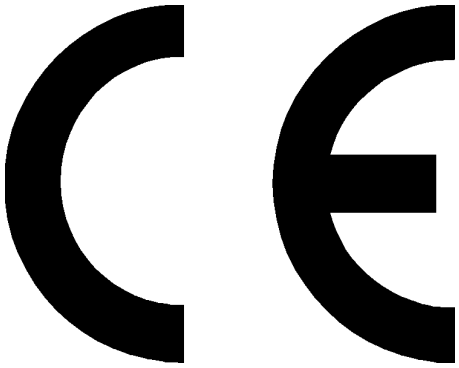
BaseStation SBS-1

Reference Manual

V 1.1.4



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Index

Introduction

This manual is a reference guide to the BaseStation SBS-1 application. If you have just started using your system then you should first consult the Getting Started manual.

Document Conventions

☞ A paragraph with this symbol contains a handy tip that will help you use the BaseStation application more efficiently.

A paragraph with this symbol contains an important point that you need to understand.

A paragraph with this symbol warns you about possible problems you might encounter.

SBS-1 : Front Panel LED Indicators Description

LED INDICATORS (viewed from the front – running left to right)

Power Indicator	USB Connection to PC Validated	SBS-1 Connected To BaseStation	Updating Non Volatile Memory	Reserved	Reserved	Bar graph of aircraft activity. Left to Right Orientation			
Red	Orange	Green	Orange	Red	Yellow	Blue	Blue	Blue	Blue

Screen Layout

The main screen of the application looks something like this:

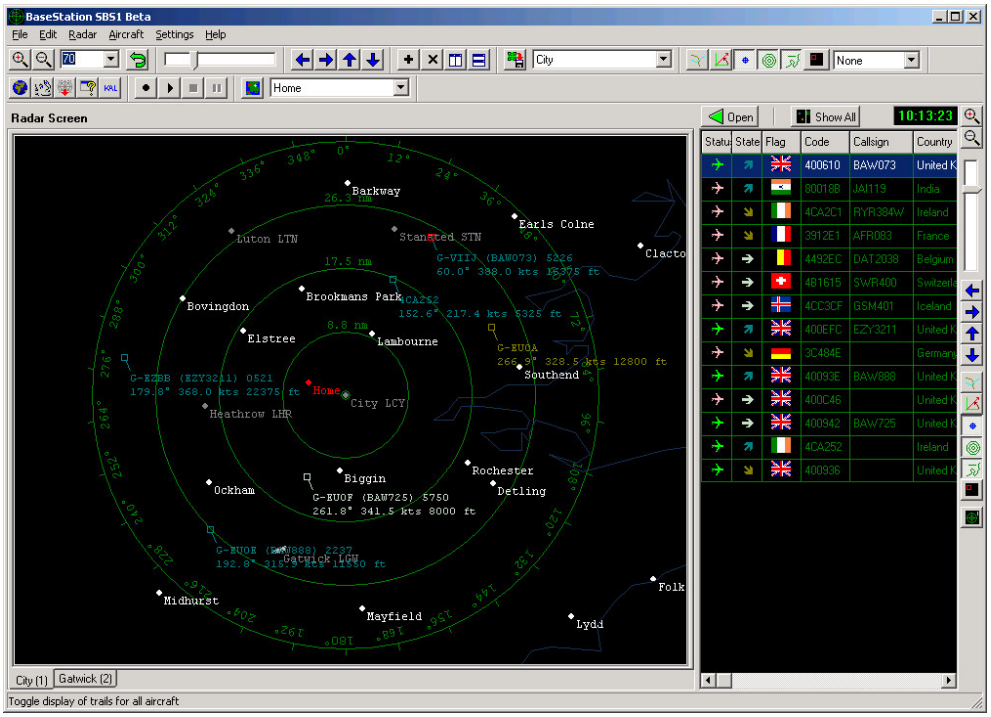


Figure 1: Application main screen

On the left is the Radar Screen and on the right is the Aircraft List. In between them is a splitter control – which you can drag in and out with the mouse to change the width of the Aircraft List.

At the top is the toolbar, which contains shortcuts to the most used menu items.

Along the right-hand side is the sidebar, which contains additional shortcuts to view commands and is also the only interface element that remains visible when in full screen mode (see Sidebar).

You can also “pop” the Aircraft List “in and out” by clicking on the Aircraft List Expand Button (the button with a green triangle and the caption “Open”). The picture below shows the screen after it has been “popped open”:

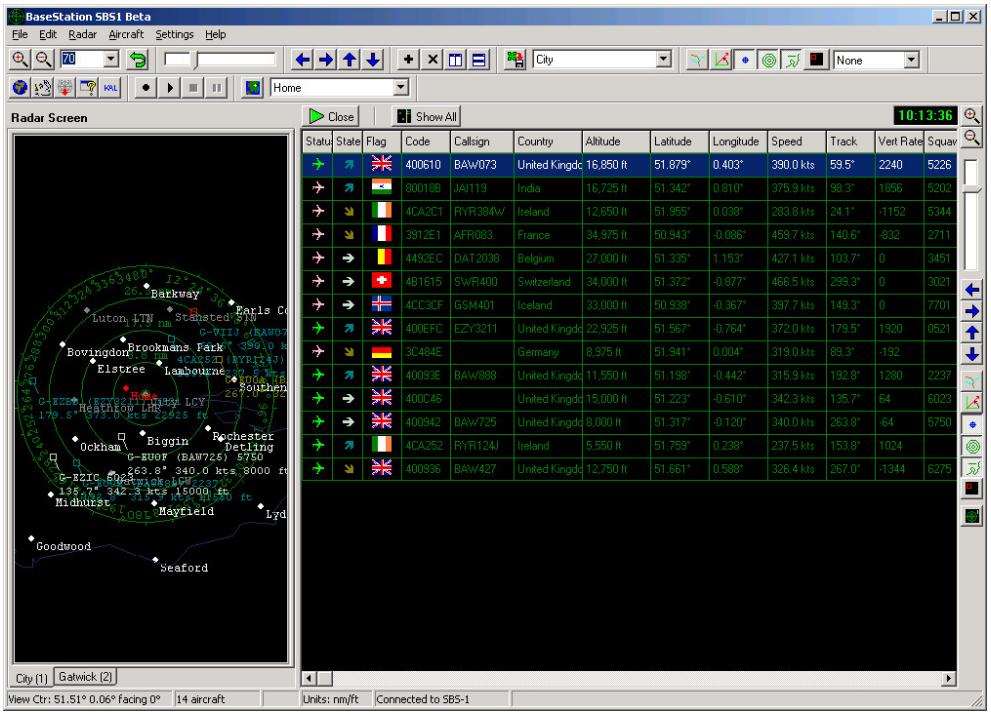


Figure 2: Application main screen with aircraft list expanded

To “pop the list closed” simply click on the Aircraft List Expand button again.

Radar Screen

The radar screen looks something like this:

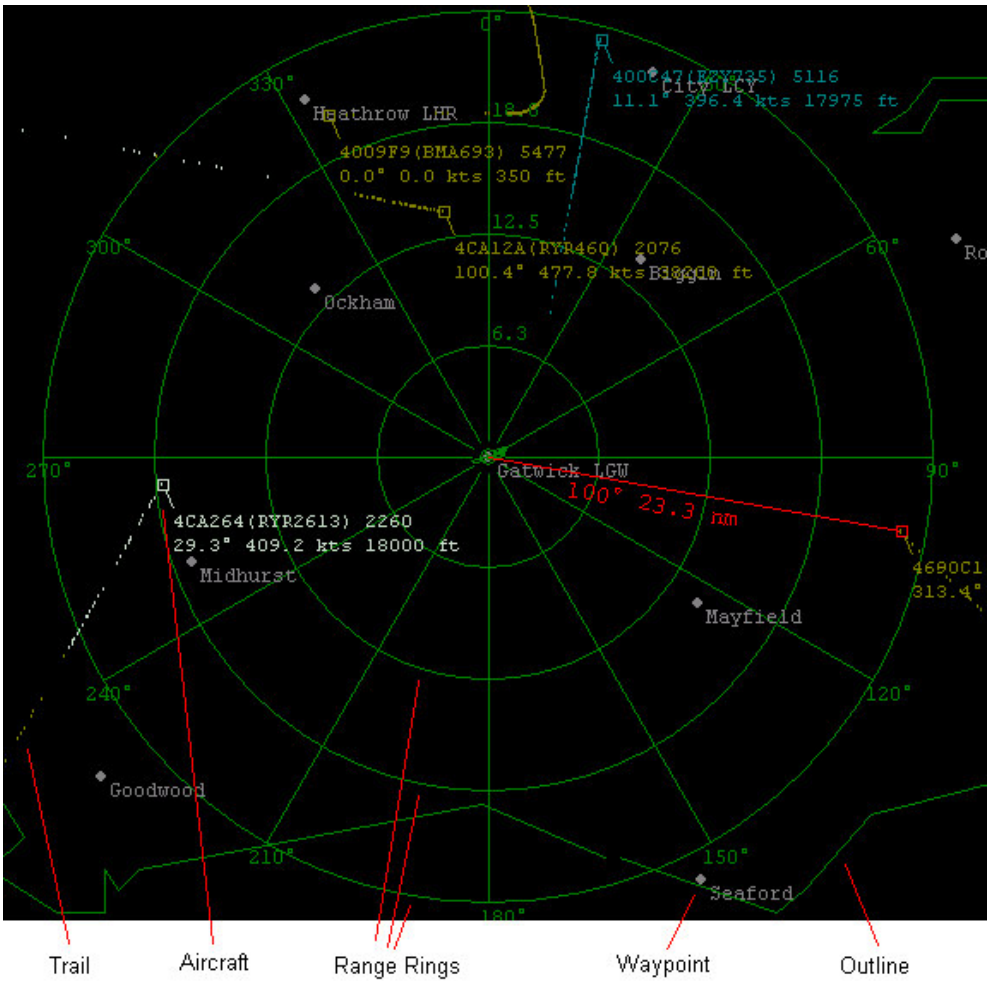


Figure 3: Radar Screen

The above example shows the screen centred on the Gatwick waypoint with a diameter of 50 nautical miles. Five aircraft can be seen on the screen, one of which, 4690C1, is shown as a red box to indicate that it is selected. Since the Display Bearing & Distance option has been enabled for this radar screen, a red line displays the bearing (100 °) and range (23.3 nautical miles) of that aircraft from the centre of the view (Gatwick).

The aircraft, and the trails indicating their past positions, are colour coded to indicate whether they are climbing, descending, or flying level. By default, these colours are:

Ascending

Descending

Level

(The way to remember it is that ascending aircraft are flying towards blue sky, descending aircraft are flying towards brown earth, and aircraft flying straight and level are somewhere in between – hence the bluey-green colour).

In our example, 400C47 (top of the screen) has been steadily climbing, 4CA12A (top middle of the screen) was flying straight and level when it entered the screen but is now descending, and 4CA264 (left middle of the screen) was descending when it entered the screen, but is now flying straight and level.

There are two other colours that aircraft can be shown as:

Aircraft that are currently on the ground are shown as grey. If we do not receive a signal from an aircraft for a set period of time (by default, this is 30 seconds) we change the colour of the aircraft to yellow. If we do not receive a signal for a further 5 seconds, then we remove it from the screen.

Main Menu

File Menu

Start Recording

This menu option brings up a file save dialog box that prompts you for the name of a file to save received data to (the default will be yyyymmdd-hhmmss.bst). Once you click on Save, all received aircraft transponder messages will be saved to the file.

Play Previous Recording

This menu option brings up a file selection dialog box that allows you to select a .bst file that you previously saved a session to. The application will then "play" the data in that file, displaying it ***instead*** of the data being received from the SBS1.

Stop Recording/Playing

This menu option is only enabled if you are either recording or playing a session. It stops the recording or playing.

Pause Playing

This menu option is only enabled if you are playing a session. It pauses the playing.

Print

This menu option has two submenu options.

- Print Radar Screen:- Prints the currently selected radar screen. (If you only have one radar screen currently visible then that is the one that will be printed – but if you have split the screen then the one that is surrounded by a red box is the one that will be printed).
- Print Aircraft List:- Prints the aircraft list (the grid of data on the right-hand side of the screen).

Exit

This menu option shuts down the application.

Edit Menu

Copy Radar Screen

This menu option copies the currently selected radar screen to the Windows clipboard as a bitmap image that can then be pasted into standard Windows graphical applications.

Copy Aircraft List

This menu option copies the data in the aircraft list to the Windows clipboard in a tab delimited text form. It can then be pasted into standard word processors of spreadsheets.

Radar Menu

Zoom In

This menu option increases the "magnification" of the view on the selected radar screen, so that it shows a smaller area but in greater detail.

Zoom Out

This menu option is the opposite of Zoom In.

Reset

This resets the view (i.e. screen centre, zoom, and view toggles) to the default for that view.

Pan

The four Pan sub-menu options allow you to shift the centre point of the view, up, down, left and right.

Save Radar Screen View

This menu option allows you to save the settings of the currently selected radar screen under a name specified by yourself. Clicking on this menu option brings up the following dialogue box with the name of the saved view currently assigned to the radar screen highlighted (every radar screen has a saved view associated with it – if you have not created any saved views then it will be a view called "Default").

