Radioactive Networks

netAPRS
System
Manual

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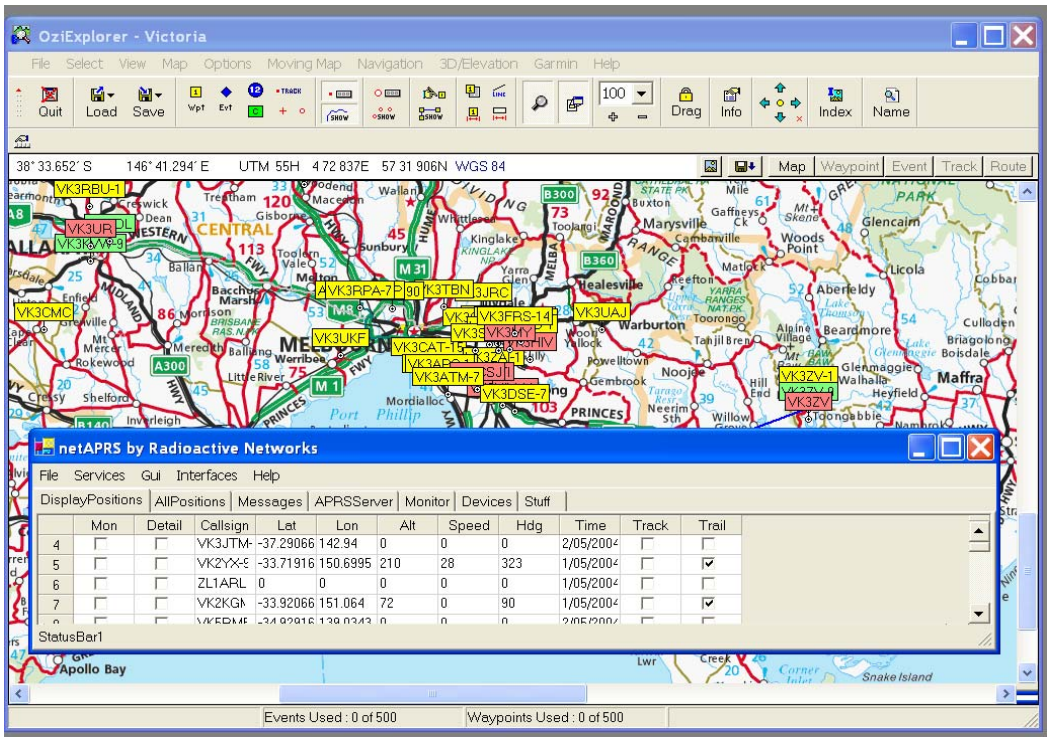
Introduction

NetAPRS is a vehicle tracking system for external mapping programs such as OziExplorer (http://www.oziexplorer.com) and Microsoft MapPoint. As such, it is intended to be a general purpose tracking tool, with little knowledge of how to actually display positions. The positions are displayed by an external program.



NetAPRS is an ever expanding piece of software, and there are always features being added. As such this manual should not be considered the be all and end all for learning about the software. Most of the features have previously been implemented in our OziAPRS software. However, some of the features in NetAPRS may not operate correctly, or may operate in strange ways. In some cases this may be their intended functionality, and in other cases it will be because the software has not been completed.

netAPRS is based on our successful OziAPRS software, and copies many of the features of this program. We intend that netAPRS will be the successor to OziAPRS, and that on a whole, development will cease on OziAPRS.

Liability and Warranty

Radioactive Networks does not accept any liability for operation or lack of operation of its vehicle tracking software and hardware. It is provided as on an ‘As Is’ basis only. Where issues are found we may decide to fix the problem, but make no representations on the fitness of any changes.

Copyright

Copyright in this software is owned by Radioactive Networks Pty Ltd. Copying this many and this software without a valid license is illegal.

APRS Capability Statement

The NetAPRS software has a number of software features that implement decoding of packets conforming to the APRS Specification published by TAPR (http://www.tapr.org).

Features

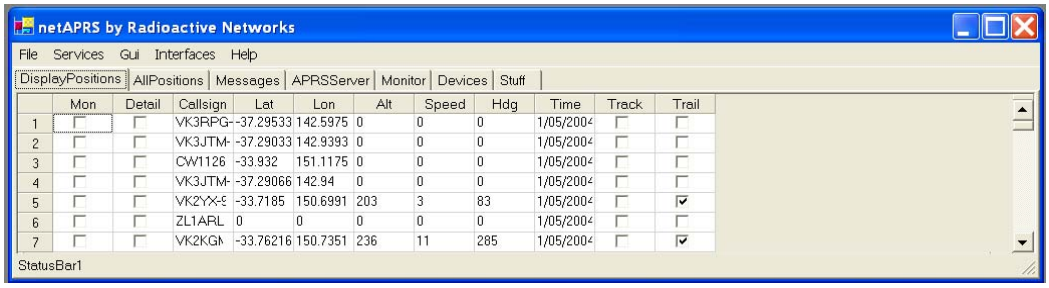
Documentation To Do

There are a number of areas that this documentation does not yet address.

Right now the list of omissions and changes required are too extensive to list.

The NetAPRS Screen

Display Positions Tab

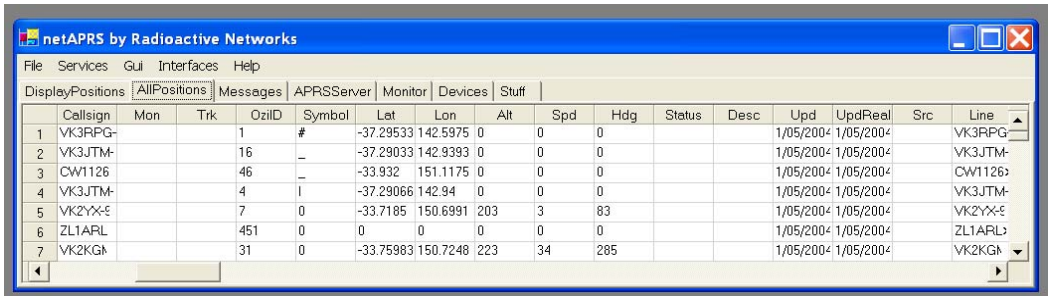


The display positions tab contains a subset of information for all known stations. The columns that appear on this list are internally configurable.

