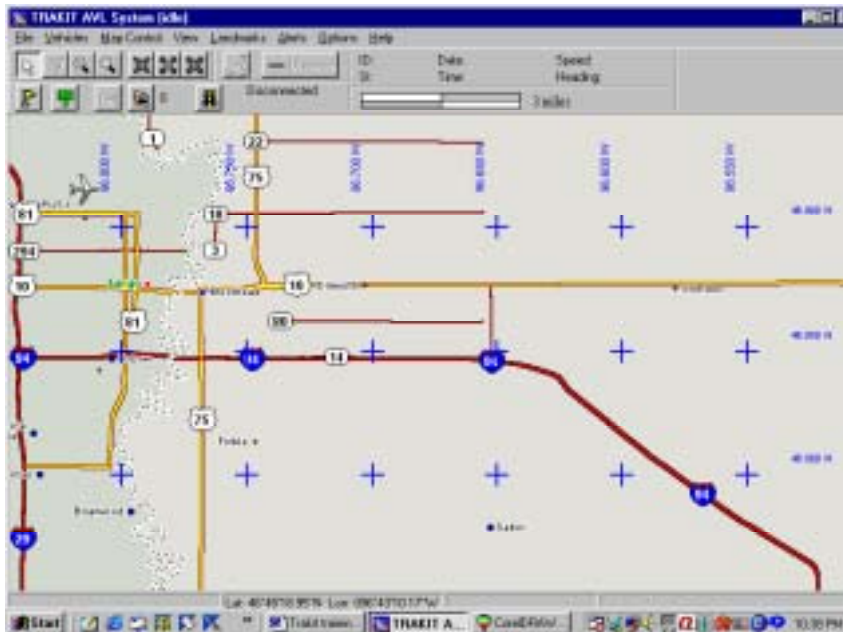
Grid Tics

Drawing Tool

The TRAKIT map includes a drawing tool for placing lines and shapes on the map.
From the MAP CONROL menu select the ADD LANDMARK
(POLYLINE/POLYGON).

Map Control
   Add Landmark (Polyline/Polygon)

20
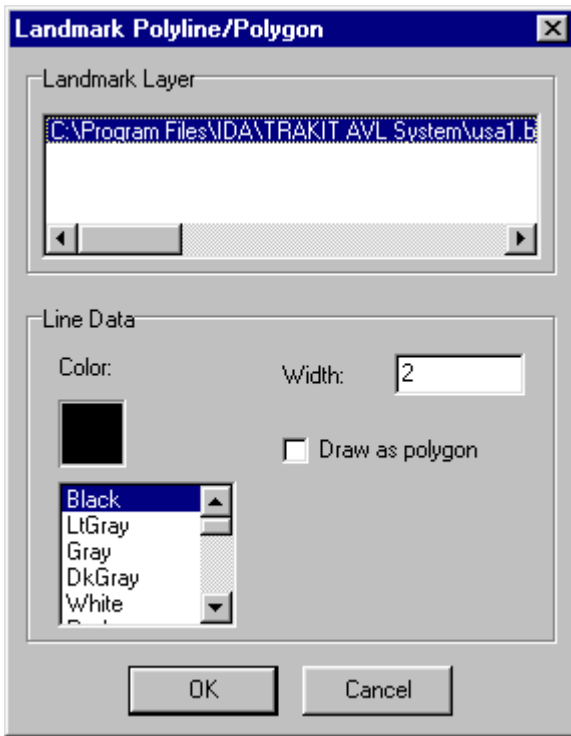
Select a color and size for the line. After left-clicking OK perform a series of left-clicks on the map along the route you wish to draw the line.
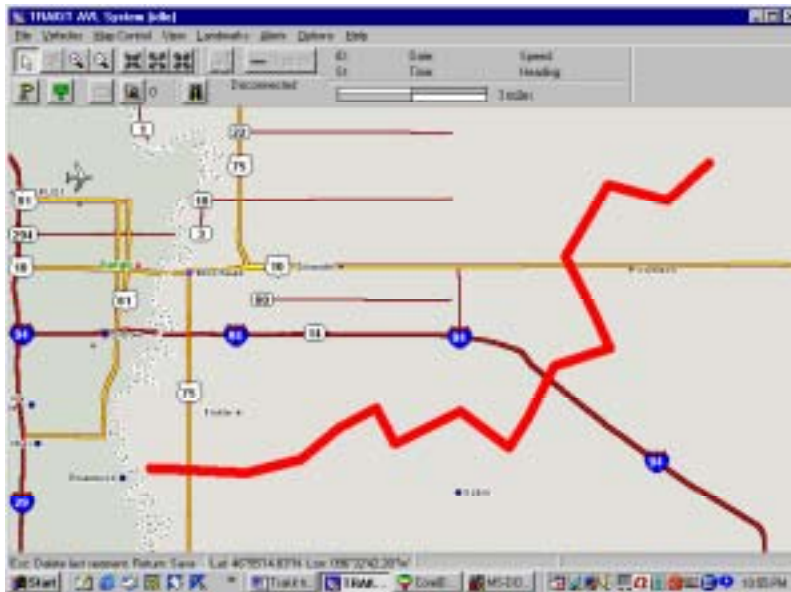
Check the Polygon box to make a shape on the map. You can make virtually any shape.
Perform a series of left-clicks on the map outlining the area you want to cover
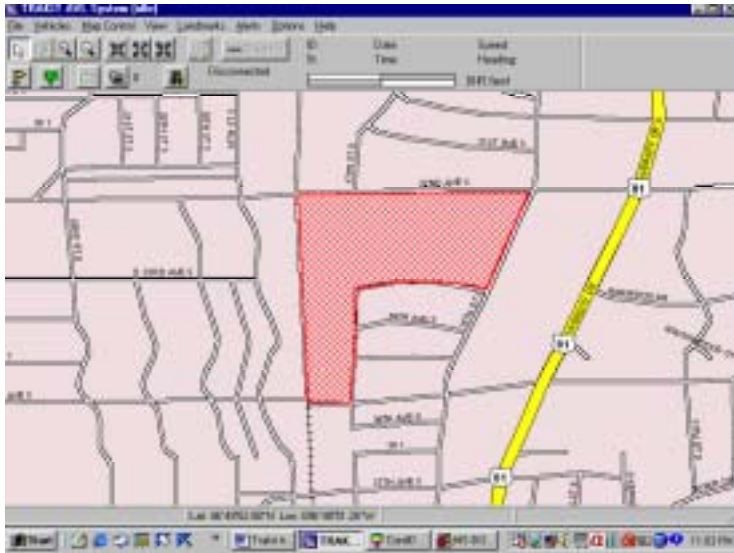
Address Search