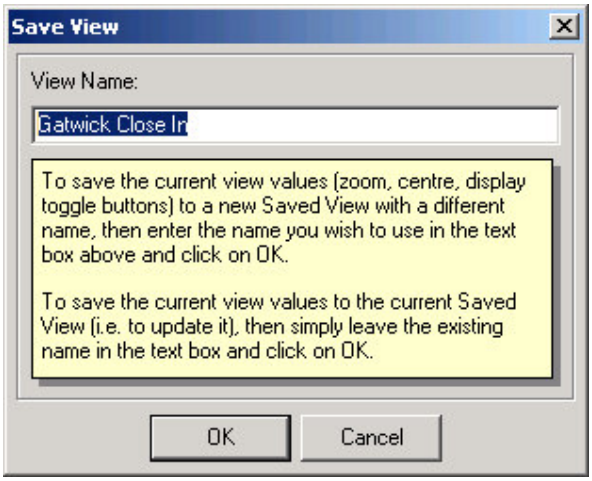


Figure 4: Save View dialog box

To update the named saved view with the current settings of the radar screen simply click on OK. To save the current settings to a new saved view – and link the radar screen to that new saved view – simply type in the name of the new view and click on OK.

The following attributes are recorded in a saved view:

- The view centre.
- The zoom diameter.
- Whether Show All Trails is enabled.
- Whether Show Bearing & Distance is enabled.
- Whether Show Waypoints is enabled.
- Whether Show Range Rings is enabled.
- Whether Show Outlines is enabled.
- Whether Display Selected Only is enabled.
- Whether Display Interested Only is enabled.
- Whether the screen stays centred, tracks an aircraft, or tracks the coordinates given by an attached GPS unit.

  ☞ It is important to understand that a view is only updated if you click on Save Radar Screen View. If you select a saved view for a radar screen and then (for example) zoom in, the saved view will still be set to the previous value. If you then shut down the application and rerun it, the application will start up with the radar screen set to that saved view, but with the zoom diameter as saved in the saved view (i.e. as it was before you zoomed in). It is done this way so that you can create a set of standard views for yourself and then quite happily zoom and pan around without fear that you will inadvertently "overwrite" your saved views.

Add Radar Screen Tab

This menu item creates an additional radar screen tab, so that you can have two radar screens active and switch between them simply by clicking on the tabs that appear at the bottom of the screen. Each tab is identified by the name of the saved view that is currently assigned to the radar screen on that tab.

Figure 5: Radar Screen tabs

☞ You can switch between tabs from the keyboard by pressing Ctrl + Alt + [Tab Number]. In the example shown in the above screenshot, you could switch to the Gatwick tab by selecting Ctrl + Alt + 1.

Remove Radar Screen Tab

This menu option removes the currently selected tab. It is disabled if you only have a single tab currently in existence.

Split Radar Screen

This splits the radar screen on the current tab into two side-by-side screens, each of which can be zoomed and panned independently and can have its own saved view.

When you have two views displayed on one tab, select between them simply by clicking inside them. The selected view will have a red border drawn around it.

If the current screen is already split, then this menu item will be called “Merge Radar Screens” and will causes the second screen to be removed.

Show Elevation

This menu item causes a separate side elevation view to be displayed below the currently selected radar screen.

If the current screen already has the elevation shown, then this menu item will be called “Hide Elevation” and will cause the elevation to be removed.

Set View Centre and Bearing

This menu option brings up a dialog box that allows you to enter in a specific latitude and longitude that you want the currently selected radar screen to be centred on. You can also set the bearing that you wish to be looking along. (By default, this is north, so the scope display has 0º at the top and the elevation runs from west to east). Setting the bearing can be useful when you want to line the elevation up with the glidepath that aircraft are following.

Centre on Waypoint

This menu option brings up a sub menu that lists your home position (the latitude and longitude you entered in as your actual position when the startup configuration wizard was running) followed by all of the waypoints. Selecting any of these will cause the currently selected radar screen to be centred on the location of that point.

Set Elevation Upper/Lower Limit

By default, the upper limit of the elevation view is 50,000 feet with the lower limit being zero feet. This menu option brings up a dialog box that allows you to change them.

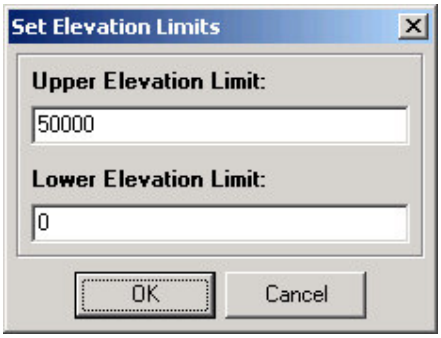


Figure 6: Set Elevation Limits Dialog Box

This is useful if you are zooming right in on an airport, watching aircraft that are just landing or taking off, and are thus very low.

- Aircraft whose altitude exceeds the elevation upper limit will not be displayed on the elevation view, even if they are visible on the scope. The same is true for aircraft whose altitude is lower than the elevation lower limit.

Display All Trails

Selecting this menu option causes the trail of every aircraft on the selected radar screen to be displayed, regardless of whether or not it has a tick in the “Show Trails” column of the Aircraft List. (If you deselect it then trails will only be shown for those aircraft that do have a tick in the Show Trails column of the Aircraft List).

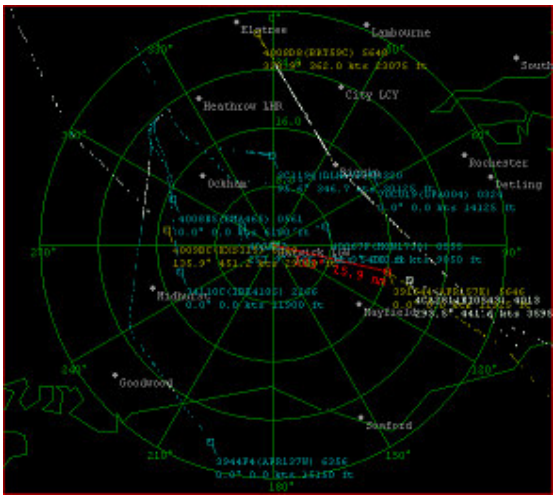


Figure 7: Display All Trails menu item/button selected/depressed

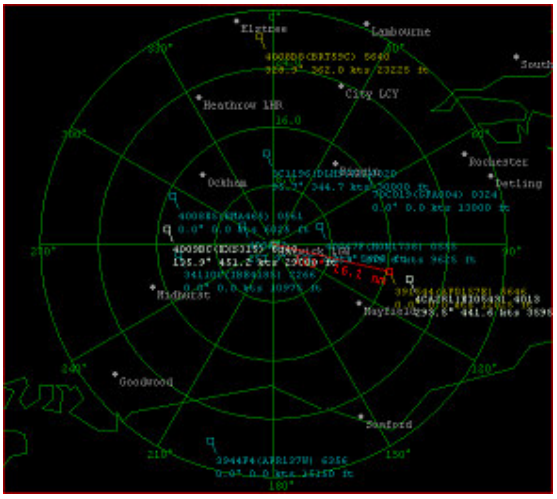


Figure 8: Display All Trails menu item/button not selected/not depressed

Display Bearing & Distance

Selecting his menu option will cause a range and bearing line to be drawn on the selected Radar Screen.

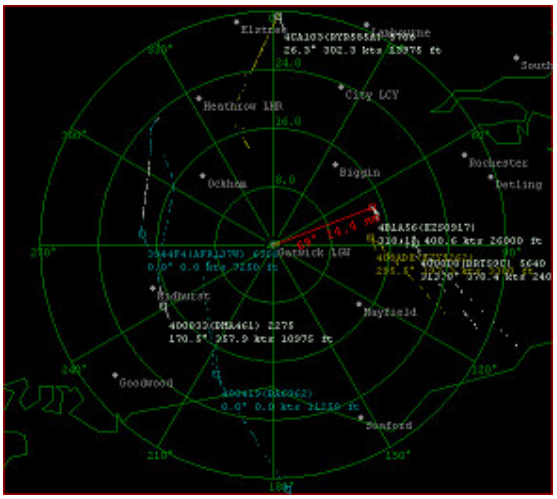


Figure 9: Display Bearing & Distance menu item/button selected/depressed

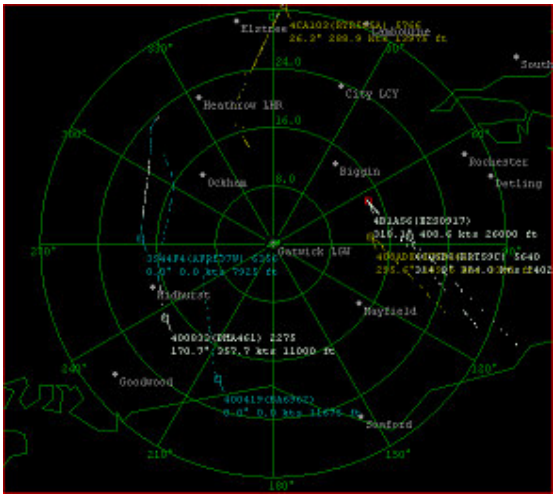


Figure 10: Display Bearing & Distance menu item/button not selected/not depressed

Display Waypoints

Selecting this menu option will cause waypoints to be displayed.

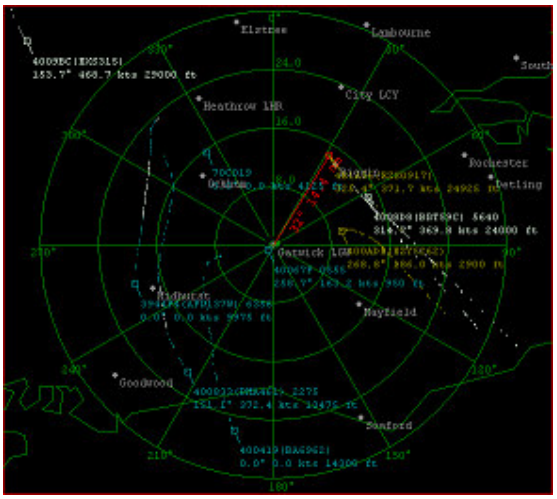


Figure 11: Display Waypoints menu item/button selected/depressed

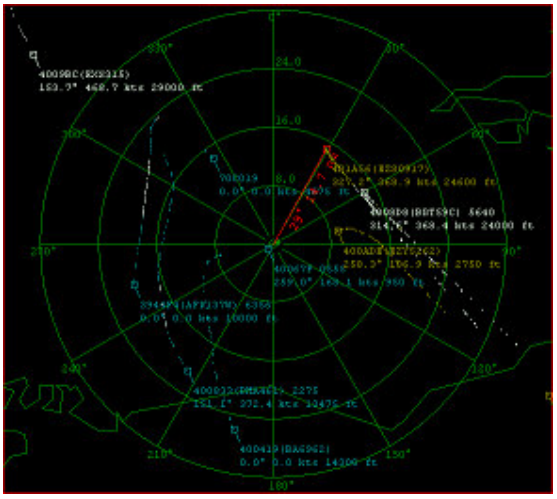


Figure 12: Display Waypoints menu item/button not selected/not depressed

Display Range Rings

Selecting this option will cause range rings to be displayed.

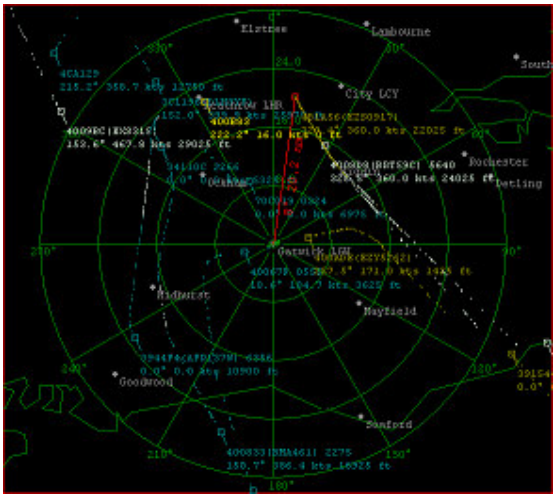


Figure 13: Display Range Rings menu item/button selected/depressed

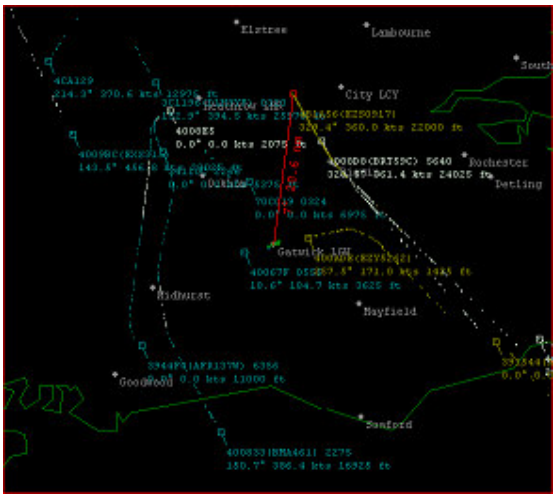


Figure 14: Display Range Rings menu item/button not selected/not depressed

Display Outlines

Selecting this option will cause outlines to be displayed:

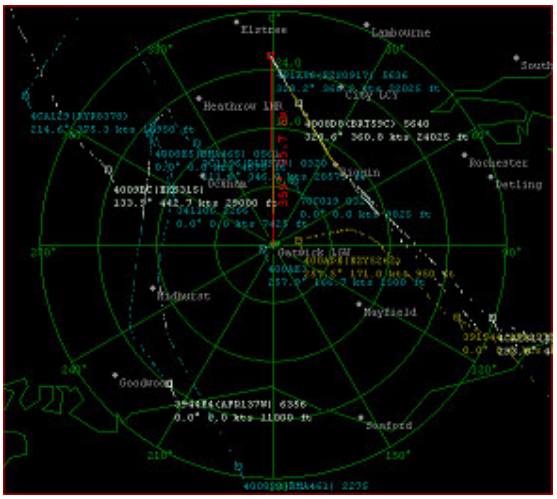


Figure 15: Display Outlines menu item/button selected/depressed

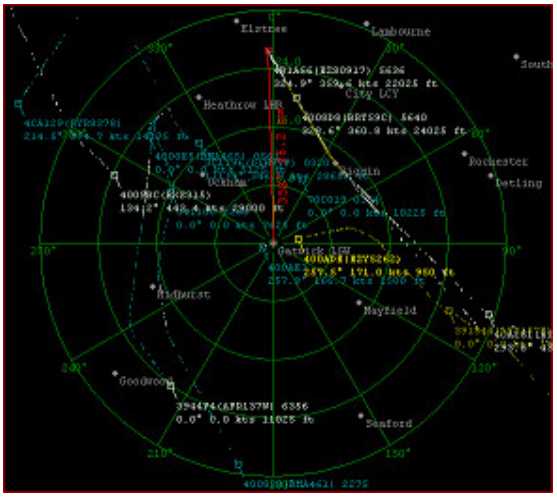


Figure 16: Display Outlines menu item/button not selected/not depressed

Display Selected Only

Selecting this option will cause the radar screen to display only the aircraft that is currently selected (i.e. you will only see one aircraft on the screen).