The central part of the NetAPRS screen is the table for the positions. This table contains all the data that the software knows about the object being tracked. If the information is not in this table then it will not appear in the mapping software.

Each row contains details on a different station, whilst each column contains different information for the station. Some columns contain information that may appear irrelevant to the user. The reason that these columns exist is that they are used by the mapping software rather than actually for the user.

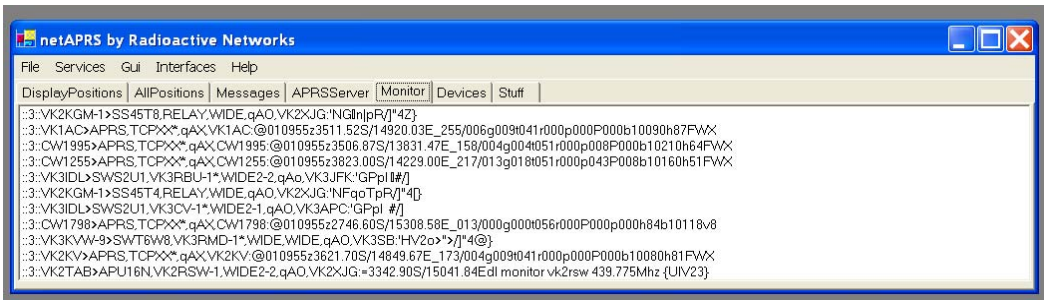
All Positions Tab



Whereas the Display Positions Tab contains only a few columns of information, the All Positions Tab contains a large number of columns, of which only a few are generally of use to a user. Additional columns include information used by the integration with OziExplorer and other mapping software.

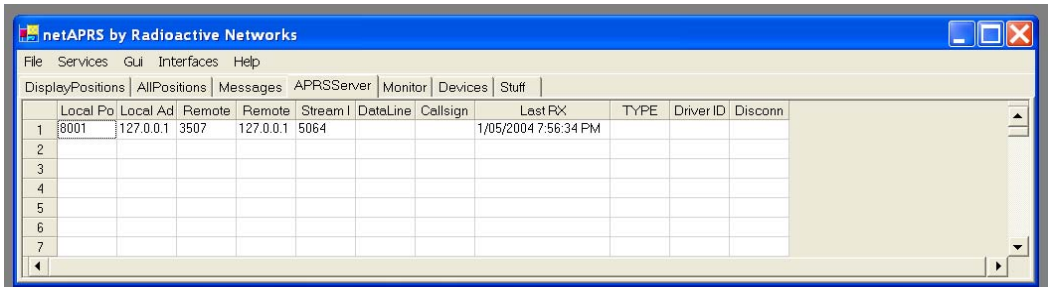
The tab is visible since there will be occasionally a need for a user to see some of this information. However in general, this tab can be ignored.

Monitor Tab



When activated, the monitor tab provides a realtime display of all incoming data. The number at the beginning of the line is the device number of the incoming data stream.

APRSServer tab

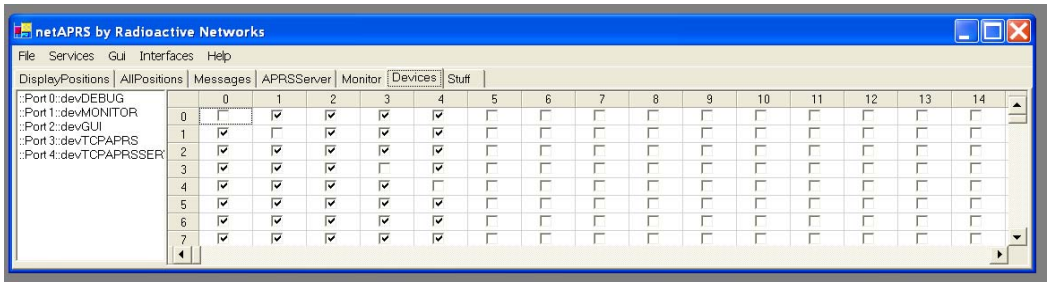


The APRSServer tab contains information about incoming connections to this computer via TCP/IP. Any incoming TCP connection (with the exception of the internal WWW server) will contain an entry in this table.

The table contains information such as the originating IP address, when the last packet was received, the last data received. There is also a button in the last column allowing connections to be closed as required.

In the case of GPRS connections identified by a Station ID, any other connections from the same Station ID will be closed when a new connection is made. This is to protect against old GPRS connections remaining longer than required.

Devices Tab



The Devices Tab contains information about the internal message processing systems inside netAPRS. Inside the software, the major components are modeled as devices. For instance the incoming APRS server is a device. The User Interface is another. The database logging is another interface.

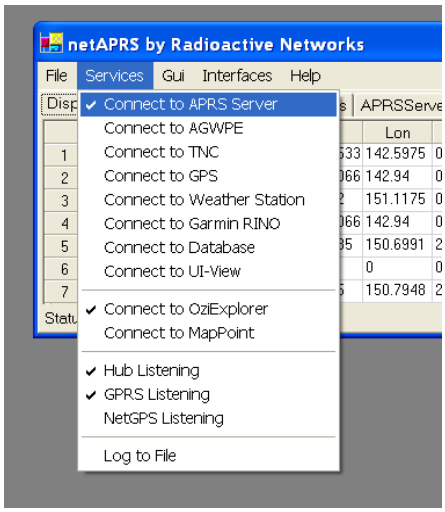
When data is received from an interface, it is sent to a crosspoint switch. The switch decodes the packet and sends it out to any devices that have indicated that they are interested in receiving data from that device.

In the table above, the incoming devices are the columns, and outgoing devices are on the rows. If the data comes in from device 3 (in column 3), it is sent to all the outgoing devices, except to device 3. This means that the device does not see its own data, but everyone else does.

The selected crosspoints may be changed by the user by clicking on them. The selections are not saved.

Menus

Services Menu



Connect to APRS Server

This menu option will initiate an outgoing connection to the APRS Server recorded in the setup screen. If the connection is lost, an attempt will be made several times a minute to reconnect.

On connection, any authentification and configuration strings are sent to the server.

Connect to AGWPE

Connecting to AGWPE allows sound card radio modems to be used with netAPRS rather than physical external devices. More information about AGWPE can be found in the section later on describing the configuration of the software.

Connect to TNC

Connecting to a TNC (or Radio Modem) allows a hardware decoder to be used for decoding packets rather than the AGWPE software. This option will connect to the TNC hardware via a serial port.