Find the map location from addresses. Indicate a city or address and the location will be found on the map. Click on the yellow flag to find a place (city) and the green sign post to find a location by street address.
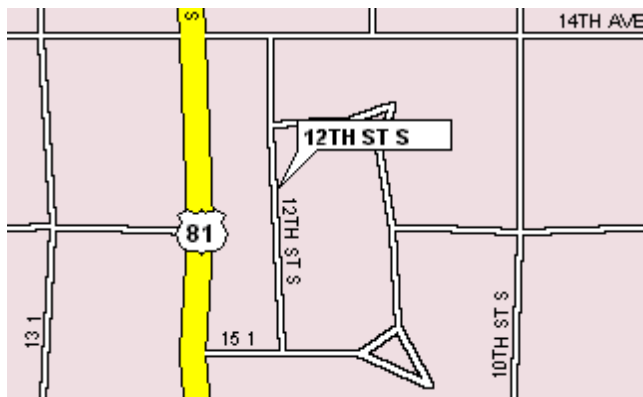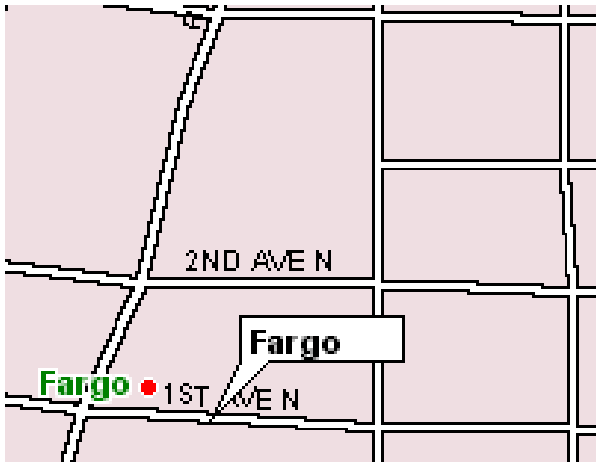
Router

The TRAKIT software includes a router that will trace out a route from one point to another.

