

Simulator Operating Manual

Course version VVE116

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1. Introduction to the *VV* Simulator

1.1 Running the Simulator

The *VV* simulator is run from within the *VV Enroute*™ exercise main screen. Clicking on one of the blue exercise tabs will launch the simulator with the appropriate exercise (figure 1.1).

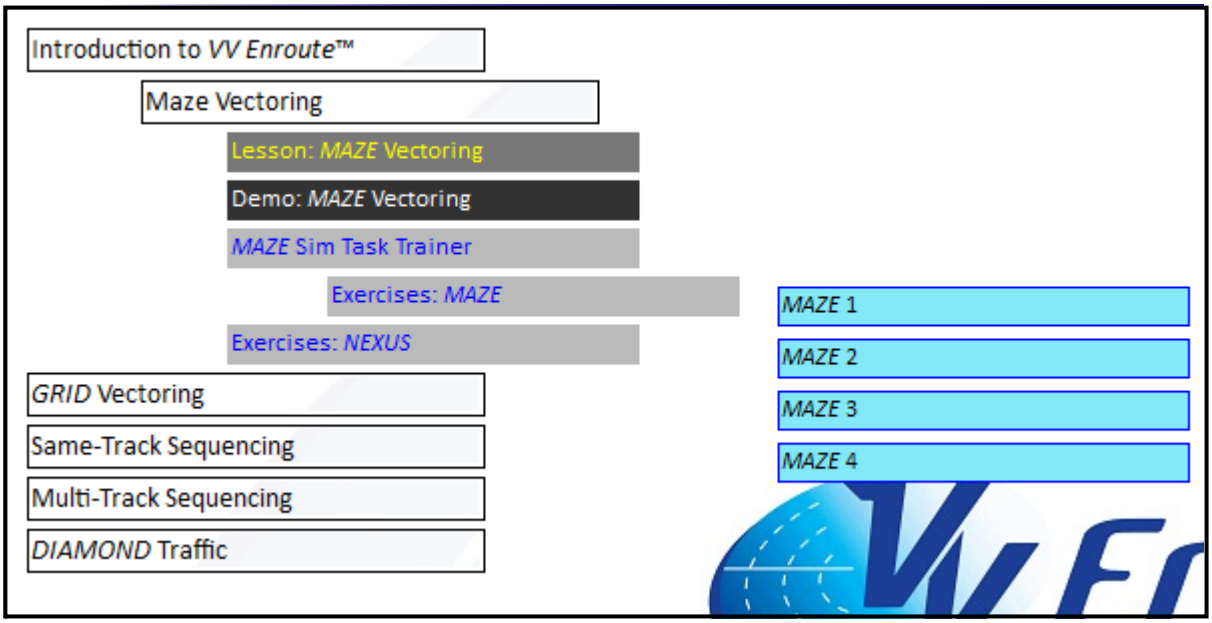


Figure 1.1: Launching the Simulator from the VV Enroute™ main screen

As shown in figure 1.1, the *VV Enroute*™ main screen provides access to all the instructional and demonstration material, and to the accompanying simulator exercises.

1.2 Speech Recognition

Prior to running a *VV Enroute*™ simulation, a user profile should be created and the Speech Engine should be trained for your voice. For instructions, see the setup guide for your operating system, which is selectable from the Speech Recognition menu on the *VV Enroute*™ main screen.

1.3 Radar Systems

This version of the *VV Enroute*™ simulator supports only one radar system. The *VV* System is the native Visual Vectoring radar system. It provides most of the functions that are available in a typical advanced ATC radar system. This system is the default display for the *MAZE*, *NEXUS*, *GRID* and *DIAMOND* exercises.