Connect to GPS

Although not currently implemented, this option connects to a GPS receiver on a serial port, and makes this data available to the software for sending out position reports, and locating the current position on a map.

Connect to Weather Station

Although currently not implemented, this option will allow data from a computer weather station to be downloaded automatically and sent to the netAPRS software.

Connect to Garmin RINO

Of most use to our North American users, this option allows users with Garmin RINO's to import positions of other units into netAPRS. We are the only software on the market to allow this to be done.

The positions are downloaded from the RINO once every 30 seconds.

Connect to Database

Connecting to the database allows all incoming data to be logged into a database. More details are available in the chapter on Databases in this manual.

Connect to UI-View

Unlike connecting to OziExplorer and MapPoint, connecting to UI-View does not send position reports to the program for display. Connecting to UI-View actually only downloads position reports from UI-View.

This is done because UI-View has superior messaging, beaconing and TNC support, whereas the graphical user interface in netAPRS is superior. This option allows both programs to be used simultaneously, with UI-View doing the external communications.

Connect to OziExplorer

Unlike connecting to UI-View, connecting to OziExplorer actually sets up the interface to OziExplorer so that positions received by netAPRS are seen in OziExplorer, and some actions in OziExplorer trigger netAPRS events.

Connect to MapPoint

Connects to Microsoft MapPoint. Starts a new instance of MapPoint.

Hub Listening

Instructs netAPRS to listen for connections from other clients wanting to receive data from netAPRS, and wanting to send data to netAPRS. Data from other HUB connections will be sent to this port as well.

The NetAPRS can operate as a local hub for connections from other tracking devices and network users. By default this functionality is not enabled, but can be quickly enabled allowing one copy of NetAPRS to connect to another server remotely, and also acting as a local distribution center for the position data without placing additional strain on the external communications links or the remote server.

GPRS Listening

GPRS Listening is almost identical to HUB listening except that data is not sent back out the connection unless it is specifically addressed to it. This is commonly used for programs that want to simply inject data to netAPRS. The most common application for that will be a GPRS device which does not need back traffic because of the data costs for the transfer.

NetGPS Listening

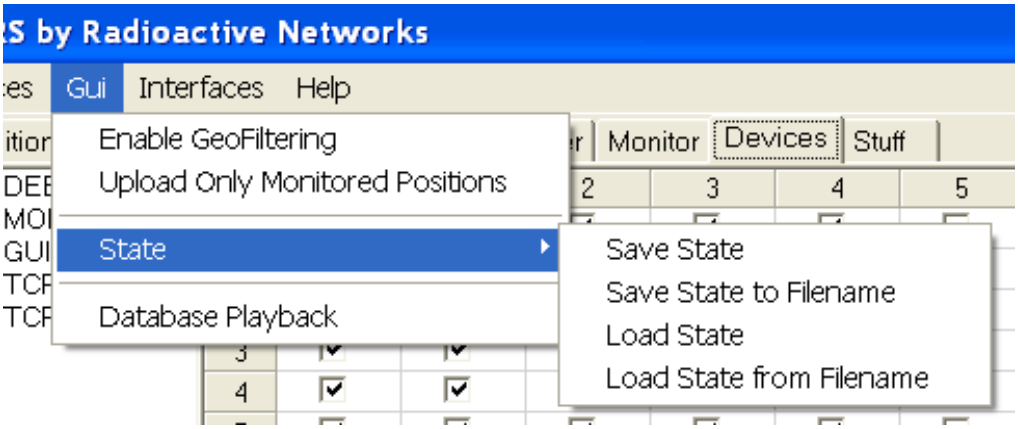
NetAPRS also has the ability to run a WWW server on port 80 allowing PDA's and PC's running the NetGPS software to upload their position reports to the NetAPRS software.

It is important to turn off any WWW servers running on the machine if this capability is to be used.

Log to File

netAPRS has the ability to log incoming data to a file. This is implemented as a device just like all the other major functions. This allows only the specific data we are interested to be logged.

GUI Menu



Enable GeoFiltering

Geofiltering is the ability to only send data to the GUI (Graphical User Interface) that is within the geographic region we are interested in. This requires us to select an area of interest and then enable the filtering.

Upload only monitored positions

There are times that we are only interested in a small subset of stations being received. In this case what we can do is denote some of the stations for being sent to the external applications only. To do this we tick the monitor box for the station in the table, and then select that we only want to upload monitored positions.

State

Save State

Save State to Filename

Load State

Load State from Filename

Database Playback

Database playback brings up the Data screen described elsewhere in this manual.

Languages

NetAPRS has been partially translated into languages other than English. English is the default language for the software. The language may be changed only by setting a command line argument selecting the required language.

Additional languages can be included by forwarding Radioactive Networks a translation of any menus that need to changed.

Outgoing Server Options

TNC Options

There are a number of options for getting data from a radio into the application. These go from using the Sound Card, a standard TNC or KISS TNC.

AGWPE – Sound Card Modem

As described elsewhere, the AGWPE software can be used with NetAPRS to decode packets. The AGWPE Server must be listening on port 8000 on the local machine.

Serial TNC

There are two options for connecting a Serial TNC. The first is to use normal strings. The TNC must operate so that APRS strings are sent out automatically in plain text when they are received.

KISS TNC

A KISS TNC may also be used. To use a KISS TNC, select the KISS TNC option, and then connect to the TNC as normal.

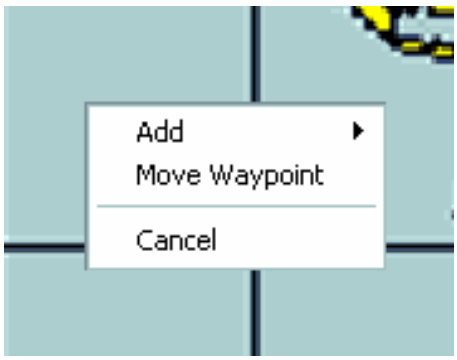
USB TNC

The way that most USB TNC's work is by using a USB to SERIAL converter module. As such, all that is needed is to select the relevant serial port.