Indicate the Start Location and the Finish Location then click on Calculate. The system will look for the best route based on your selections
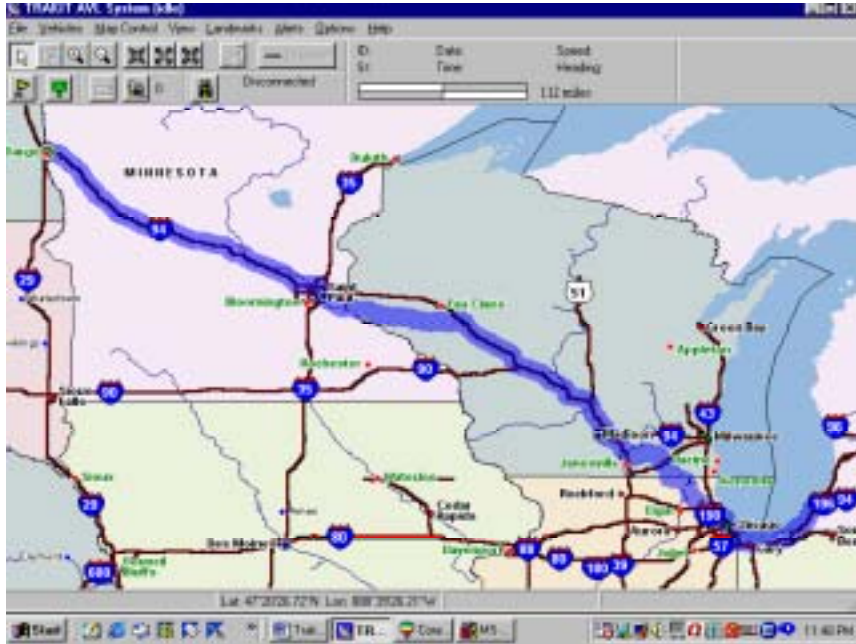
When you close the box the route will be plotted for you on the map.

Print Map

If you want to print a map there is a menu selection under MAP CONTROL to print the map that is currently on-screen. The map is printed along with any landmark symbols and landmark labels you entered.

Map Control
      Print Map

VEHICLE
Vehicle Programming
<u>New/Modify vehicle</u>

When setting up the system you must tell the TRAKIT software about the vehicles. There are numerous features and functions available if the vehicles are properly programmed into the software. From the VEHICLES menu select ADD VEHICLE

Vehicles
> **Add Vehicle**

The Group and ID you enter must match with the Group and ID that was programmed into the vehicle device when it was installed. The Alias is the label that you will see under the vehicle icon on the digital map when you are monitoring.

Ref# and Driver are fields that will be inserted in log files. You may want to assign these to identify a job, customer, etc. or the driver of the vehicle. When reports are generated from the files this data can be reported.

You must check the Poll Vehicle box if you want the system to include this vehicle in the polling rotation. Likewise you will want to check the Playback Display box if you want this vehicle to appear on the digital map when playing back an activity file.

Choose a Polling Interval. There are many choices from By Query Only to One Day.

Choose a vehicle icon. You may want to organize your icons to represent types of vehicles in your fleet. If the icon shows black in the box you can change the color.

Bread Crumb Trail Enable will turn on a feature where the last 20 positions of the vehicle activity will be displayed on-screen by the icon you select for the bread crumb trail. If the icon shows black in the box you can change the color.

The Cellular Setup and StarCom Setup boxes are not used for radio systems.

Modify Vehicle

Selecting MODIFY VEHICLE from the VEHICLE menu allows you to change the settings for each vehicle.

Vehicles
  Modify Vehicle

You may want to change the settings often to increase the efficiency of the system. By turning off polling when the vehicle is not in use the system will not waste time looking for it.

Modify Vehicle Hardware

There is intelligence in the TRAKIT vehicle devices that help the efficiency and usefulness of the system. You can adjust settings in the vehicle devices over-the-air that affect how often location positions are sent to the dispatch center or recorded in the vehicle device data buffer.

When you select MODIFY VEHICLE HARDWARE from the VEHICLES menu ,

Vehicles
  Modify Vehicle Hardware

you will select a vehicle you wish to change the settings for. The system will attempt to communicate with the vehicle device and retrieve a copy of the present settings. If the vehicle device is not operating, possibly because it is powered down, the connection will not be able to take place.