Display Interested Only

Selecting this option will cause the radar screen to display only aircraft whose Interested field (in the database) is set to True.

Display Centre & Bearing Tracking

This option sets whether or not the radar screen will track the currently selected aircraft and, if so, what factors it will track.

If it is set to *None*, then the radar screen will stay set to the latitude, longitude and bearing that you have set for it.

If it is set to *Centre Only*, then the centre of the screen will always stay positioned on whichever aircraft is currently selected.

If it is set to *Centre & Bearing*, then the centre of the screen will always stay positioned on whichever aircraft is currently selected and – in addition – the bearing (direction) of the screen will be set to the track of the aircraft. (i.e. The aircraft will appear to be flying

straight up the screen, with the outlines and waypoints wheeling around it whenever it turns).

> If the selected aircraft stops being displayed, and you don't select a new aircraft, the screen will stay on the last latitude, longitude and bearing that the aircraft gave out. Also, if you set this option back to None, the screen will still stay on the last latitude, longitude and bearing. (i.e. Changing back to None will just stop the screen centre and bearing changing when a new aircraft becomes selected – but it won't change the current screen centre and bearing). If you want to set these settings back to the settings for the saved view, then you need to click on the Radar->Reset menu option (or alternatively, reselect the current view in the Saved View popdown on the toolbar).

If it is set to *GPS*, then the centre of the screen will always stay positioned on the latitude and longitude coordinates supplied by an attached GPS, assuming that the GPS is able to provide valid coordinates (i.e. that it has got a fix). This option is only visible if you have enabled the use of a GPS feed (by ticking the Use GPS Feed checkbox on the GPS tab of the Hardware Settings dialog box).

Aircraft Menu

Expanded All Aircraft List

This menu item duplicates the effect of the Aircraft List Expand Button. Selecting it (i.e giving it a check mark) pops the aircraft list open (see Figure 2). Clicking on it again to deselect it (i.e. take away the check mark) pops the aircraft list back to its normal extent.

Show All Aircraft (Inc. Non Position)

This causes all aircraft to be shown in the Aircraft List, regardless of whether or not we have position information for them. (By default, only aircraft that we are able to plot on the radar screen are shown in the aircraft list).

Show Only Aircraft Marked Interested

This causes only those aircraft whose Interested field (in the database) is set to true to be displayed in the Aircraft List. (By default, all aircraft are displayed).

Display Full Info Window

This menu option displays a floating window that contains the details of whichever aircraft is currently selected.

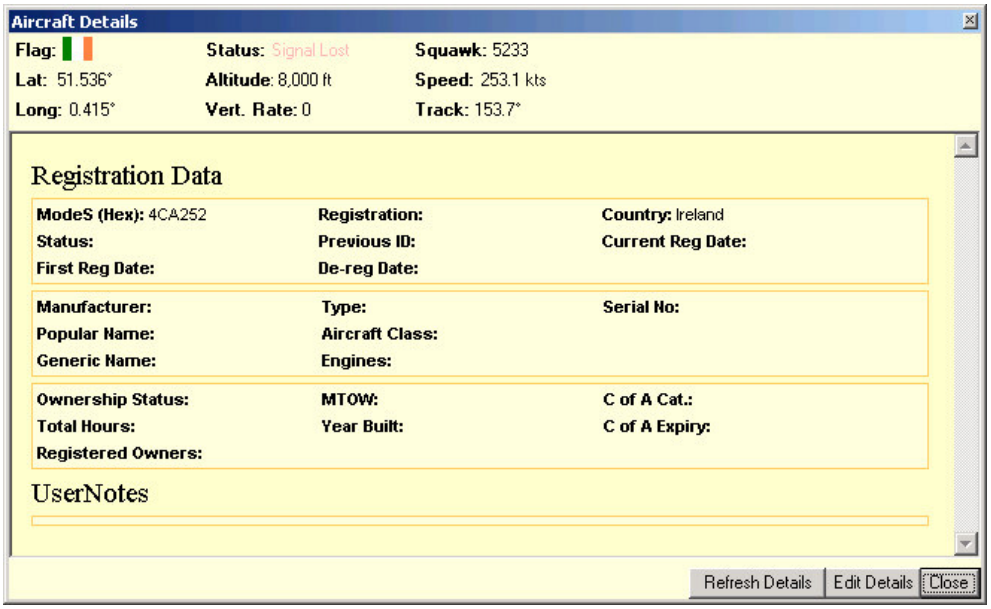


Figure 17: Aircraft Details Window

This details in this window will be updated each second. You can leave this window visible while you select other aircraft – it will always display whichever aircraft is currently selected.

☞ An easier way to display this window is simply to double-click on either the aircraft box on the Radar Screen, or on the aircraft's row in the Aircraft List.

Clicking on the Edit Details box brings up an edit dialog box that allows you to enter details for the aircraft.

☞ You can also edit an aircraft's details using the BaseStation Reporter application described later in this manual.

Sort By

This menu option allows you to set which column in the Aircraft List you wish to sort on.

☞ An easier way to do this is simply to click on the heading at the top of the column in the actual list itself.

Columns

This menu option allows you to set which columns you wish to appear in the Aircraft List. By default, all columns are visible, but you can turn off those you aren't interested in.

If the menu item has a check next to it then that column is visible. Clicking on a checked item will deselect it and the hide the column. Clicking on an unchecked column will select it and restore the column.

Toggle Tracking on Selected Aircraft

The selected aircraft is the one that is highlighted in the Aircraft List (a solid blue bar) and in the Radar Screen (aircraft box drawn in red). Selecting this menu item will set the aircraft to be tracked (have it's trail shown) if it was not already set, or sets it to not be tracked if it was previously set.

Aircraft that are set to be tracked have a tick in the show trail column in the Aircraft List. The value of that column is overridden if the Display All Tracks menu option/button is set.

Refresh DB Data For Selected

Clicking on this menu option re-reads the database record for the currently selected aircraft.

☞ You would normally only need to do this if you've just updated the aircraft's registration data with BaseStation Reporter (or with another program) and want to get BaseStation to re-read the record and get the new, updated data.

Centre on Selected Aircraft

This centres the radar screen on the current position of selected aircraft. (Note, the Radar Screen will then stay fixed on that particular point, not the aircraft itself).

☞ This option is useful if an interesting looking aircraft has appeared on your Aircraft List, but is not visible on the Radar Screen. Rather than zoom and pan around looking for it, you can simply centre on it.

Caption Position

The first four items on this submenu (Top Left, Top Right, Bottom Left and Bottom Right) allow you to set the radar screen caption for the selected aircraft to a different position (relative to the aircraft). This is chiefly for use when two aircraft are flying close to each other and their captions are overlapping.

The last two items (Rotate Anti-Clockwise and Rotate Clockwise) simply change the setting of the selected aircraft to the next position in the set direction.

i.e. If the caption is currently Top Left and you click on Rotate Clockwise, it will change to Top Right.

☞ You can easily arrange all the captions on the screen by using the keyboard shortcuts F9 and F10 to cycle through the aircraft, and using F11 and F12 to rotate the captions clockwise and anti-clockwise.

Refresh DB Data For All

This option is similar to the “Refresh DB Data

Select Previous Aircraft

This menu option changes the selection of the current aircraft to the first one before the current one in the aircraft list that is broadcasting its position (i.e. has an aircraft symbol).

✍ You wouldn’t normally click on this menu item. It has been included so that you can use its keyboard shortcut (the F9 key) to cycle backwards through the aircraft displayed on the screen.

Select Next Aircraft

This menu option is identical to the Select Previous Aircraft option, except that it cycles forwards through the aircraft list, and its keyboard shortcut key is F10.

Settings Menu

Display Settings

This menu option brings up the Display Settings dialog box:

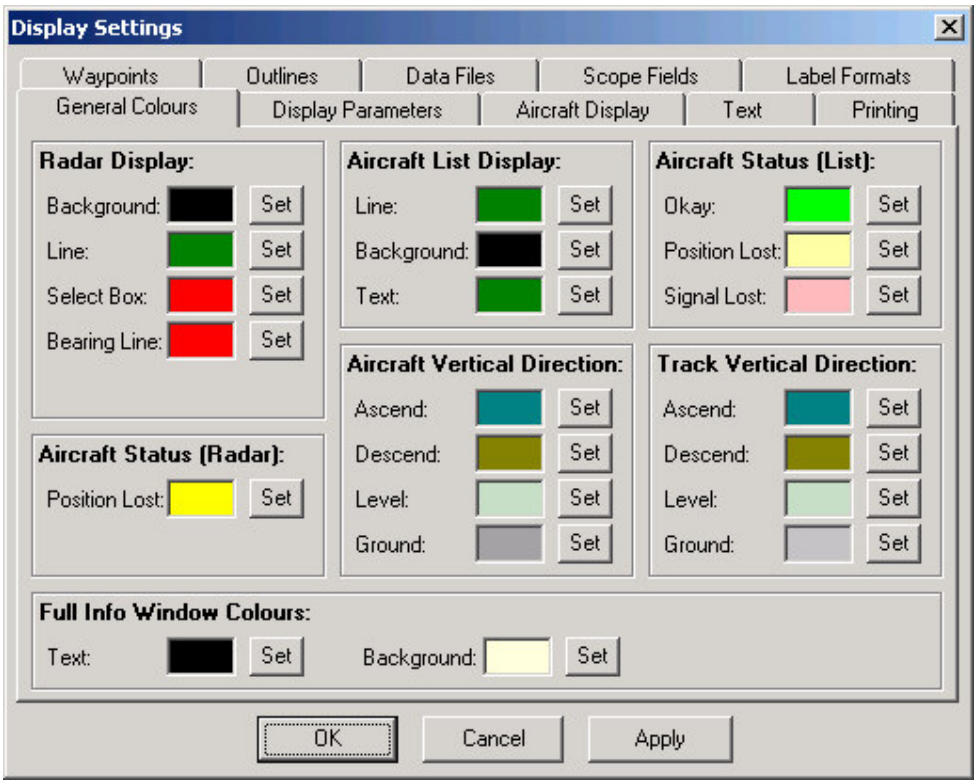


Figure 18: The Display Settings dialog box (General Colours tab)

The settings on this tab concern the colours used by the application. If you want to experiment with colours, then clicking the Apply button saves the updated colours – which will cause the application to start using those colours – without exiting the dialog box.

Radar Display: These set the colours used on the Radar Screen.

Line is the colour used in the Range Rings (and the horizontal lines in the Elevation view) as well as the text associated with the Range Rings.

Select Box is the colour used both for the box around a selected Radar Screen as well as the colour used to display a selected aircraft.

Bearing Line is the colour used to display the bearing and range line for the selected aircraft.

Aircraft List Display: These set the colours used in the Aircraft List.

Aircraft Status (Radar): Position Lost sets with which colour aircraft on the radar screen are shown if they have a status of position lost. (For an explanation of aircraft statuses, see Data Settings).

Aircraft Status (List): Okay, Position Lost and Signal Lost relate to which colour the aircraft symbol in the first column is painted. (For an explanation of aircraft statues, see Data Settings).

Aircraft Vertical Direction: These set the colours used on aircraft on the Radar Screen.

Aircraft (this includes the box representing the location of the aircraft, the information text, and the line connecting the two) are coloured according to whether they are ascending, descending, flying level, or on the ground. However, if we don't receive a signal for the Position Lost timeout period (by default, this is 30 seconds) the aircraft turns to the colour set by the Position Lost setting – regardless of whether it was ascending, descending, level, or on the ground.

Track Vertical Direction: These are similar to the aircraft colours, except there is no position lost colour. This is because each dot in the track represents a time when we received a message, so we knew what the position was then.

Full Info Window Colours: These set the colours of the Full Info Window.