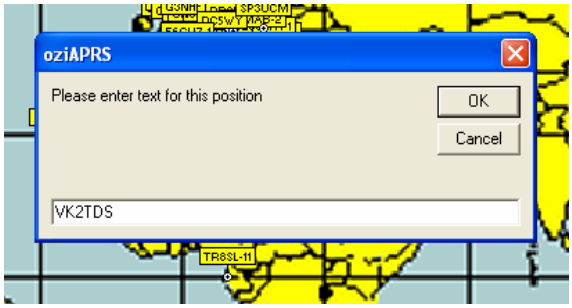
Graphical User Interface

Popup Menu

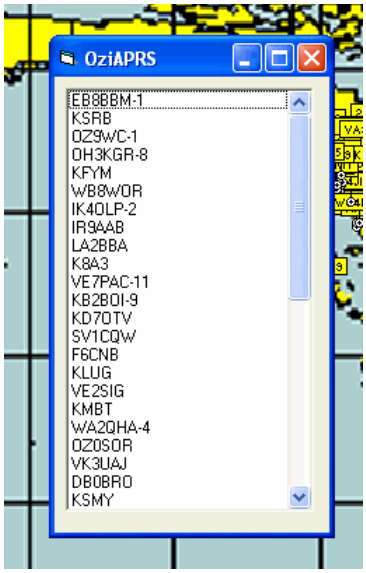
Double Clicking on the OziExplorer Map will bring up a menu allowing you to move a station or add a new station.



Add Station



Moving a Station



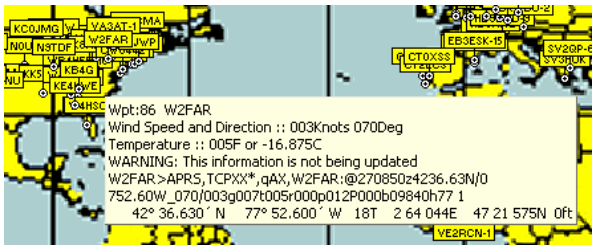
Geographic Filtering

Geographic Filtering allows you to only upload certain positions to OziExplorer. Often you are not interested in stations outside a certain area. With filtering you just tell NetAPRS to ignore them. In order to ignore stations you need to Double Click in OziExplorer on the top left corner of the area you are interested in, and then select the menu item for filtering. Then do the same for the bottom right. The menu option for Geographic Filtering will automatically be enabled.

If NetAPRS cannot make sense of the coordinate, it may change them around so that the top left and bottom right corners are chosen.

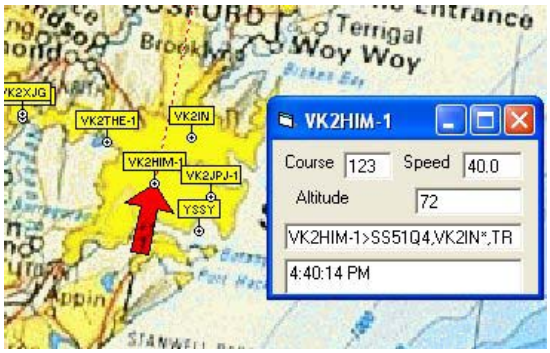
Mouse Over Stations

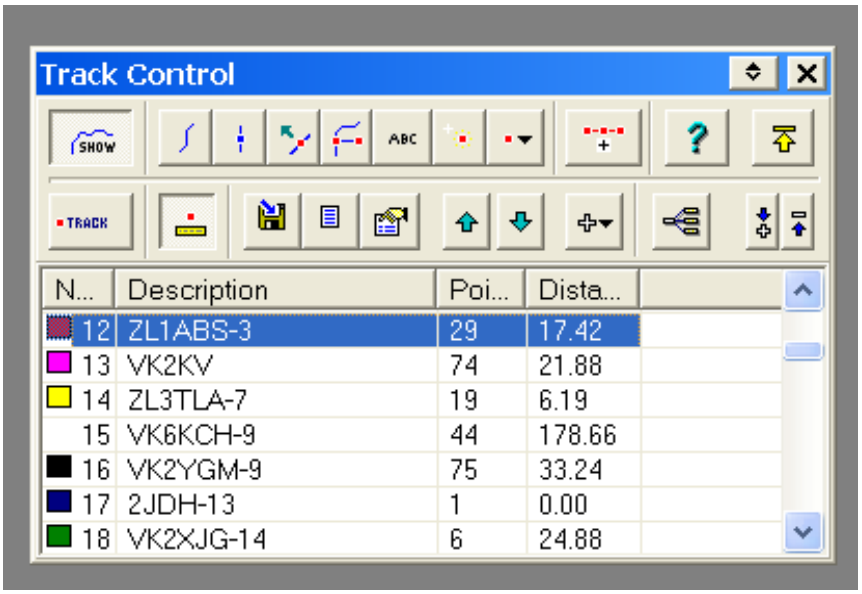
This is the type of information that is displayed if the mouse is held over a station.



Station Details

This information is displayed as a new form for each station that is selected, and is updated whenever new packets come in. New forms are opened by double clicking on the appropriate line of the table in the form, or by clicking on the object in OziExplorer itself.

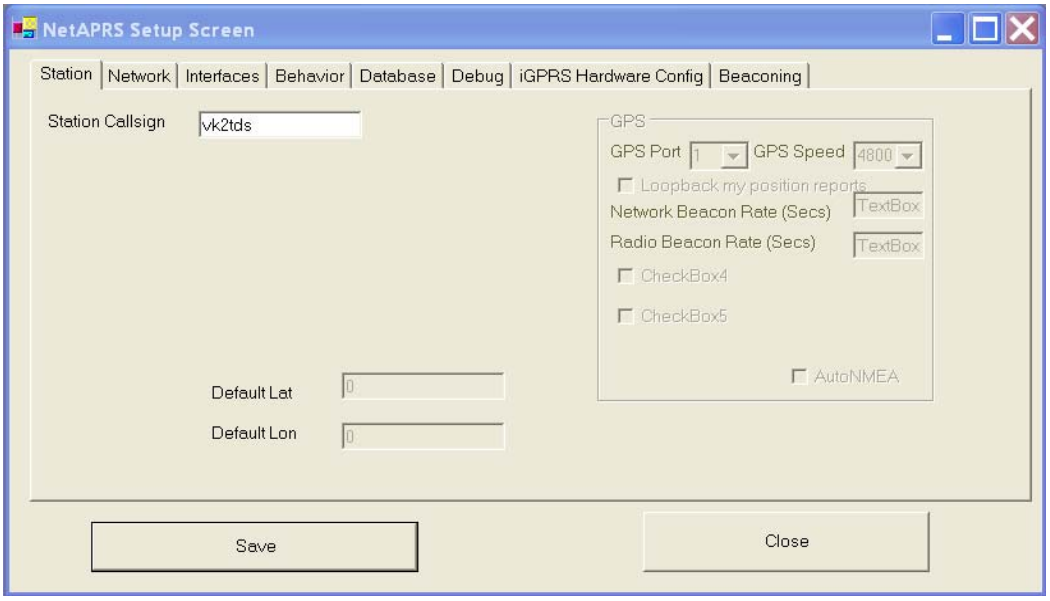



Track Control
SHOW
ABC
TRACK
N...
Description
Poi...
Dista...
12 ZL1ABS-3 29 17.42
13 VK2KV 74 21.88
14 ZL3TLA-7 19 6.19
15 VK6KCH-9 44 178.66
16 VK2YGM-9 75 33.24
17 2JDH-13 1 0.00
18 VK2XJG-14 6 24.88