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2. Top Menu

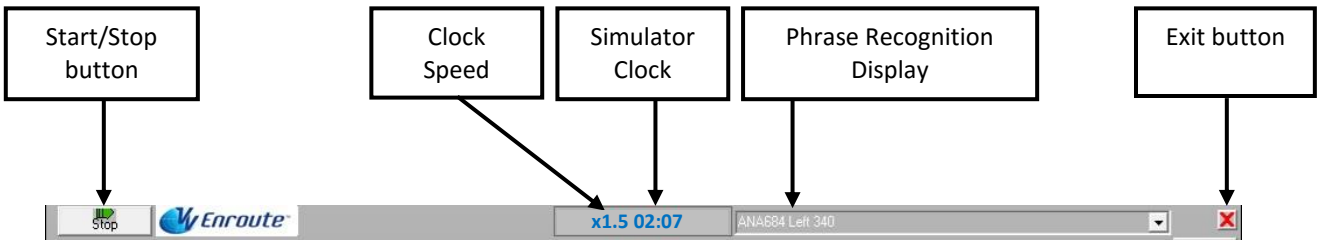


Figure 2.1: The Top Menu

The Top Menu appears at the top of the main radar screen, as is depicted in Figure 2.1.

2.1 The Start/Stop Button

The *Start/Stop Button* is used to start and pause a simulator exercise. When the simulator is paused, it may be back-stepped to an earlier time in the exercise.

2.2 The Clock Speed Indicator

The *Clock Speed Indicator* will show the current simulator speed, which may be varied in the *Exercise Controls* window from x0.5 (half speed) to x2.0 (double speed). When the indicator is not present, the exercise is running at x1.0 (normal speed). Click on the indicator to return to normal speed.

2.3 The Simulator Clock

The *Simulator Clock* shows the current 24-hour time in the exercise. Where the time is displayed in blue the clock is running, when it is red the exercise has been paused.

2.4 The Phrase Recognition Display

The *Phrase Recognition Display* area shows the most recent phrase recognised by the speech system. Clicking on the down-arrow will display the previously-recognised phrases in time order.

2.5 The Exit Button

Clicking the *Exit Button* will terminate the simulator exercise. If the exercise has been run for sufficient time (around ten minutes, depending on the exercise), a score will be displayed. This score is saved to a database and may be reviewed and analysed using the *Scoring Centre* under File on the main *VV Enroute™* screen.