Remote vehicle setup

Vehicle ID

Group [1]   ID [1]

Buffer control
- ● Overwrite buffer when full
- ○ Stop writting to buffer when full

Send timeout/retries

Position send timeout [0]

Position send retries [0]

Position events

	Send	Store
Poll		☐
Power	☑	☐
Timer	☐	☐
Direction change	☑	☑
I/O line active	☐	☑
I/O line inactive	☐	☐
I/O line 2 active	☐	☑
I/O line 2 inactive	☐	☑

Dynamic timers

	Speed	Interval
Speed/Interval 1	10	1
Speed/Interval 2	10	1
Speed/Interval 3	120	44
Speed/Interval 4	120	99
Speed/Interval 5	120	1000

Additional values

Turn threshold value [0]

[OK]   [Cancel]

If your communication with the vehicle was successful the Remote Vehicle Setup box will appear.

Buffer Control
With this setting you control what happens if the capacity of the data buffer is exceeded in the TRAKIT vehicle device.

Position Events
Certain events can trigger location positions to be sent to the dispatch center or recorded in the TRAKIT vehicle device. A vehicle does not always have to be polled from the dispatch computer to send its location. These settings will cause the positions to be automatically sent when it is most efficient for the vehicle to do so. Likewise location positions can be selectively recorded in the vehicle data buffer reducing the amount of unnecessary data and conserving buffer capacity.

<u>Dynamic Timers</u>
The efficiency of tracking a fleet of vehicles on a radio system is greatly enhanced by maximizing the capacity of the communications link. By sending location data only when necessary the burden on the communications link is lessened considerably.

The Dynamic Timers feature provides for five speed ranges each assigned with a different time interval for sending the vehicle position. Depending on the requirements of your application you can adjust these settings to promote the greatest efficiency of the system. The interval is expressed in seconds and the speed is expressed in miles per hour or kilometers per hour depending on your setting in the Map Control, Display Options.

Map Control
       Display Options

Each Speed/Interval corresponds with the time interval that is used for recording or storing positions.

<u>Turn Threshold Value</u>
This setting is the number of degrees of heading change that will trigger a direction-change event for sending or storing location positions. This feature can help define the actual route of a vehicle by showing all of the corners of the route taken. It can also be useful to efficiently track a vehicle, not just getting time-interval positions but positions when the vehicle changes direction.

When OK is clicked on the Remote Vehicle Setup box the system will attempt to update the settings in the vehicle. The TRAKIT vehicle device needs to be operational for the settings to be updated in the vehicle.

OPERATION

Real-time Monitoring

After the TRAKIT vehicle devices are installed and the vehicles are properly set up in the TRAKIT software you can begin to start monitoring activity of the vehicles. Start your TRAKIT AVL system from Windows.
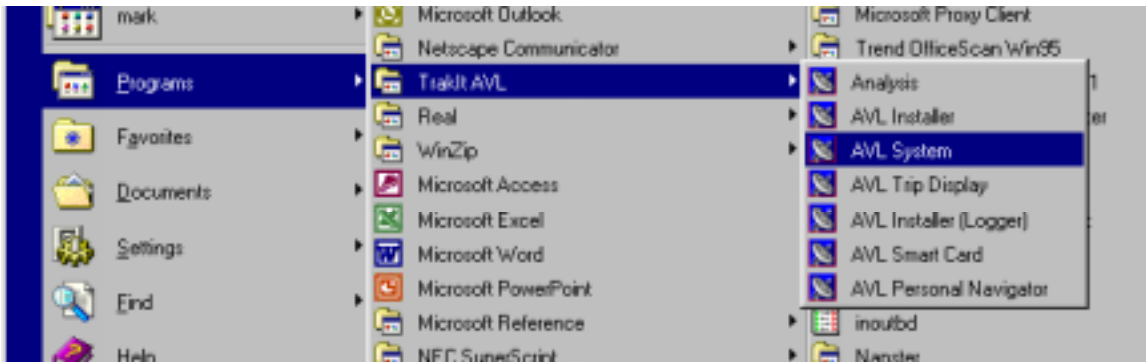
You will see the TRAKIT map.

From the FILE menu select the option to START MONITORING.

File
      Start Monitoring

The system will immediately begin to start polling the vehicles and/or displaying positions sent from the vehicles. As each position is received the icon for that vehicle will be presented on the map at the location that is reported. You can set the system to always start monitoring when you go into the program. This setting is located in the OPTIONS menu, GENERAL SETUP.