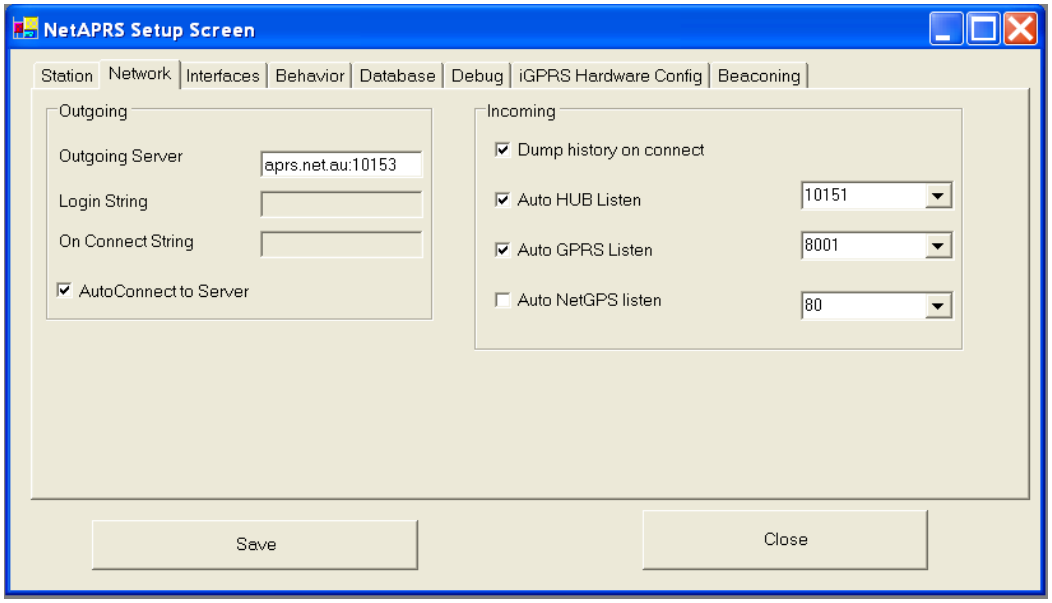
Setup

Most of the settings are on the many pages of the Setup screen. Changing the settings generally do not actually change current connections or operations.

Station Tab



Network Tab



Setting Server to Connect to.

In order to connect to an external server, you must enter the destination address and port of the server that you wish to connect to. You must enter the TCP/IP Address and Port under the “Set Server” menu. The format for the server is

SERVER_NAME:PORT_NUMBER

Or

SERVER_IP_ADDR:PORT_NUMBER

Common Servers include

- APRS.NET.AU:10151 - World Wide
- APRS.NET.AU:10153 - Australians Only
- APRS.NET.AU:10154 - New Zealand Only
- APRS.NET:10151 - World Wide

Setting User Login Details

In order to restrict users from polluting the distributed positioning system data streams, Usernames and Passwords are commonly used by servers to restrict the information uploaded or downloaded.

This information can be entered under the “Set User Login” menu item. This will as for a username and a password. They are entered on the same line

separated by a space. These details can be obtained from the owner of the server.

Setting the OnConnect string

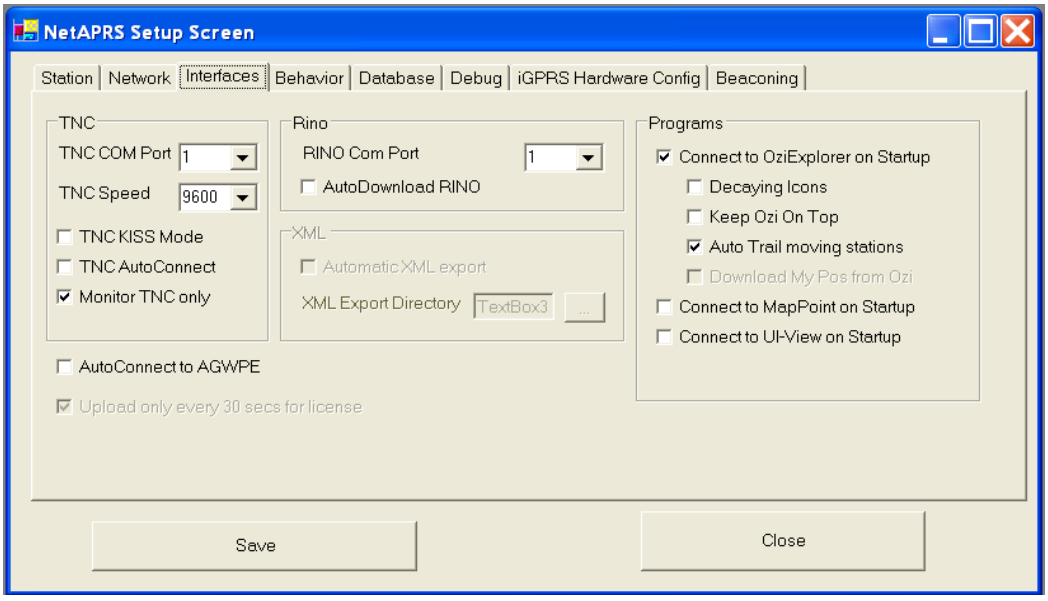
Some servers allow for a custom string to go geographical filtering on the server side. The OnConnect string will be sent directly to the server on connection, and it will be interpreted by the server accordingly.