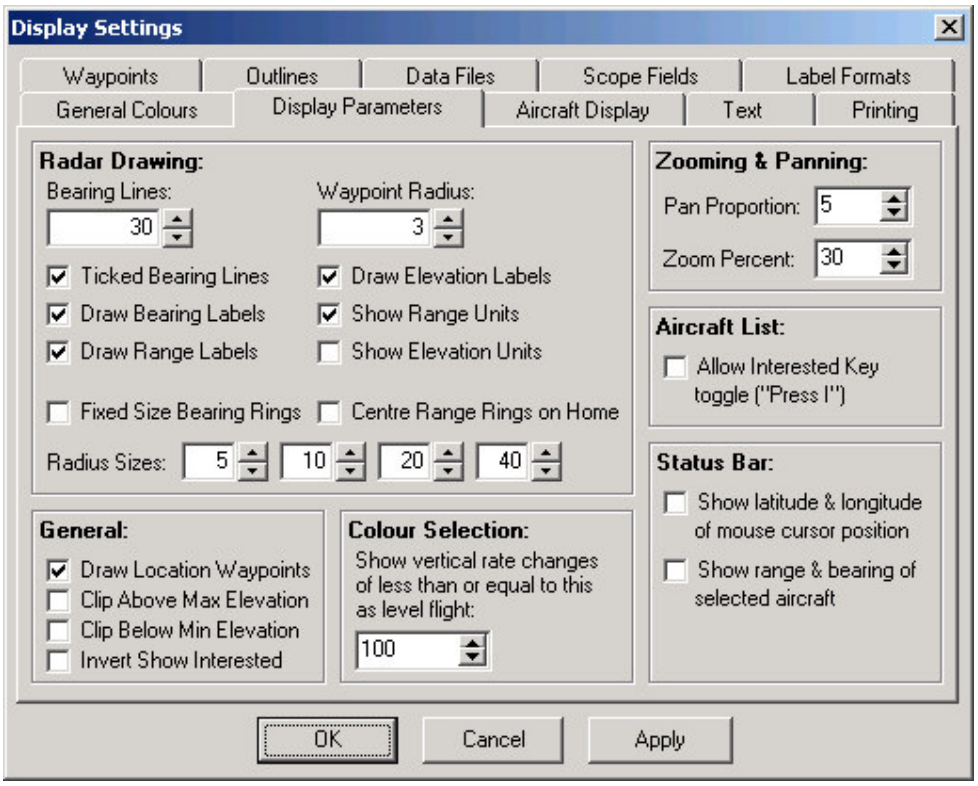


Figure 19: The Display Settings dialog box (Display Parameters tab)

Radar Drawing: *Bearing Lines* shows how many segments ("pies") the radar display will be divided into by the range rings. The minimum is four, which gives four quadrants. If *Ticked Bearing Lines* is checked then small ticks are drawn instead of the radial lines. If *Fixed Size Bearing Rings* is checked, then the bearing rings are drawn at fixed distances from the centre of the rings, rather than being sized to fit the view. By default, fixed size rings will be drawn at radii of 5, 10, 20 and 40 nautical miles, but this can be changed using the *Radius Sizes* spin edits. If *Centre Range Rings on Home* is checked, then the

range rings are centred on the currently selected location (i.e. home), rather than being centred on the view. *Waypoint Radius* controls how large the dots that are drawn for Waypoints are.

Zooming & Panning: These parameters related to how far the screen moves sideways while panning (decreasing the number will increase how far you pan), and by which percentage of the existing view you zoom in and out when zooming in and out.

Aircraft List: If Allow Interested Key Toggle is set to true, then you can toggle the status of an aircraft's Interested field by simply selecting it in the Aircraft List and then pressing the I key. This setting is set to false by default in order to guard against inadvertent editing of the database.

General: If *Draw Location Waypoints* is selected then a waypoint is drawn at each location defined by the Locations Manager (this is an easy way of having a waypoint drawn at your home position). The *Clip Above Max Elevation* and *Clip Below Min Elevation* options will, if set, cause the radar screen to display only those aircraft whose altitude is below and above the maximum and minimum altitudes defined in the Set Elevation Limits dialog box. If *Invert Show Interested* is checked, the the Display Only Interested and Show Only Interested buttons work in the opposite way – that is, selecting them will cause only aircraft that you have ***not*** marked as interested to be displayed.

Colour Selection: Aircraft flying notionally level sometimes make slight up and down movements. To avoid ending up with "rainbow coloured trails" we – for the purpose of deciding which colour to use for dots in the trail only – ignore changes of less than this amount.

Status Bar: If *Show latitude and longitude of mouse cursor position* is checked, then a panel on the status bar appears that shows the latitude and longitude of the position on the radar screen that the mouse pointer is currently over. If *Show range and bearing of selected aircraft* is checked, then a panel on the status bar appears that shows the range and bearing of the currently selected aircraft. (This data is the same as when you show range and bearing on the screen, but can be easier to read when the display is cluttered).

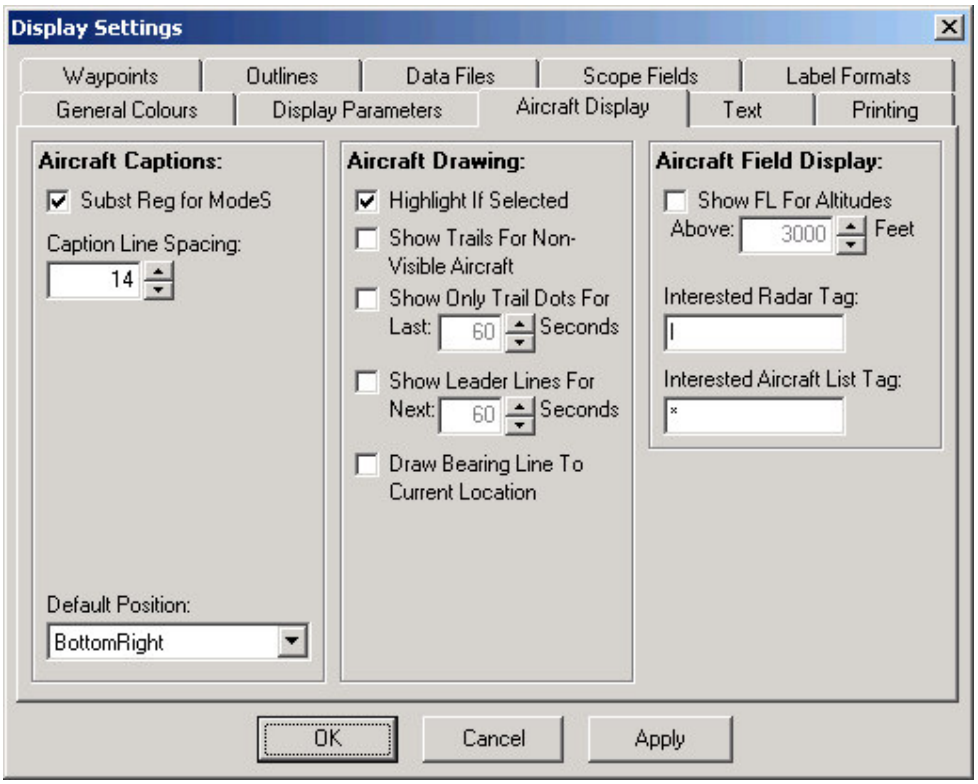


Figure 20: The Display Settings dialog box (Aircraft Display tab)

Aircraft Captions: These set which bits of information get written beside each aircraft on the radar screen.

Subst Reg for ModeS is a special case that can be used where the ModeS field has been set to be displayed (using the Scope Fields tab). If checked, then the aircraft's radar screen caption will show the ModeS code where it does not have a registration for that aircraft, but the registration instead where it does.

- This means that if you have this option checked, you should set the Registration field (in the Scope Fields tab) to ***not*** be displayed – otherwise you'll end up with Registration being shown twice.

Caption Line Spacing allows you to set the gap between each line of text in the radar caption.

Default Position sets where the caption will, by default, be drawn on the radar screen relative to the aircraft.

Aircraft Drawing: *Highlight If Selected* sets whether the aircraft that is currently selected (this is also shown by a blue highlight bar in the Aircraft List) should be highlighted on the Radar Screen by being drawn as a red box (rather than whichever colour would indicate its ascending/descending/level/ground status).

Show Trails For Non Visible Aircraft sets whether or not we display trails for aircraft that are no longer visible. By default, if an aircraft disappears from the screen, either by flying off the edge, or by failing to send out a message for a (default) 35 seconds, then the trail is removed from the screen also (and will only reappear if the aircraft itself reappears). However, if you check this setting, then the trail will continue to be shown until the aircraft is removed from the aircraft list (which by default happens if we don't receive a message for a further 5 minutes).

Show Only Trail Dots For Last x Seconds allows you to set the system to now show the complete trail of an aircraft, but instead show only the most recent portion of the trail. (Note:- this only applies if the aircraft is set to have its trail drawn).

Show Leader Lines For Next x Seconds allows you to set the system to draw lines ahead of an aircraft showing its predicted path over the set period.

- This feature is not fully implemented as yet, and is prone to produce inaccurate results. It has been left in this version for purposes of demonstration only.

Aircraft Field Display: The *Show FL For Altitudes Above x Feet* control will, if set, cause altitudes above that level to be shown as flight levels rather than in feet. (e.g. An altitude of 8500 feet would be shown as FL85). The *Interested Radar Tag* and the *Interested Aircraft List Tag* show what characters are used if the Interested field is displayed on either the radar screen or the aircraft list.

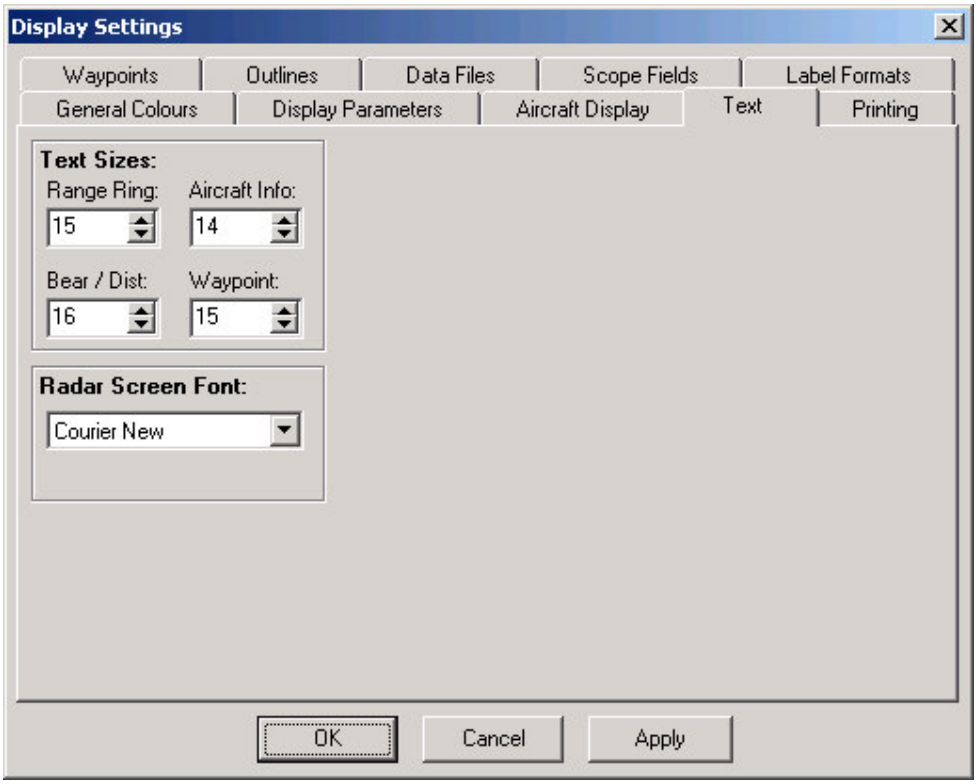


Figure 21: The Display Settings dialog box (Text tab)

Text Sizes: These set the size of the text that is written to the radar screen.

Radar Screen Font: This is which font is used to draw the text on the radar screen.

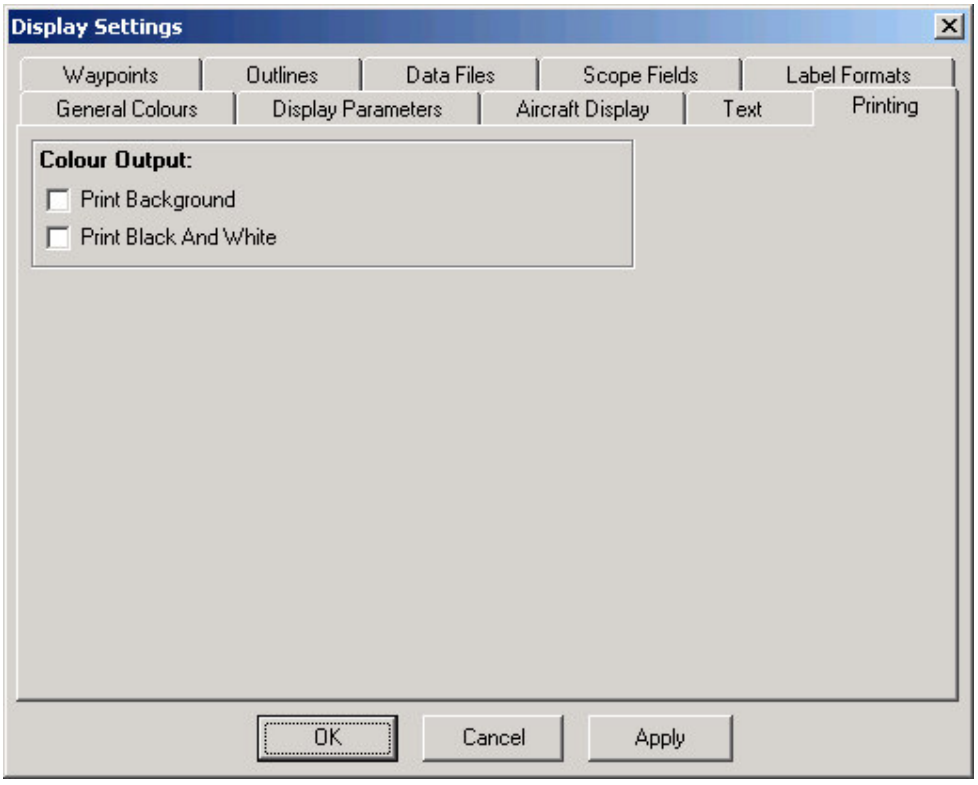


Figure 22: The Display Settings dialog box (Printing tab)

Print Background sets whether or not the background (which by default is black) is printed when you print the radar screen.