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3. Side Menu

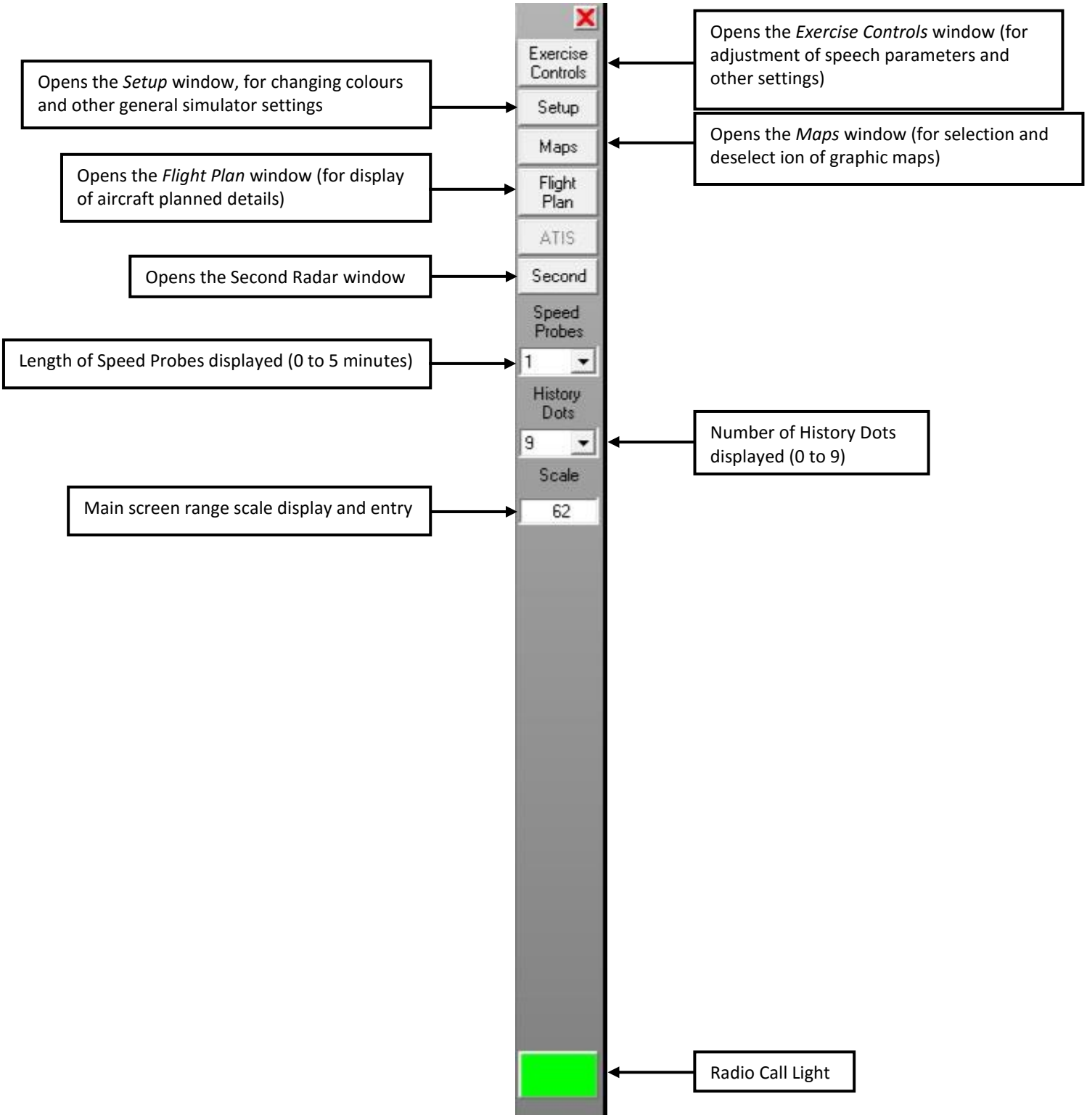


Figure 3.1: Side Menu of VV Simulator

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3.1 The Exercise Controls Button

This button opens the *Exercise Controls* window (see Section 6), which enables adjustment of various exercise settings, such as wind direction and clock speed, to be made.

3.2 The Setup Button

This button opens the *Setup* window (see Section 7), which provides access to screen display and simulator performance settings.

3.3 The Maps Button

This button opens the *Maps* window (see section 8), for selection and de-selection of radar map elements.

3.4 The Flight Plan Button

This button will open the *Flight Plan* window (see section 9), which contains details of flight tracking and planning information for a particular aircraft.

3.5 The Second Button

This button opens the Second Radar window (see section 10), for display of the radar screen with a different centre and range. This window is useful for displaying areas of the radar screen in more detail.

3.6 Speed Probes Entry

The length of the Speed Probes (0 to 5 minutes) can be selected here. See the next section for more information on Speed Probes.

3.7 History Dots Entry

The number of displayed History Dots (0 to 9) can be set here.

3.8 Radio Call Light

The *Radio Call Light* provides an indication that a transmission is in progress, either by you, as the controller (in which case the button will display PTT for Press To Talk), or from an aircraft. If the Call Light is yellow, your radio frequency is active.

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4. The Main Radar Screen

4.1 The Map Display

4.1.1 Moving and Resizing the Map

Commonly used functions in scrolling and resizing the radar screen are listed in the table below:

Key	Action
Arrow Keys	Offset map
Page Up	Decrease range
Page Down	Increase range
Home or F9	Restore default centre and range
Shift-End or Shift-F10	Store custom centre and range
End or F10	Restore custom centre and range

The main simulator map is set to a default centre and range. To scroll to a new centre, the keyboard arrow keys may be used. The Page Up and Page Down keys are used to re-scale the map to a new range. Pressing Home or F9 will restore the map to the default centre and range.

Pressing Shift-End or Shift-F10 will store the current centre and range as a custom setting. Pressing End or F10 will revert to the custom centre and range.

When the mouse is placed over the second radar screen, the use of the above keys will independently change the range and centre of the second radar screen.