Connecting to the Server

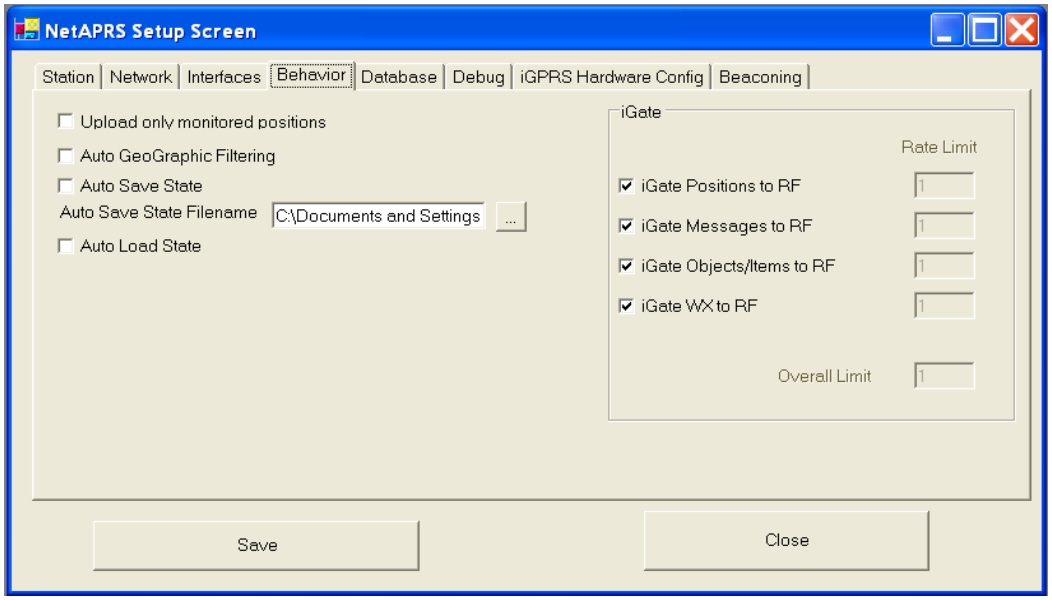
To connect to the server, simply select the Connect to Server menu. This will cause the menu to be selected to that the status can be examined by examining the menu.

If the server dies, the server will attempt to reconnect to maintain the position updates.