Print Black and White sets whether or not the radar screen is printed in colour or black and white.

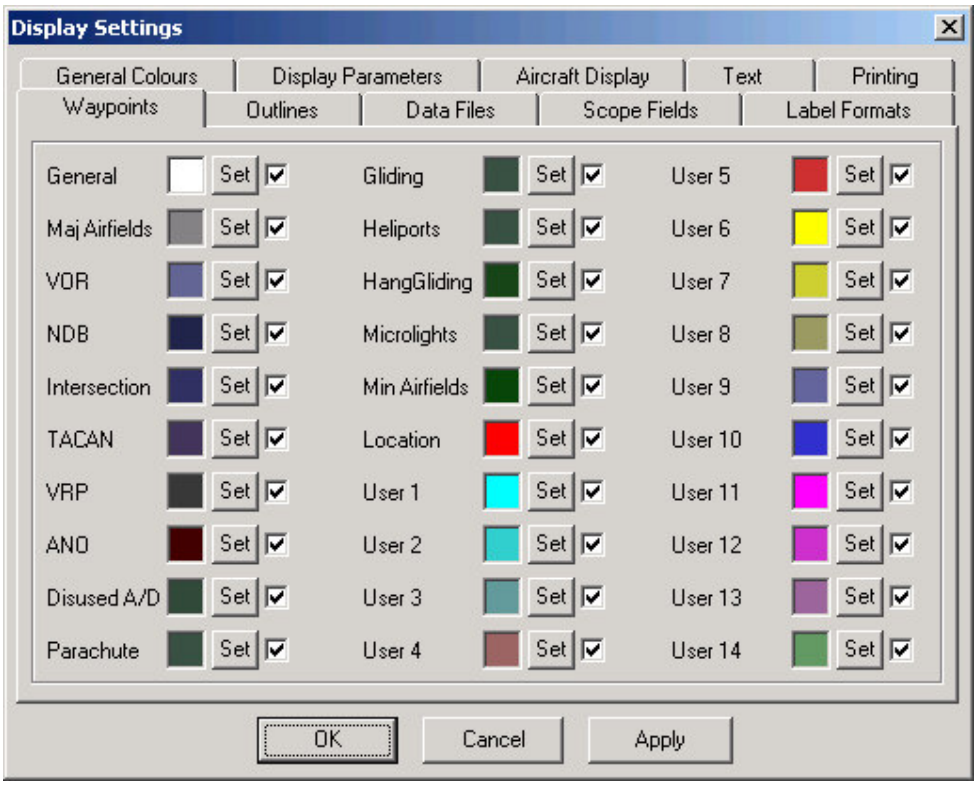


Figure 23: The Display Settings dialog box (Waypoints tab)

This tab allows you to set the colours used for each type of waypoint. It also allows you to select which types of waypoints you wish to be visible (check the checkbox to make them visible, uncheck it to hide them).

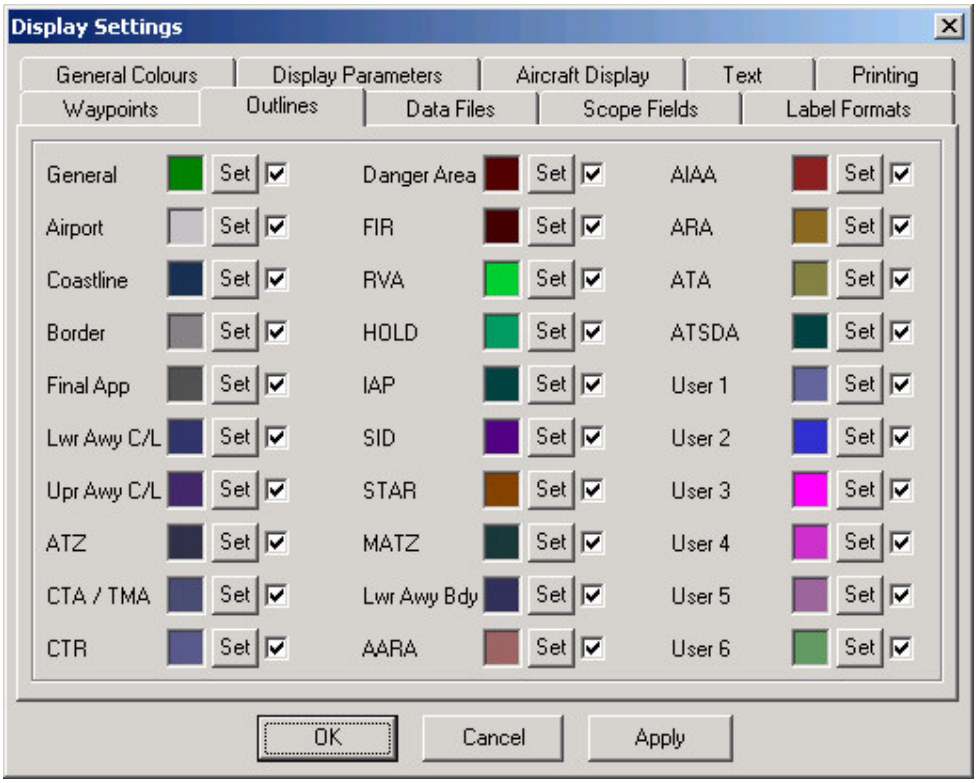


Figure 24: The Display Settings dialog box (Outlines tab)

This tab allows you to set the colours used for each type of outline. It also allows you to select which types of outlines you wish to be visible (check the checkbox to make them visible, uncheck it to hide them).

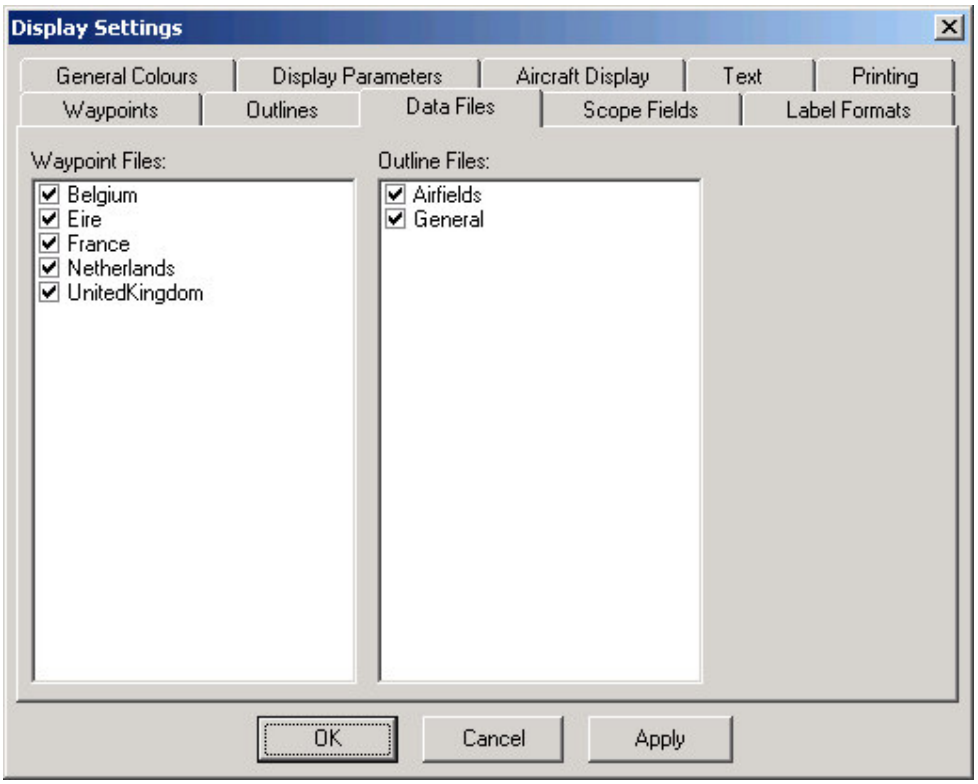


Figure 25: The Display Settings dialog box (Data Files tab)

This tab displays the outline and waypoints files that are in your \Outlines and \Waypoints directories respectively, and allows you to opt to not load specific files.

To stop a file being loaded, simply uncheck the checkbox next to its name. When you click on OK or Apply, the system will purge and reload the waypoint or outline lists, loading only those files you have set to be loaded.

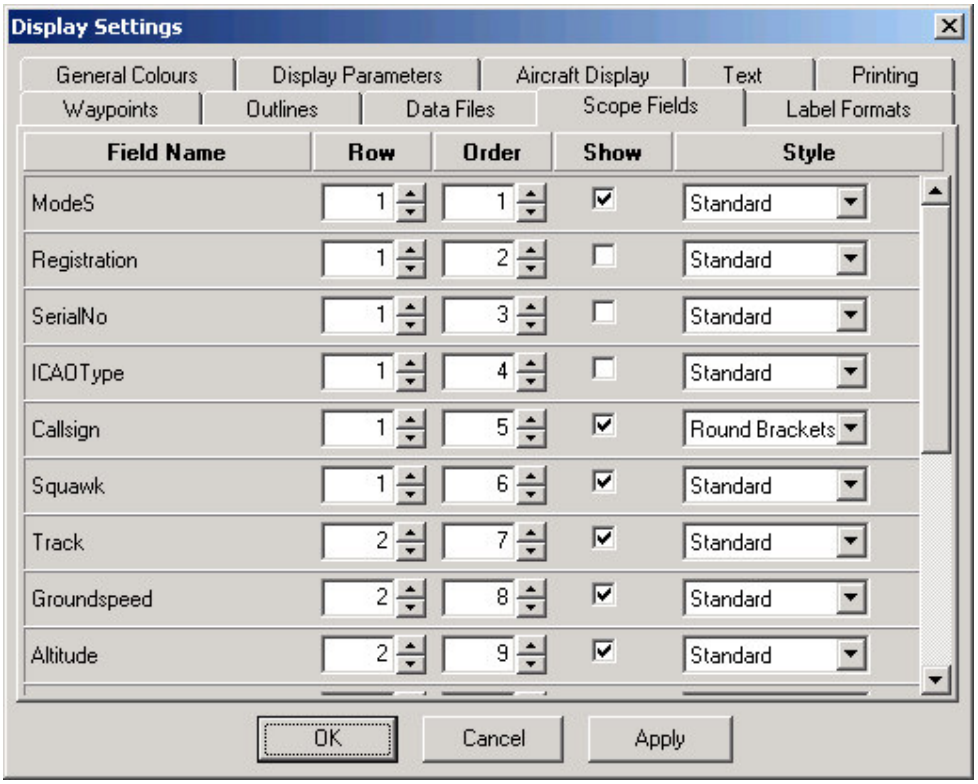


Figure 26: The Display Settings dialog box (Scope Fields tab)

The Scope Fields controls allow you complete control over the fields that are shown in the aircraft tags on the radar screen (replacing the earlier, less flexible, checkboxes in the Display Parameters tab).

For each field that can be displayed in the caption, you can set four settings:

Show: This sets whether or not the field will be displayed. If this checkbox is not checked, then the other three values make no difference (i.e. they only apply if you've set the field to be shown).

Row: This sets which row of the tag the field will appear in. By default, there are two rows, but you can have up to five. Row must be set to a value between one and five.

Order: This sets the order in which fields are displayed on a row (the Row parameter sets which row they are displayed on).

Style: This sets the style in which the field is displayed. If set to the default (Standard) then the field value is simply added into the caption. But you can opt to have the value surrounded by brackets, have dashes or bars before or after it, and so on.

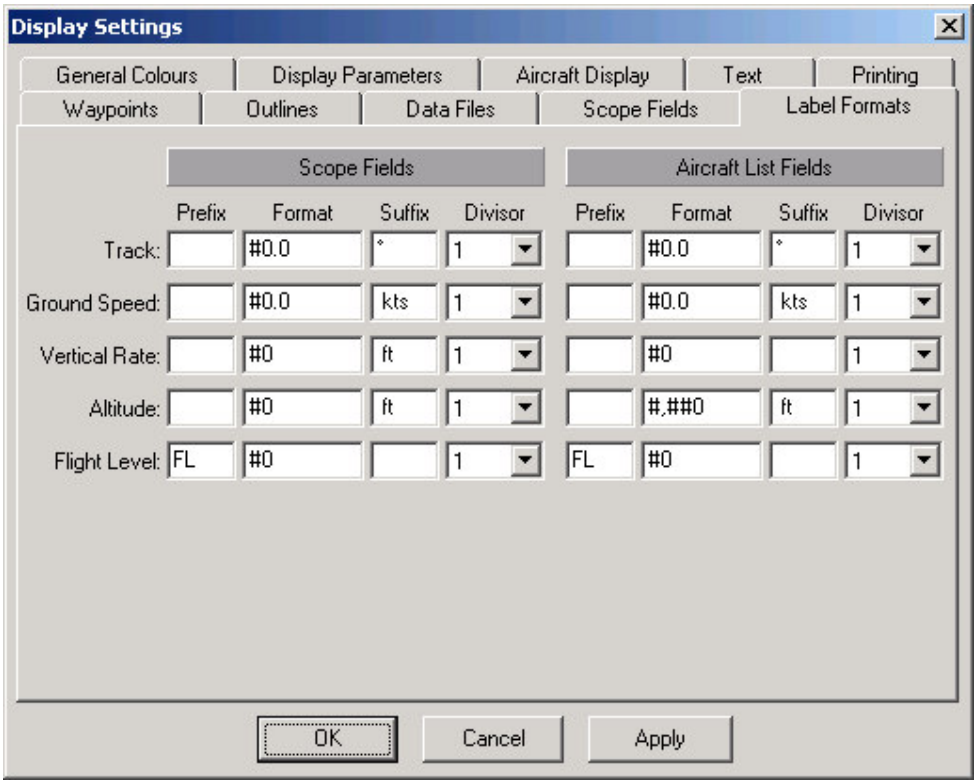


Figure 27: The Display Settings dialog box (Label Formats tab)

The Label Formats tab allows you to set the ways in which field values are displayed on the radar scope and in the aircraft list. This enables you to have as much, or as little, detail as you wish, which can be a great help if the radar scope is getting cluttered.