If the *Mouse Zoom* function is enabled, the centre and range of the map may be changed directly with a right click of the mouse (See Section 5.4.2).

4.1.2 Aligning the Map

The radar map is always aligned with either True or Magnetic North. The size of some large Enroute sectors with variable magnetic variation requires the radar map to be aligned to True North.

In this version of the *VV Enroute* the magnetic variation is always zero, so this setting will not have an effect on the alignment of the simulator map.

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4.1.3 Changing Map Colours

Map colours are specific to each type of radar system. They may be changed in the Setup Window. After you have changed the colour palette, it may be stored as a personal setting. Details on how to do this are included in Section 7.8.

4.2 The Aircraft Display

Aircraft on the main radar screen are presented in the form of a Radar Track with an associated data block or label. An aircraft's display contains several elements:

- The Radar Track or Symbol: In *VV Enroute*, this is presented as a round symbol, centred at the geographic location of the aircraft at the last radar sweep.
- The Leader-Line: A line joining the radar track to the data block.
- The Data Block (label): A block of text containing information pertaining to the aircraft.
- History Dots: A set of markers showing previous positions of the aircraft. As the name suggests, these are records of where the aircraft was at the most recent radar sweeps.
- Speed Probe: A line segment showing *predicted* future positions of an aircraft at one-minute intervals. The Speed Probes are an instantaneous indication of the aircraft's direction and speed and are useful in predicting future conflicts and timing turn instructions.
- Selection Indication: An indicator associated with the radar track showing that the aircraft has been *selected* for some action. In the *VV* system, the radar track is surrounded by a larger circle.

4.2.1 Label Colours

The colour of an aircraft's display is determined by its control status. Aircraft that are under your control will generally have a different colour to those that are in a handover state (in out) or that are not yet under your control. Details are contained in the individual sector modules.

For the *VV* system, *controlled* labels are green in colour, those that are *handing-in or out* are orange, and *pending* aircraft are blue.

A particular aircraft display may be toggled between normal and a highlighted (colour changed) by centre-clicking the radar track.

4.2.2 Rotating the Data Block

The data block is rotated, or re-located on the screen, by right-clicking on the radar track symbol and dragging the label to the desired location.

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4.2.3 Contents of the Data Block (*VV* System)

Data Block Element	Set by:	Description
Callsign	System	The callsign is the aircraft identification containing the airline abbreviation and flight number, the aircraft registration, or some other identifier.
Aircraft Type	System	The abbreviator for the type, or make/model, of the aircraft.
Radar Level (RL)	System	The level of the aircraft, as determined from the aircraft altimeter in feet above mean sea level. The information comes from the aircraft's altimeters via the radar system. It is measured in hundreds of feet and may be either an Altitude (when measured with respect to local atmospheric pressure) or a Flight Level (when measure with respect to standard pressure).
Level Change Indicator	System	A symbol, (>, ^ or v) showing the vertical progress of the aircraft. (> [or blank] indicates the aircraft is level, ^ indicates the aircraft is on climb and v indicates it is on descent).
Cleared Level (CL)	Controller	The level assigned to the aircraft by the controller, and entered into the label. The CL colour may be toggled to provide a record of controller actions.
Radar Groundspeed	System	The groundspeed of the aircraft, as calculated by the radar system, displayed in knots.
Ops Data	Controller	Operational data entered into the label directly by the controller.
X-Prompt	Controller	A memory prompt that may be toggled on and off in the label by the controller.
Alert Indicators	System	An indication in the label that some action is required by the controller. Generally, the system has detected that the tracking, level or behaviour of the aircraft is not as expected.

4.2.4 *VV* Radar System Label

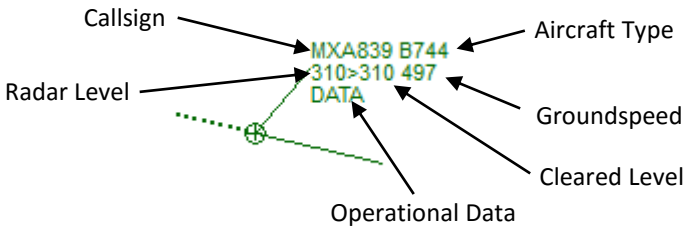


Figure 4.1: The label data block: VV radar system

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4.2.5 Mouse Functions

VV Enroute™ is designed for the use of a three-button mouse. A two-button mouse may also be used, but some functions may not be available. Most of the mouse commands used in the simulator relate to various elements of the radar track (figure 4.1).