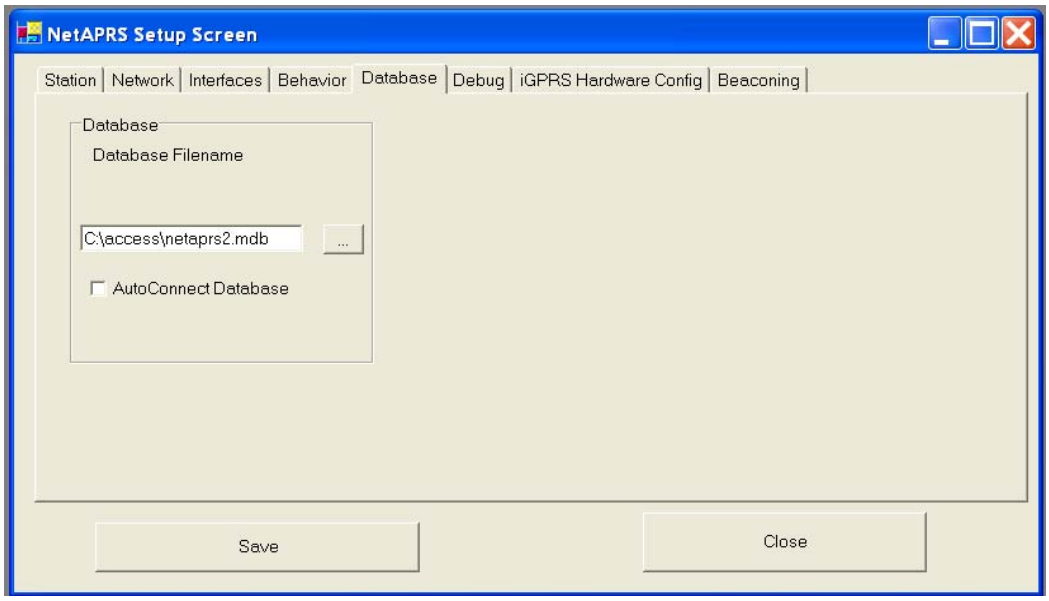
Interfaces Tab



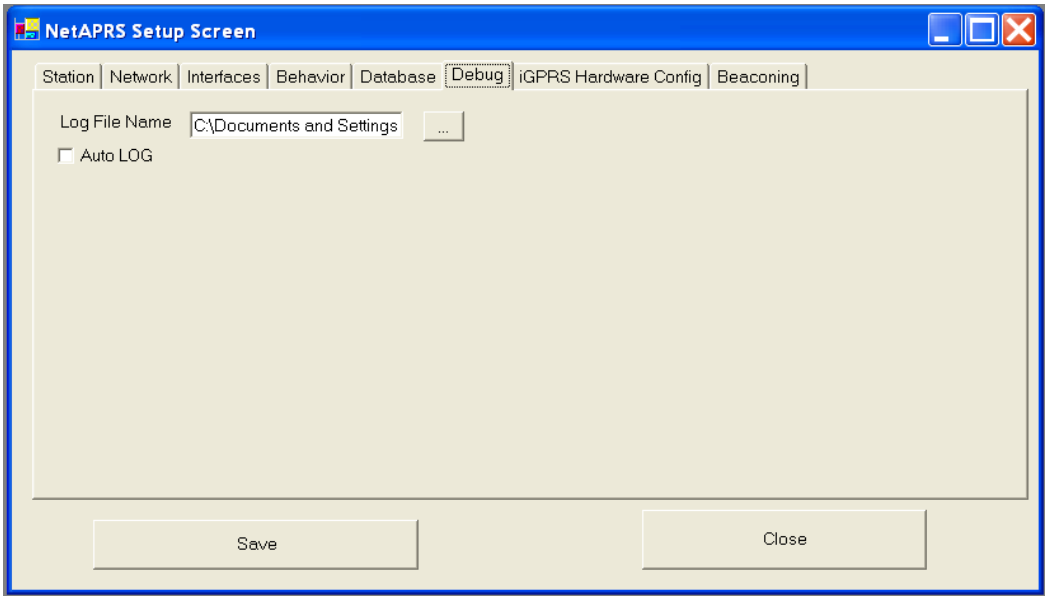
Behavior Tab



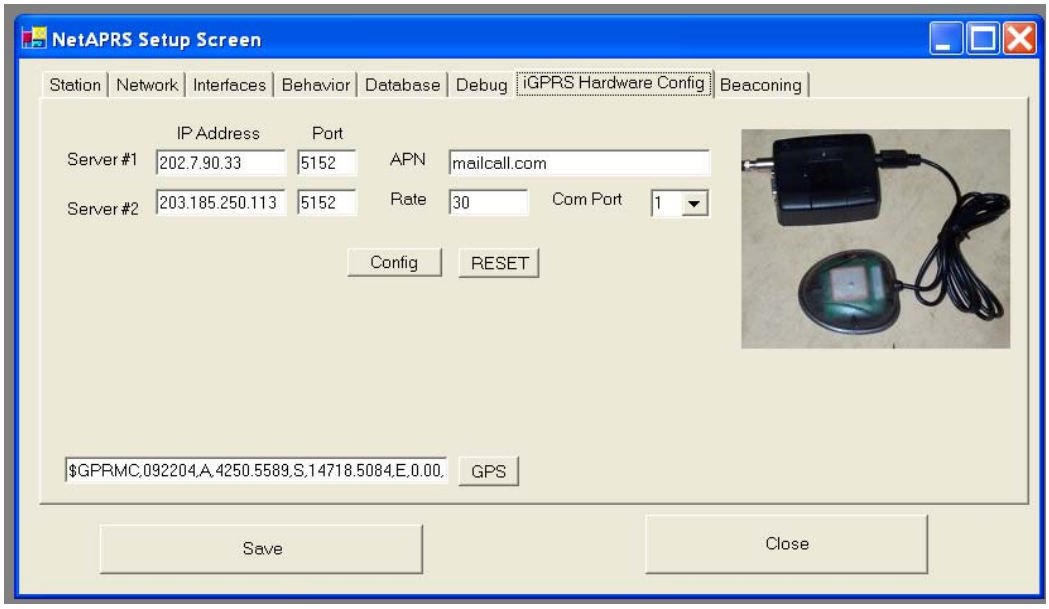
Database Tab



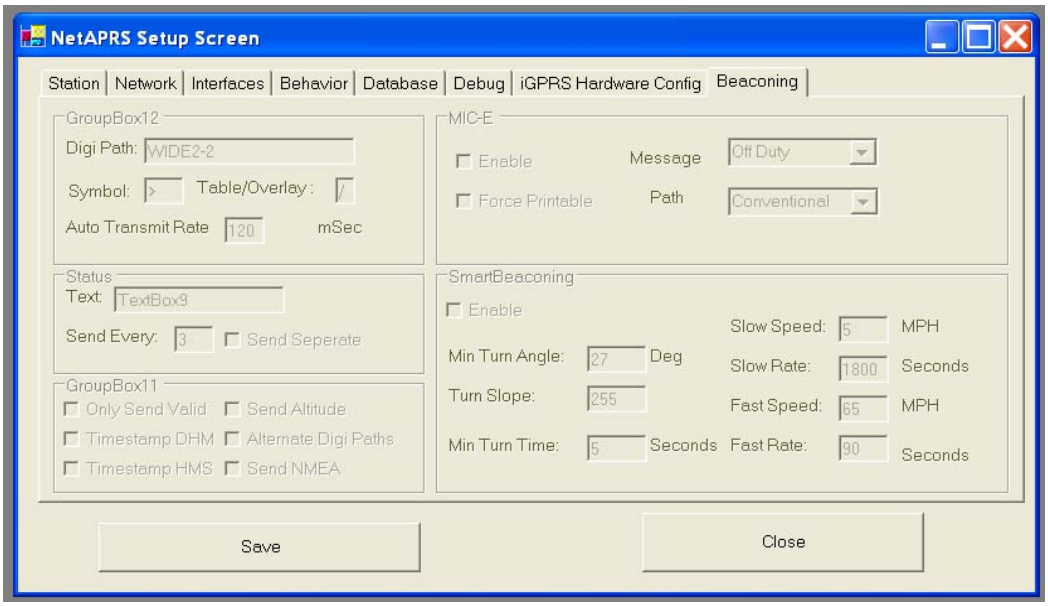
Debug Tab


NetAPRS Setup Screen
Station
Network
Interfaces
Behavior
Database
Debug
iGPRS Hardware Config
Beaconing
Log File Name
C:\Documents and Settings
...
Auto LOG
Save
Close

iGPRS Tab

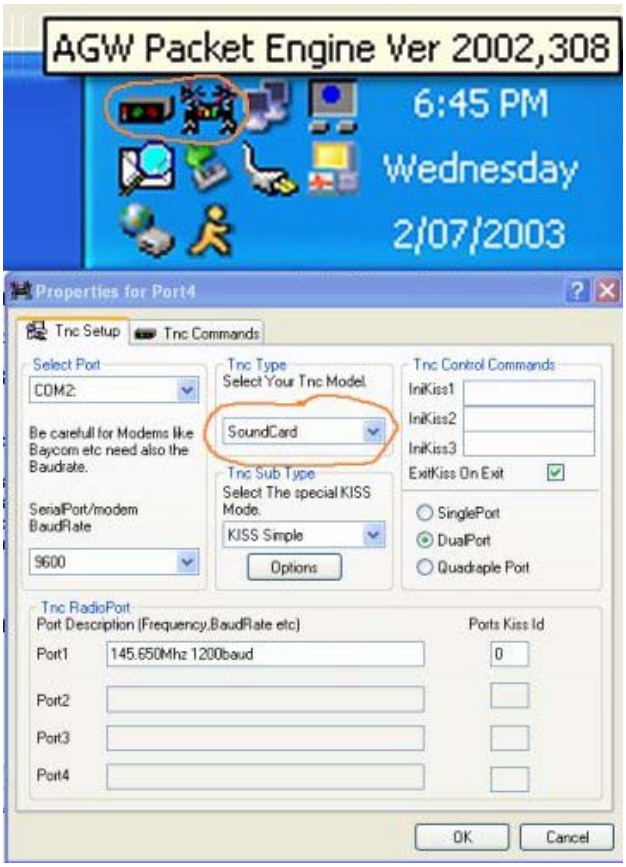

NetAPRS Setup Screen
Station
Network
Interfaces
Behavior
Database
Debug
iGPRS Hardware Config
Beaconing
IP Address
Port
Server #1
202.7.90.33
5152
APN
mailcall.com
Server #2
203.185.250.113
5152
Rate
30
Com Port
1
Config
RESET
$GPRMC,092204,A,4250.5589,S,14718.5084,E,0.00,
GPS
Save
Close

Beaconing Tab



Configuring AWGPE

AGWPE is an interface to use the sound card inside your PC in association with a scanner as a replacement for a Radio Modem. This allows for a significant cost saving in terms of hardware. You can download a copy of the AGWPE software from Here.