For example, by default the setting for the ground speed field on the radar scope is:

Prefix: [blank] Format: #0.0 Suffix: kts Divisor: 1

This will caused the radar scope to display track values in the form: **157.3 kts** (note that there is a space before the kts in the Suffix edit box).

If you changed it to the following:

Prefix: G Format: #0 Suffix: [blank] Divisor: 1

…it would display values in the form: **G157** (note that in this example, we've put no space after the G).

You can use the divisor to divide the value displayed. If you changed the divisor of the above example to 10, for example, the value displayed would change to **G16**.

The Prefix and Suffix fields are purely text only, and can contain any values. The Format field should contain only the values "#", "0", "," and ".".

Data Settings

This menu option brings up the Data Settings dialog box:

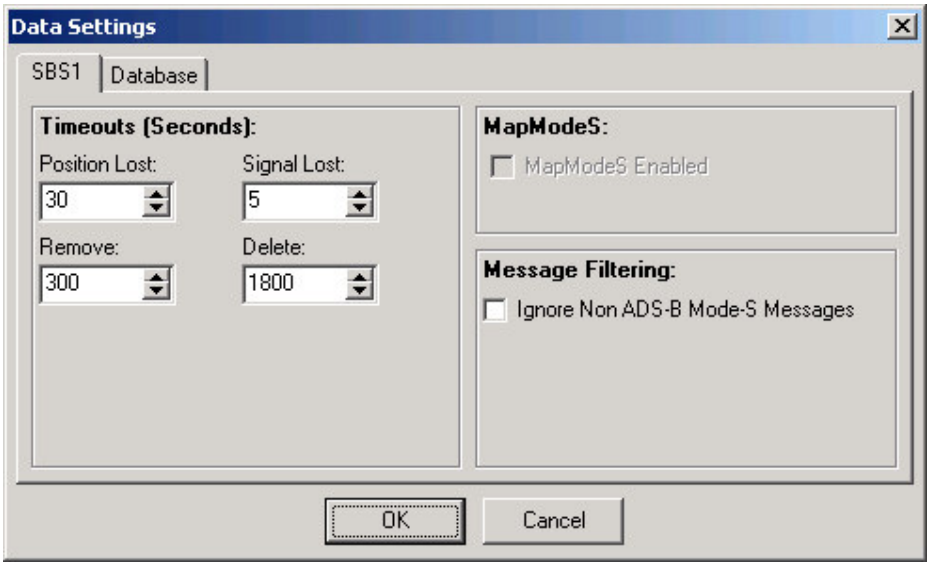


Figure 28: The Data Settings dialog box (SBS1 tab)

Message Filtering: By default BaseStation receives and processes both ADS-B and non-ADS-B Mode-S messages. However, you can turn off the processing of non-ADS-B messages by checking the Ignore Non ADS-B Mode_S Messages checkbox.

Timeouts (Seconds): These parameters dictate how the application responds when it stops receiving messages from an aircraft. After Position Lost seconds has elapsed since the last message is received, the aircraft changes to a state of "position lost" and is shown as yellow (by default) on both the Radar Screen and in the Aircraft List. If a further Signal Lost seconds elapse without receiving a message, the aircraft changes to a state of "signal lost" and is removed from the Radar Screen and shown as red in the Aircraft List. If a further Remove seconds elapses without receiving a message then we remove the aircraft from the Aircraft List. Finally, when a further Delete seconds have elapsed, we purge its data from memory.

MapModeS: The MapModeS Enabled checkbox (which is initially unchecked) enables the use of the MapModeS network. If checked, then the previously hidden MapModeS menu item will be made visible. If unchecked, the menu item will be hidden. (Note: If this checkbox is greyed out, then this means that the MapModeS network is not currently available).

> As of the writing of this version of the manual, MapModeS is ***not*** currently available.

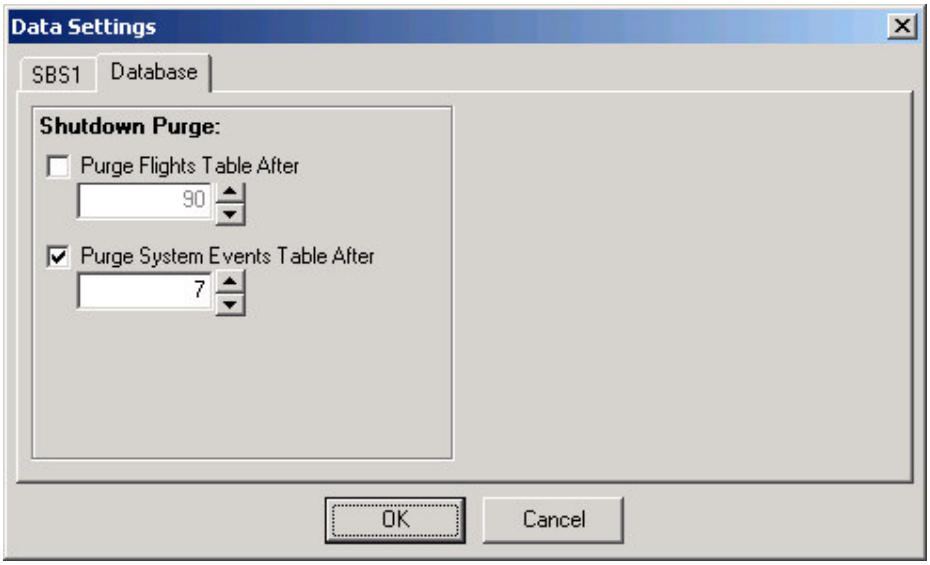


Figure 29: The Data Settings dialog box (Database tab)

The system can be set to purge (i.e. delete) data that is now old enough that is no longer needed when it shuts down. It can do this for both the Flights and System Events tables. By default, it leaves the Flights table alone, but delete all records in the System Events table that are more than 7 days old.

Hardware Settings

This menu option brings up the Hardware Settings dialog box:

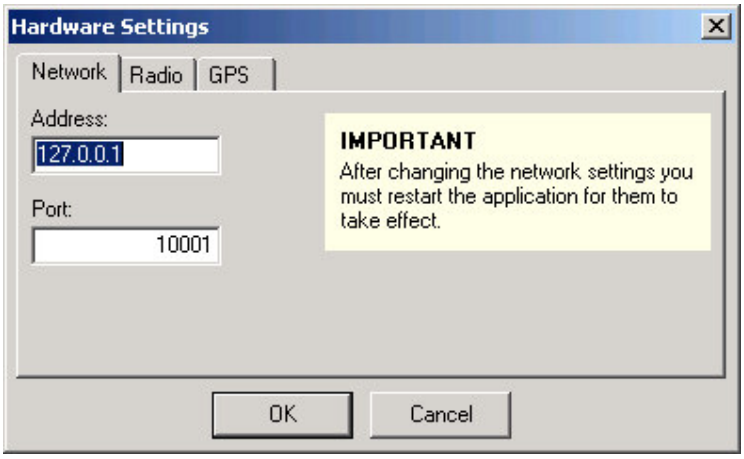


Figure 30: The Hardware Settings dialog box (Network tab)

This tab is only relevant if you have the Ethernet add-on for your SBS-1. If you do, then this is where you enter in the IP address it has on your network and the port that you use to connect to it (which will usually be 10001).

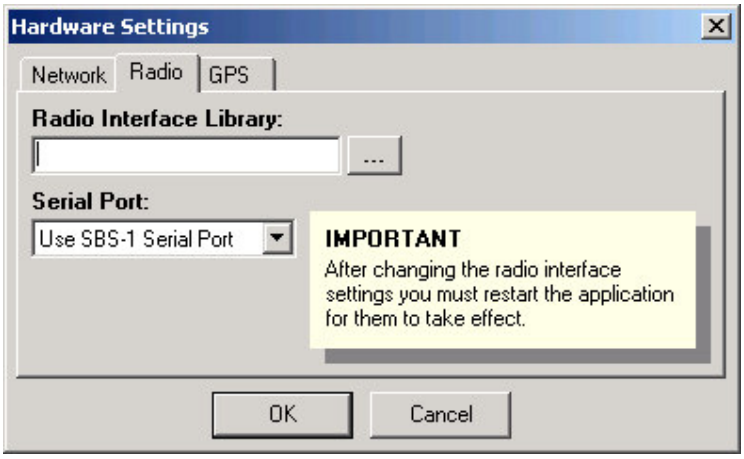


Figure 31: The Hardware Settings dialog box (Radio tab)

The radio tab allows you to select a BaseStation Interface Unit file that implements an interface to the radio (scanner) that you use.

Selecting an interface file will cause the Radio menu to appear in the main application menu bar.

The Serial Port combo allows you to select between having the scanner connected to your PC's serial port (the standard option) and the SBS-1's serial port (useful when your PC is a laptop that doesn't have a serial port).

The radio functionality will only work if your SBS-1 has been upgraded to have the radio interface functionality. Contact your dealer for details of how to do this.

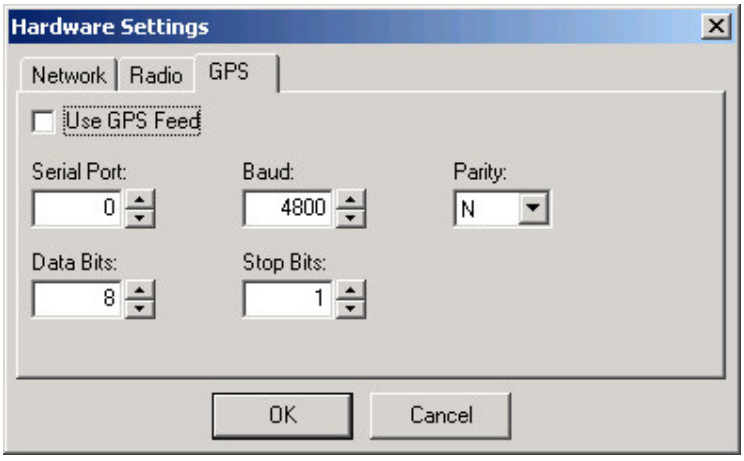


Figure 32: The Hardware Settings dialog box (GPS tab)

The GPS tab allows you to configure the system to use an attached GPS unit to provide coordinate data to BaseStation.

- The GPS unit must be able to output NMEA data to a serial port (or a USB port configured to emulate a serial port).

To enable the use of a GPS, simply check the Use GPS Feed checkbox, and then enter the appropriate values into the edit fields below.

Once this value is checked, a GPS status panel will appear on the status bar (you have to restart BaseStation for this to occur), and a GPS Status menu option will become visible in the Settings menu.

Providing that the GPS is providing valid data (i.e. it has a fix – see the GPS Status menu option for details of this) then the latitude and longitude coordinates that it is outputting (i.e. your current location) will be used in preference to the coordinates of the currently selected location. This includes when you have opted to centre the range rings on the current location (GPS location will be used) and when you have opted to have range and bearing lines drawn from the current location (GPS location will again be used).

Install Firmware Option

Clicking on this item brings up the following dialog box:

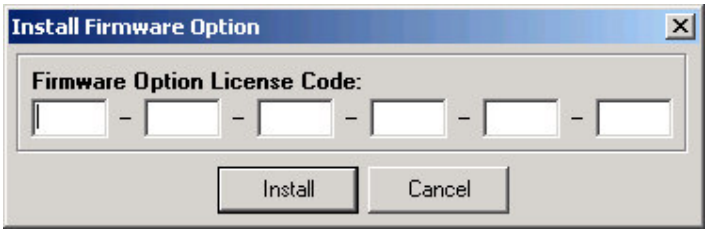


Figure 33: The Install Firmware Option dialog box

This option is used to transfer Firmware Option License Codes to the SBS-1 to active separately purchased features. Instructions for doing this will be included in any such feature packages that you purchase.

Data Source

This submenu has two options: Use USB and Use Network. You should only use it if you have the Ethernet add-on for your SBS-1 and have configured its use via the Network tab of the Hardware Settings dialog box.

If the above is all correct, then you can toggle between the use of USB and the use of the network by clicking on the options in this submenu.