Options
      General Setup

You can also have the Vehicle Info List show automatically when you start the program.
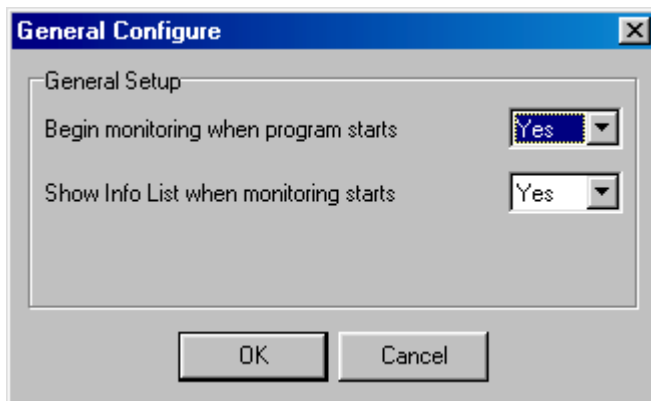
Also from the OPTIONS menu you can change polling settings in POLLING SETUP.

Options
      Polling Setup

Polling Setup

Group	GroupID	Alias	Poll
1	1	001-001	Yes
1	2	Two	No
1	100	Greg	Yes
10	10	John	Yes
17	17	John	Yes

Global Interval Override

☐ Override individual intervals

By query only
Continuous (no delay)
1 minutes

Group Update

☐ Group 001
☐ Group 010
☐ Group 017

[Poll] [Display]

File Logging

☐ Record position files
☑ Automatic name creation
☑ New file created at midnight

Polling Control

Polling Retries: 1

Polling Timeout: 10

☑ Enhanced Records

Dynamic Polling

☐ Enable

Intervals before pause: 4

Intervals before retry: 20

[OK] [Cancel]

In this box you can set a polling rate that overrides the vehicle settings. Double-clicking on the vehicle will bring up that vehicle's settings if you want to change them.

File Logging
If you check this box a file will be created storing all of the activity of all of the vehicles. These files can be used for play-back at a later time or for processing in the TRAKIT ANALYZER program for generation of operation and management reports. You can instruct the system to automatically name these files for you each time and to automatically start a new file at midnight of each day.

Dynamic Polling
There are times when vehicles are out of service or inactive for extended periods of time. It may be inefficient to continue to try to poll those vehicles, taking up valuable cycle time of the system. When Dynamic Polling is enabled, if polling is not successful for a certain number of Intervals Before Pause, the system will automatically wait a set number of Intervals Before Retry before trying to poll that vehicle again.
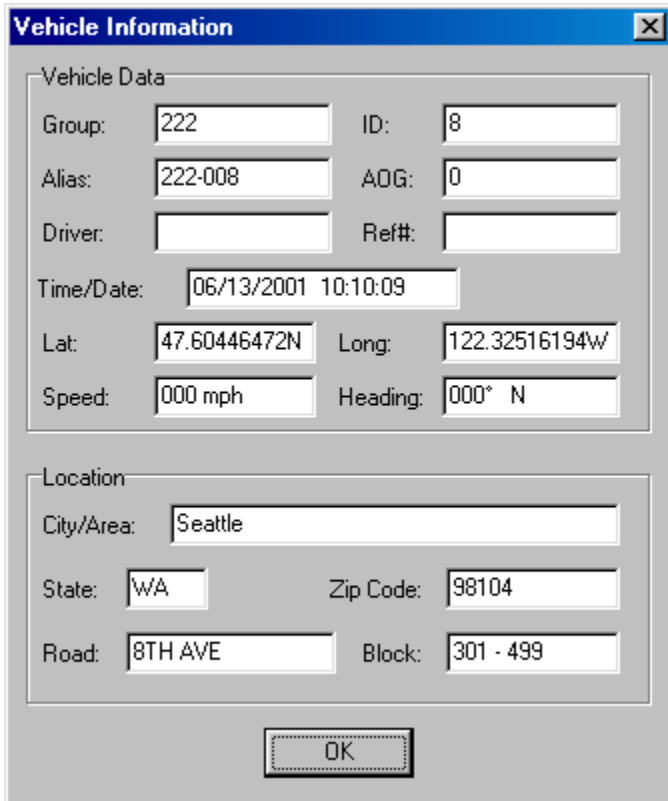
Query A Vehicle

At any time you can query the location of any active vehicle. Do this by either selecting QUERY VEHICLE from the VEHICLES menu

Vehicles
> **Query Vehicle**

or by clicking on the speed button and selecting the vehicle you want to query

Get information about a vehicle by clicking on the question-mark speed button .
Drag the ? to the vehicle you want and click.
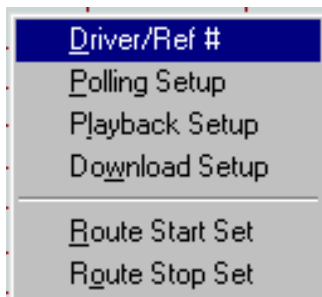
Information on that vehicle will display showing time and date of last position and the physical address of the position.