AGW – Setup Interfaces
TCP/IP
Port 8000
AGW – Properties – Create a New Interface
AGPW – Properties - Edit the settings by double clicking on one of the interfaces
Set Soundcard as Type of TNC
AGW - Sound Card Tuning Aid - Adjust volumes until things look right as per the manual for AGWPE.

If you are adjusting the volume, and testing a tracker, holding the mouse over the left hand side mini-icon will bring up the number of decoded packets. This should increase for every packet you decode correctly. Adjust things until this decodes most packets

State Functions

It is often useful to be able to load and save the information stored in the table for use at a later date. Alternately, often it is useful to have the previously heard positions automatically appear on the map with the software is started.

In order to satisfy these needs, it is possible to load and save the state from a file – either to the NetAPRS default file, or to a specified file. In addition, the state can be automatically staved periodically to

Log

NetAPRS has the ability to record a large amount of internal data for use when debugging the application. The main use for the function is when requested to use it by Radioactive Networks to help debug a programming error.

Decaying Icons

It can be hard to work out how current a position report is for a vehicle without spending a great deal of time looking at the detailed report data. In order to improve the usability, ‘Decaying Icons’ have been implemented.

With ‘Decaying Icons’, the background color with the vehicle details becomes paler over time unless it is refreshed with a new position report. Each time a new position report arrives, the coloring is returned to normal.

Mapping Software Interfaces

OziExplorer

The interface to OziExplorer is probably the most complete of all the interfaces, as it was the one that NetAPRS was originally written for.

MapPoint

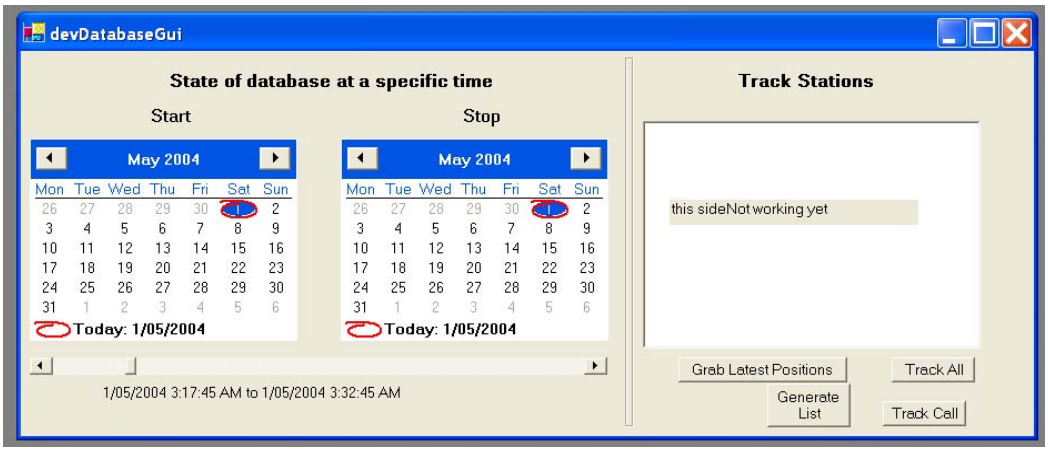
NetAPRS also interfaces to Microsoft MapPoint.

Upload Delay

Microsoft MapPoint comes with a license that restricts it from being used as a 'Real Time' or 'Near Real Time' Vehicle Tracking System for 50 or more vehicles. For this reason there is the ability to upload positions triggered by a timer rather than the positions being received.

The timer is currently set to every 15 seconds…

Database Functions



Database Playback

NetAPRS has the ability to show were all vehicles were at any point in time. Using this feature is simple. Choose the start and end dates on the calendars. Then use the slider to choose the time.

When the slider moves, the database will be queries for all the position reports during that time period. These will then be sent to the netAPRS crosspoint distribution module where the station ID will be pre-pended with “db_” indicating the source of the position report.

Testing NetAPRS

The simplest way to test NetAPRS is to connect to an APRS server and ensure that the position reports also appear in the mapping application. The steps to test NetAPRS are

1. Set the Server to Connect To being ‘aprs.net:10151’.
2. Connect to the server
3. Ensure that the positions appear in the table in NetAPRS
4. Ensure that the positions also appear on the map in the mapping application (OziExplorer or Microsoft MapPoint).

Features that have not yet being implement

Command Line Options

NetAPRS allows a number of command line options to modify the behavior of the product on startup. Each command should be separated by a space.

Commands that are followed with an asterisk (*) may be pre-pended with a 'NO' to explicitly cause the opposite to happen. For example, whilst the DUMP command will send know positions when a station connects, NODUMP will cause no positions to be sent.

Language Based Options		
	ENGLISH	Select English for Menus
	FRENCH	Select French for Menus
Database		
	DATABASE*	Connect to the Database on Startup
Connect		
	AGWPE*	Connect to the AGWPE Software on startup
	CONNECT*	Connect to the TCP/IP Server on Startup
Server		
	HUB*	Start up as a Server on Startup
	DUMP*	Dump latest known positions when connections are made to this server
	GPRS*	Allow GPRS connections on Startup
	NETGPS*	Allow NetGPS connections from Startup
Logging		
	LOG	Log Debug messages to a file
Geographic Filtering		
	GEOFILTER*	Turn on Geographical Filtering
	GEOLOAD	Load Geographical filter locations
TNC		
	TNC*	Connect to the TNC
	KISS*	Select KISS mode on TNC
Icons		
	DECAY*	Decaying Icons

State		
	STATELOAD	Load State from Default Filename
	AUTOSAVE*	Save State Automatically
Interfaces		
	OZIEXPLORER	Connect to OziExplorer on Startup
	MAPPOINT	Connect to MapPoint on Startup
	POSDELAY*	Delay position uploads for to comply with license conditions
RINO		
	RINODOWN	Automatically download positions from a RINO
NMEA		
	NMEA	Download GPS from OziExplorer