Locations Manager

Clicking on this item brings up the following dialog box:

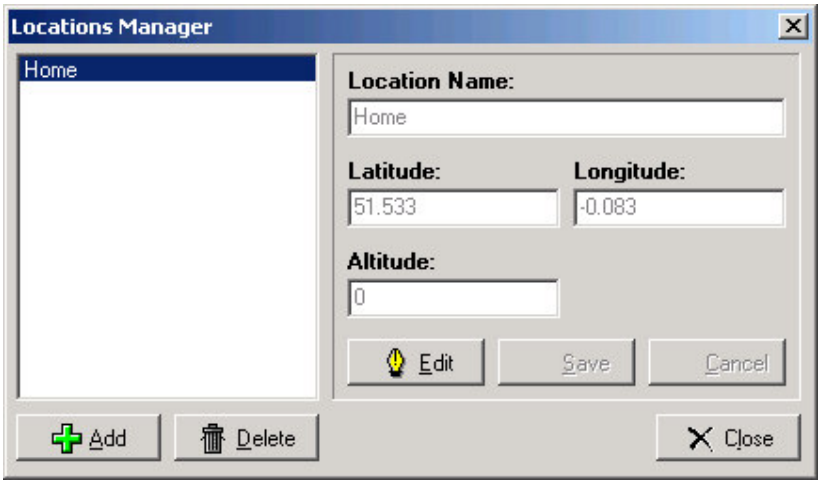


Figure 34: The Locations Manager dialog box

The Locations Manager allows you to define the positions from which you intend to use BaseStation. By default, you will have one location defined called “Home”, which will have the latitude and longitude value that you entered into the Startup Configuration wizard.

If you use your SBS-1 in a different location, then you should either edit the values of your Home location or create an additional location. This is necessary to ensure that all messages are decoded correctly.

To add a new location, simply click on Add, enter the location name, the latitude, the longitude and the altitude (can be zero) and then click on save. To edit an existing location, select it, click on edit, change the required details, and click on save. To delete a location, select it and click on delete.

- You cannot delete a location that has been used while you were recording data. This is because there are flights in the database linked to that location. You can only delete a location if you have not yet used it.

For more details on location, including how to set the current location, please see the section on the Current Location Selector in the Toolbar chapter).

GPS Status

Clicking on this item brings up the following dialog box:

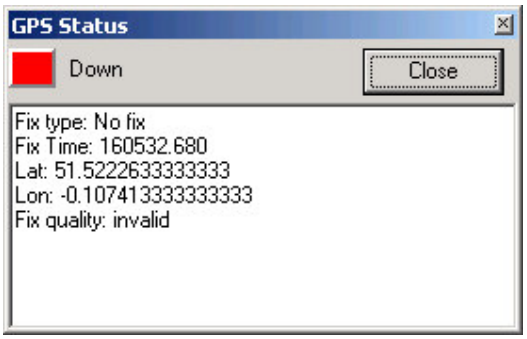


Figure 35: The GPS Status dialog box

This floating window shows the current status of the GPS connection. It can have three states:

Off: This means that BaseStation is not receiving any messages from the GPS unit (i.e. it appears to be off or disconnected). This is shown as dark red in both this dialog box and on the status bar.

Down: This means that BaseStation is receiving messages from the GPS unit, but that those messages are telling BaseStation that the GPS unit is not currently able to validly determine its location. This is shown as bright red in both this dialog box and on the status bar.

Up: This means that the GPS has informed BaseStation that it is now fully operational delivering valid coordinates. This is shown as bright green in both this dialog box and on the status bar.

Toolbars

This submenu allows you to hide or show individual parts of the toolbar.

Status Bar

This menu option allows you to hide or show the status bar.

Sidebar

This menu option allows you to hide or show the sidebar.

Reload

Reload Outlines causes all outlines to be reloaded. You would normally only do this if you have modified an existing outline file or added a new one.

Reload Waypoints causes all waypoints to be reloaded. You would normally only do this if you have modified an existing waypoint file or added a new one.

Help Menu

Reference Manual

This menu option displays the PDF reference manual (i.e. this document).

Release Notes

This menu option displays the release notes.

BaseStation Websites

This submenu can launch (in your default browser) various BaseStation related web sites that can be used to get help and information about the BaseStation and SBS-1 products.

User Websites

This submenu can launch websites that are not connected with the BaseStation system but that we think might be of interest to users.

About BaseStation

This menu option launches an About dialog box that displays the version number of your BaseStation software and other information, including which option firmware options you have installed (as of the writing of this manual, the radio option is the only such firmware option available).

Aircraft List

What It Shows

The Aircraft List has an entry for each aircraft that we are currently receiving messages from.

The **status** column shows the transmission status of the aircraft by means of colour-coded symbols. Green indicates that we are receiving transmissions. Yellow indicates that more than 30 seconds have gone by without us receiving a transmission. Red indicates that 35 seconds have gone by without us receiving a transmission.

If the symbol is an aircraft (✈) then it indicates that we are receiving ADS-B messages from this plane that contain latitude and longitude data.

If the symbol is a solid circle (●) then this indicates that we are receiving ADS-B messages from the plane, but that they do not contain latitude and longitude data.

If the symbol is four diamonds (❖) then this indicates that we are receiving only Mode-S messages from the aircraft (but no ADS-B messages).

The **state** column uses colour coded arrows to indicate whether the aircraft is ascending (upward pointing thick blue arrow), flying straight and level (level pointing thick blue-green arrow), descending (downward pointing thick brown arrow), or on the ground (level pointing thin grey arrow).

The **show trail** column indicates whether or not the aircraft is being individually tracked. A tick indicates that it is.

The **squawk** column shows the squawk code, if any, that the aircraft is transmitting. Under certain circumstances, the squawk code will be displayed with a symbol after it. The possible symbols are:

* (Ident): Transmitted when the pilot presses the "Ident" button in response to a request from Air Traffic Control. Normally transmitted for 18 seconds.

+ (Alert): Transmitted when the squawk code changes (usually for 18 seconds).

E (Emergency): Indicates that the squawk is one of a set number of codes defined to indicate an emergency. These include 7700 (emergency condition), 7600 (radio failure) and 7500 (unlawful interference).

The **last update** and **time tracked** columns display the time that the last message was received for that aircraft and the time that has elapsed since the first message was received.

The remaining columns simply display the data received from the aircraft.

Initially, the Aircraft List is sorted on **last update**. This means that as new aircraft appear, their rows are inserted in at the top, with the existing rows shuffling down.

The operator column can be used to display a graphic for each aircraft, typically to show its operator. Operator flag graphic files must be in .bmp format and must be placed in an OperatorFlags subdirectory. To set an aircraft to display the operator flag, enter the name of the file minus the .bmp extension into the OperatorFlagCode of the Edit Aircraft Details dialog box.

For example, if you enter “BAW” into the OperatorFlagCode field of an aircraft, and you have previously placed the file “BAW.bmp” into the directory C:\Program Files\Kinetic\BaseStation\OperatorFlags, then the baw bitmap will be displayed in the Operator column for that aircraft.

> ✍ We do not envisage users typically entering these codes using this interface. Instead, we have provided this feature so that those existing third party applications that use BaseStation’s database interface to write registration data into the database can write in flag codes matching existing flag data sets, allowing the users of those third party products to have operator flags automatically appear.

Using It

To select an aircraft, simply click on that aircraft's row. You can move the selection up and down by using the arrow keys.

To sort on a different column, simply click on that column's heading. The column that is the current sort column is drawn depressed as an indicator, and has an arrow showing the direction of sort. (Some columns default to ascending, others to descending). You can toggle the direction of sort by clicking a second time on the heading.

You can toggle the "show track" status of the currently selected aircraft with the space bar.

Double-clicking on the Aircraft List will bring up the Aircraft Details window. Once that is visible, it will display the details of whichever aircraft is selected.

Finally, right-clicking on the Aircraft List will display a pop-up menu containing the menu options that particularly apply to the Aircraft List.

The Show All button determines which aircraft are shown on the aircraft list. It duplicates the functionality of the **Show All Aircraft (Inc. Non Position)** menu item (see the description of that item for details).

The Int All button also determines which aircraft are shown on the aircraft list. It duplicates the functionality of the **Show Only Aircraft Marked Interested** menu item (see the description of that item for details).

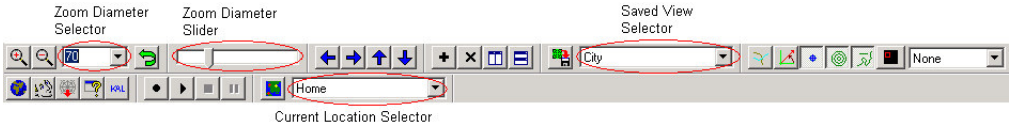
Customising It

You can change the width of columns by simply moving the pointer to the "groove" between column headings and then dragging (holding down the mouse button and moving the mouse) the column heading to be wider or narrower.

You can opt to hide or display certain columns using the Columns submenu of the Aircraft menu.

Toolbar

Most of the items on the toolbar are duplicates of commonly used menu items, and are described in the section above. However, there are four items that are unique to the toolbar, and are described in this section.



Zoom Diameter Selector

Popping this down offers a range of specific zoom diameters (the width, in miles, of the real-world area covered by the radar scope range rings) to set the current view to. You can also type in a specific number.

Zoom Diameter Slider

This offers an alternative way to zoom in and out. Simply slide to the left to zoom in, and to the right to zoom out.

Saved View Selector

This allows you to select a previously saved view to apply to the current view. The current view (zoom diameter, zoom centre and display toggle settings) will change to the settings saved in the saved view.

Current Location Selector

This allows you to change which of your previously defined locations is the one you are currently at. Setting the correct location is important for a number of reasons:

1) It causes the system to use the correct current latitude and longitude when decoding messages picked up from aircraft on the ground, thus ensuring that they are correctly decoded.

2) If you later browse the flight in BaseStation Reporter you will be able to see from where it was you picked up the aircraft.

3) If you use BaseStation Logger to log the data messages received for later analysis, you will be able to distinguish between messages received from different locations.

For more information about locations, see the entry for the Locations Manager.

☞ You might typically change the location if you run your system on a laptop and are using it outside your home (e.g. you might change the current location from “Home” to “Hatton Cross nr Heathrow”.

✍ When you change the current location, it is changed for the entire session. (i.e. If you started BaseStation at 9:01 am and at 9:03 am change the location, the system assumes that you’ve been at that new location since you started up).

Sidebar

The sidebar offers duplicates of some of the controls in the main toolbar, plus one unique control: the Full Screen button.

Clicking on the Full Screen button puts the application into full screen mode. In this mode, the application occupies the entire screen (including the area where the taskbar would normally be) and all controls except for the sidebar and the radar screen are hidden (i.e. no menu, no toolbar, no status bar and no aircraft list).

This mode is ideal if you want to concentrate on the Radar Screen alone without any distractions.

To get out of full screen mode, simply click on the Full Screen button again.

Using The Radio Interface

Enabling The Radio Interface

Enabling The Firmware

As bought, BaseStation does not have the capability to link to a radio (a.k.a. a scanner). To do this, you must purchase the radio interface option from your dealer. The dealer will then send you a firmware update package and a license code.

Instructions for updating and configuring the firmware will be included with this package.

Enabling BaseStation

The radio interface supports multiple models of radio through the use of a separate BaseStation Interface Unit (.biu) file for each model or range. To select the correct biu for your model of radio, go to the Hardware Settings dialog box (see separate entry earlier in this manual) and select the biu file for your model. You should also be sure to select the appropriate method of connection (either your PC's serial port or the SBS-1's serial port).

(If you are unsure which biu file is appropriate for your model of radio, then contact your dealer for advice).

Once you have done this the Radio menu will appear in the top-level menu bar.

Customising The User Interface

The radio user interface includes extra toolbar buttons that are not initially activated. To activate them, click on the Settings->Toolbars->Radio menu option.

You should then see the following buttons appear on your toolbar.

Figure 36: The Radio Toolbar

Using The Radio Interface

> You will not necessarily have access to all functions in the radio interface, as only those functions that are supported by your model of radio are implemented. For example, if your radio does not support the setting of volume from a linked PC then all volume controls will be greyed out.

Radio Menu

The top items on the radio menu allow you to turn the radio on and off and reset it.

The Preset Frequencies submenu allows you to select any frequency in BaseStation's radio frequency database. If you select a frequency then your scanner will be tuned into that frequency. (Note:- BaseStation comes with frequencies for the UK. If you are in other countries then you will have to add frequencies to the .rfq files in the RadioFrequencies subdirectory. Details of how to do this are available on the Kinetic forums.)

Note: For descriptions of the other menu items, see the descriptions of the equivalent items in the radio toolbar.

Radio Toolbar

 Pressing this button makes the Radio Control Panel appear. Pressing it again makes it disappear.

 Pressing this button brings up a menu which allows you to select any frequency in BaseStation's radio frequency database.

 Pressing this button mutes the sound.

 Pressing this button increases the volume.

 Pressing this button decreases the volume.

Radio Control Panel

The Radio Control Panel looks like this:

Figure 37: The Radio Control Panel

The grey buttons on the left allow you to select which frequency mode to use.

The on button allows you to turn the radio on.

The numeric keypad allows you to manually enter a frequency, clicking the “ent” button when you have finished or “Clr” if you make a mistake. (You can also type the frequency in using the numeric keypad of your PC, pressing the return/enter key when done).

> Although BaseStation remembers the frequency as khz (as in the above example), you can enter them as mhz (i.e. you could type in “118.5” in order to select 118500 khz – BaseStation will simply convert it).

The large knob (with red dot) allows you to adjust the frequency relative to its current setting. Simply click on the red dot and drag it either clockwise, or anti-clockwise.

The blue left and right buttons allow you to make minor adjustments to the frequency.

Finally, the slide on the right-hand side of the panel allows you to adjust the volume.

The “LED” display shows the current frequency and volume. If you selected the frequency by selecting a frequency from the BaseStation database (as opposed to manually typing it in) then it will also show the description of this frequency (in this case “EGLL-TWR”).