Right-clicking anywhere on the map will bring up a dialog box with short-cut options.

You can change the Driver/Reference number on the fly. These data elements will occur along with the location data in files captured while monitoring the activity of the fleet. You can go directly to the Polling Setup, Playback Setup or Download Setup menu options.

The Route Start Set and Route Stop Set are used to automatically indicate the start and end parameters of the automatic routing feature.

Follow Vehicle

You may want the map to adjust automatically to follow a vehicle if it should travel past

the map shown on the screen. Left-clicking on the Follow Vehicle button [— Disabled] will let you select the vehicle that you want to follow.
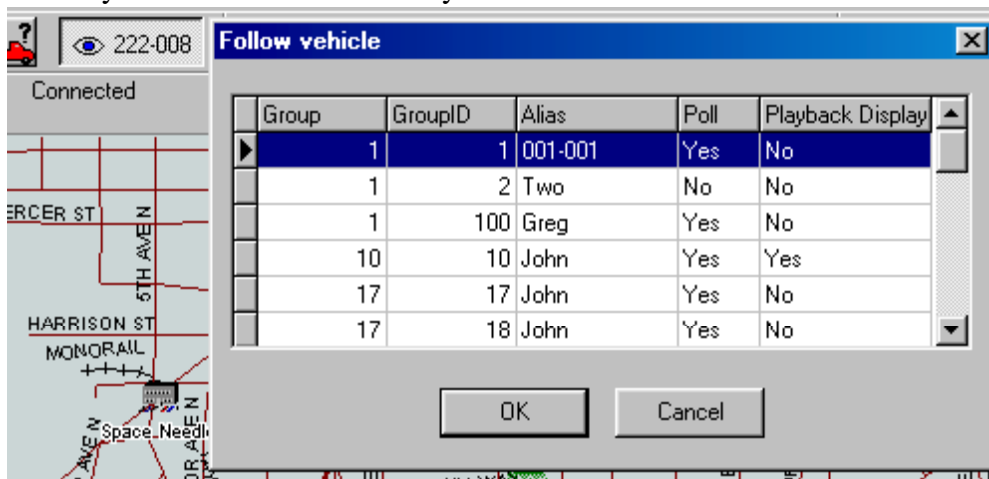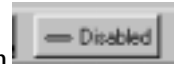
Whenever this selected vehicle starts to go off-screen the map will automatically adjust to position this vehicle in the middle of the screen.

Over-The-Air Buffer Download

Data captured and stored in the TRAKIT vehicle device can be downloaded to the dispatch computer over-the-air. To do this select DOWNLOAD VEHICLE DATA from the VEHICLES menu.

Vehicles
    Download Vehicle Data

You will be asked to select the vehicle. You will name the file and indicate where on your computer you would like to place it. The system will then attempt to download all of the data from the selected vehicle's buffer. The amount of time this will take will depend on the capacity of the radio system and amount of data to be downloaded. Once downloaded the files can be used to play-back activity or for processing by the TRAKIT ANALYZER to produce operation and management reports.

Play-back of Vehicle Activity

Any file captured from monitoring or downloaded from the vehicle can be played back on-screen. From the FILE menu choose PLAYBACK FILE.

File
> **Playback File**

Select the file you wish to play back. You can control the play-back using the VCR-type buttons.

In order from left-to-right the buttons are:
REWIND-STOP-PLAY- FAST FORWARD-PLAY AT 2X SPEED-REPEAT PLAY-
PAUSE
The playback will run at approximately one position per second. 2X SPEED will double that speed. REPEAT PLAY will automatically start the playback over from the beginning when it reaches the end.

Export to ASCII

A captured data file can be exported to a standard ASCII file. This file can be imported into a variety of spreadsheet and database management programs for individual and detailed analysis. Select this option by going to the FILE menu and selecting EXPORT TO ASCII.

File
> **Export To ASCII**

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