Local Frequencies Right-Click Popup

You can click anywhere on the map and select “Local Frequencies” from the resulting pop-up menu to get a list of the radio frequencies in use in that area. For example, clicking somewhere between Heathrow and Elstree would produce the following menu:

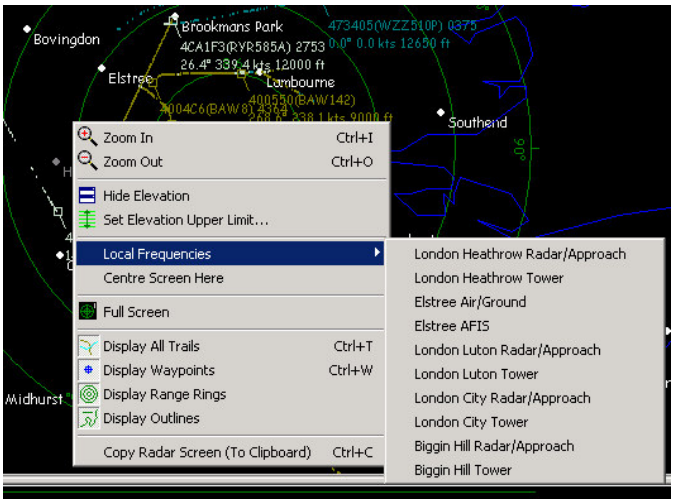


Figure 38: The Local Frequencies submenu

The frequencies are sorted in order of the waypoints that they are associated with. Simply click on the desired frequency to have your radio tuned to that frequency.

BaseStation Reporter

Introduction

The BaseStation Reporter is the companion program to BaseStation. It allows you to browse the historical data that BaseStation saves into the database.

Main Screen

Aircraft Tab

The aircraft tab shows the aircraft in the database in the top pane, with the flights made by the selected aircraft in the bottom pane.

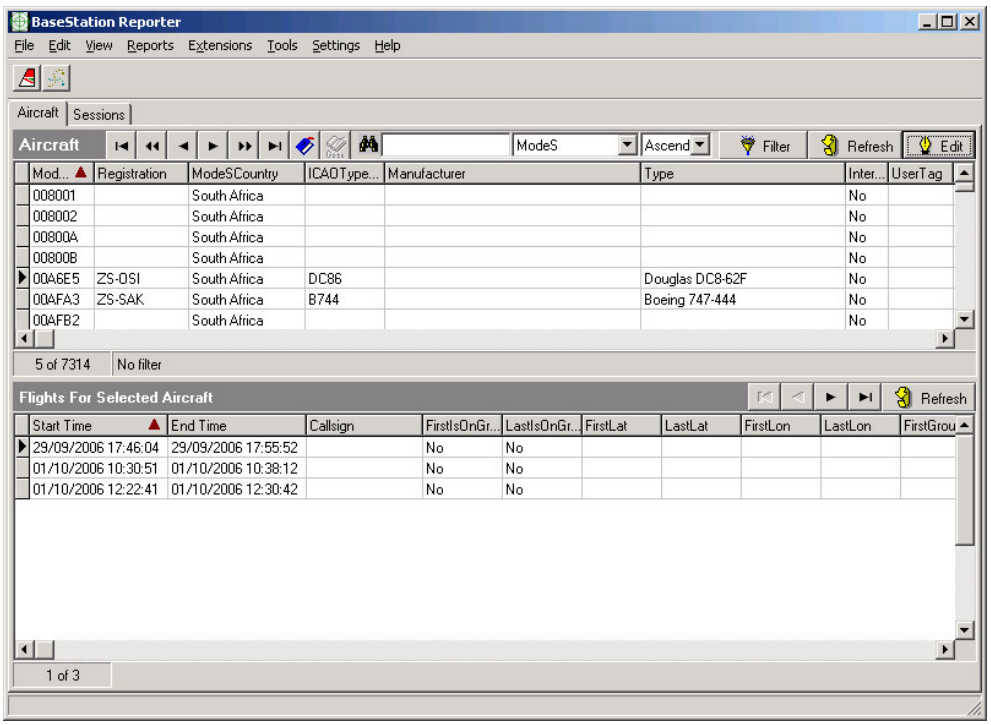


Figure 39: Reporter's main screen, open on the Aircraft tab

The grid can easily be customised. To sort on a column, click on it. To change the sort order to descending, click on it again.

> ☞ You can also set the sort order and direction using the pop-down lists on the aircraft control strip (the ones just to the left of the Filter button).

To change the order of the columns, simply click on a column heading, and drag it to where you want it to be.

The Refresh buttons cause the application to re-read its data from the database.

> ☍ You would only need to do that if you want to see aircraft and flights that BaseStation has since written into the database.

To search for a particular record in the aircraft list, first set the sort order of the aircraft grid to the field you want to search on, and then start typing the phrase you are looking for into the edit box next to the binoculars icon. After you type each letter, the grid will jump to the first aircraft that matches that phrase. (i.e. If you set to sort on manufacturer and then type in “Bo” it might jump to the first aircraft with a value of “Boeing”). If you type a letter such that the phrase now doesn’t match an aircraft, the edit box will turn red.

The Filter button allows you to set a filter so that only aircraft matching certain criteria are shown in the aircraft. Upon clicking on it, the following dialog box will appear:

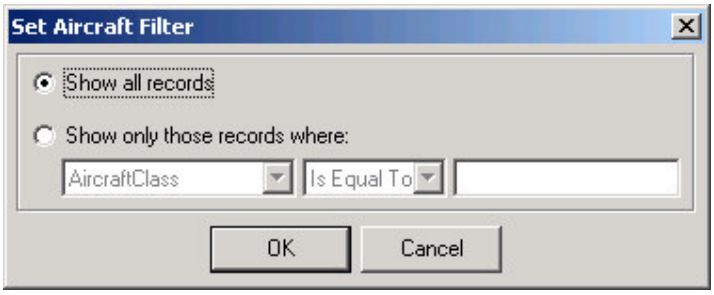


Figure 40: The Set Aircraft Filter dialog box

To set a filter, select the "Show only those records where" radio button, and then select the desired filter in the lower boxes.

☞ The filter will be displayed in the status strip under the grid, and will stay active until you cancel it using the Set Aircraft Filter dialog (by selecting back to "Show all records").

The Edit button allows you to edit the details of the selected aircraft. Upon clicking on it, the aircraft details will appear in a dialog box:

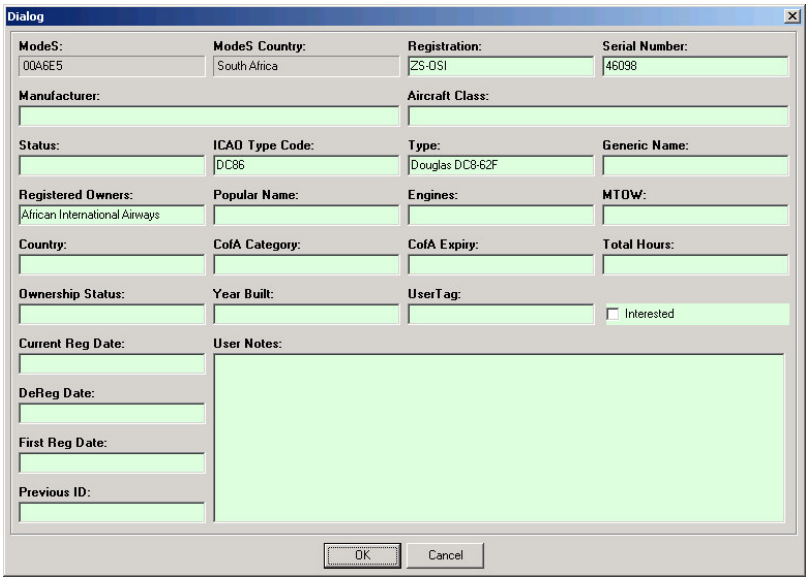


Figure 41: The Edit Aircraft dialog

To update the values for the aircraft, simply enter in the details and then click on OK. To help you keep track of which values you have edited, edit boxes turn red once changed.

Sessions Tab

The sessions tab shows the sessions in the database in the top pane, with the flights made during the selected session in the bottom pane.

☞ A session is basically the period from when you ran BaseStation to when you shut it down. Each time you do this it counts as one session.

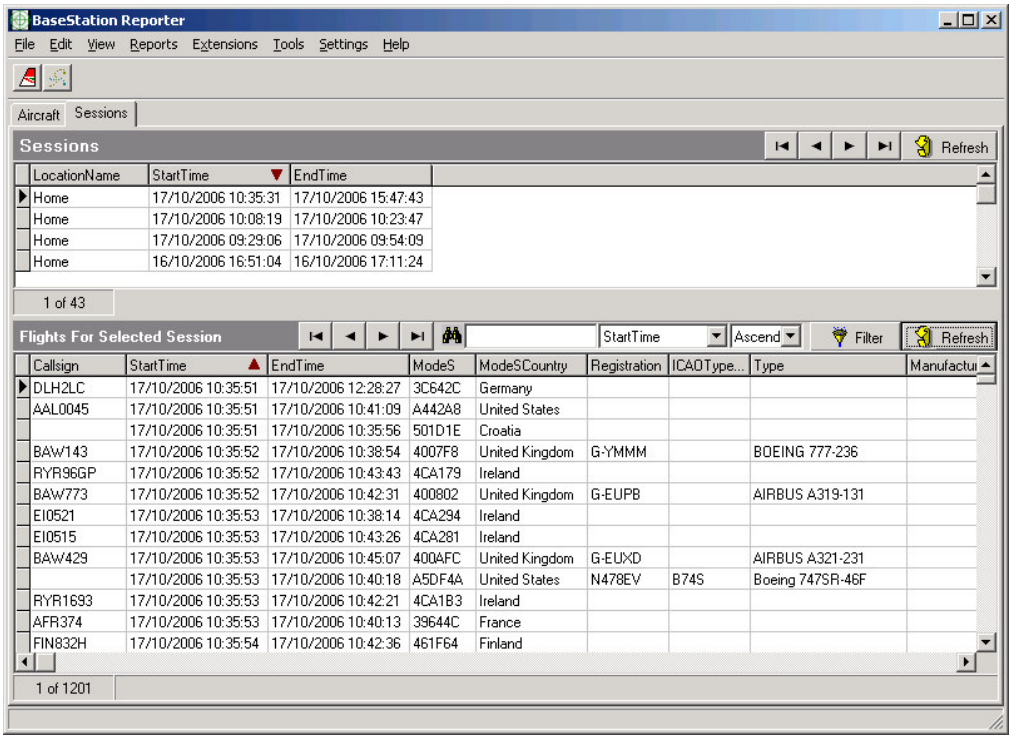


Figure 42: Reporter's main screen, open on the Sessions tab

The controls on the sessions tab work in exactly the same way as on the aircraft tab. In particular, you can search and filter the Flights grid in the same was as you can the Aircraft tab's Aircraft grid.

Menus

File

Export Database: The options in this submenu allow you to export specific tables within the database to .csv files, which can be imported by spreadsheet or database applications.

Export Grid: The options in the submenu allow you to export the four grids displayed on the main window to .csv files.

Backup Database: This menu option produces a BaseStation backup file (.bbk) that contains all of the data in the database.

Restore Database: This menu option allows the user to restore a previously backed up set of data (.bbk file).

> If you restore a .bbk file, all of the data that is currently in your database will be erased.

Edit

Copy: The options in the submenu allow you to copy the four grids displayed on the main window to the clipboard.

Reports

Aircraft Report: This menu option produces a report (that can be printed, previewed, or saved to .csv) of all the aircraft in the database.

Flights Report: This menu option produces a report (that can be printed, previewed, or saved to .csv) of all the flights that were tracked for a certain time period.

> The initial from and to times that appear in the Flights Report dialog are taken from the session that is currently selected in the Sessions tab. (i.e. The default is

to produce a report showing all the flights that were made during the current session).

Tools

Pack Database: This menu option removes unused space from the database file to reduce its size.

- This option must not be invoked while BaseStation (or any other application that uses the BaseStation database) is running.

Settings

Show Status Bar: This menu option toggles the status bar on and off.

Allow Direct Aircraft Editing: Setting this menu option (i.e. clicking on it so that a tick appears) allows you to edit the values in the aircraft grid simply by clicking on a cell).

- This setting should be used with caution since, when enabled, it is easy to inadvertently alter data without realising.

Set Grid Request Limits: This menu option brings up a dialog that allows you to select how many records can be shown in each of the four grids. If your database grows beyond this amount, then the status area under each grid will show you which portion of the table you are currently looking at, and will have controls allowing you to move through the data.

BaseStation Logger

BaseStation Logger is a simple program that, when run, connects to BaseStation and writes out log files containing all the messages that are being received as well as other bits of information. These files, which are in CSV format, can then be analysed by spreadsheets such as Excel, or by custom applications.

A detailed description of the format of these log files is beyond the scope of this manual. Those requiring more details should visit the Development forum on the SBS-1 web-forums.

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DECLARATION OF CONFORMITY

(*According to ISO/IEC Guide 22 And EN45014*)

We, Kinetic Avionic Products Limited, Kinetic House, 44 Hatton Garden, London, EC1N 8ER, United Kingdom

declare that the following product:

SBS-1 Real-Time Virtual Radar

is in conformity with the provisions of the following European Directives:

Council Directive 89/336/EEC, as amended by 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/97/EEC and 98/13/EC

Council Directive 73/23/EEC, as amended by 93/68/EEC

And the following standards:

EN55022:1994 + A1:1995 + A2:1997
EN55024:1998 + A1:2001
EN61000-3-2:2000
EN61000-3-3:1995 + A1:2001
FCC Part 15, Class A

Done London, United Kingdom, on 25th August 2005

Mark Maurice
Product Manager

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