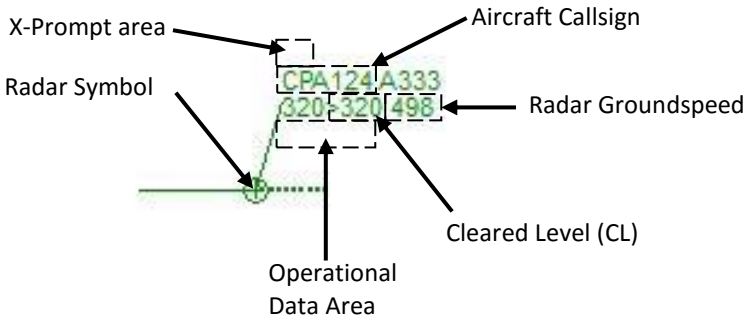


Figure 4.2: Clickable areas of the Radar Track (VV Radar System)

The functions available by clicking the elements of the aircraft track are as follows:

Track Element	Click	Function
Radar Symbol	Left	Select/Unselect the Aircraft.
	Right	Move the Label by dragging the mouse while the right button is selected
	Centre	Highlight an aircraft (change to highlight colour)
Aircraft callsign	Right	Opens the Mouse Control menu (when this function is enabled)
	Left	Opens the Quick Popup window (see 5.4.5)
Radar Groundspeed	Left	Opens the Speed Control menu (when this function is enabled)
Cleared Level	Left	Opens the Cleared Level dropdown menu
	Right	Highlights/de-highlights the Cleared Level
	Centre	Highlights/de-highlights the Cleared Level
Operational Data Area	Left	Click below the levels to open up a text box for entry of operational data, such as assigned headings, using the keyboard
X-Prompt Area	Right or Centre	Click above the left side of the aircraft's callsign to add/remove an X-Prompt in highlight colour.

Other mouse and keyboard actions available in the *VV Enroute™* Simulator are detailed in the information and instruction modules.

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5. Simulator Functions

5.1 General Simulator Functionality

5.1.1 Speech Recognition

The *VV Enroute*™ Simulator utilises a speech recognition engine that can be trained to a high level of accuracy. Hints for improving accuracy are included in *Lesson*: *MAZE Vectoring*. Note that a specific set of control phrases has been assigned for use in *VV Enroute*™; their use is detailed in the instruction modules. A list of useable phrases is included in Appendix A.

5.1.2 Speech Synthesis

Speech Synthesis is used to simulate radio transmissions made by aircraft. This negates the need for pseudo-pilots ('blip drivers'). The speech synthesis may be turned off in the *Exercise Controls* window (figure 6.1). Additionally, the volume and speed of the synthesised speech may be set. It is suggested that, for very busy exercises, the rate of speech be set higher to save time.

The synthetic voices packaged with *VV Enroute*™ are Microsoft® Voices: Mary, Sam and Mike. For a system that has other SAPI 5 compliant voices, they may be used by adding their names to the Voices.txt file in the *VV Enroute*™ directory. This may be done manually, or with the use of the Voice Selector utility in the main *VV Enroute*™ screen.

Microsoft™ Vista and Windows 7/8 installations will make use of the Microsoft™ Anna voice only. Other compliant voices may be added to the Voices.txt file as described above. There is no real benefit to having multiple aircraft voices. After a short time the fact that the aircraft all answer in the same voice is not noticed. In live simulation a single pseudo pilot provides all the aircraft replies.

5.1.3 Variable Speed

The speed of the simulator clock can be set from half to double speed. This is done in the *Exercise Controls* window. As a shortcut, the F12 key will advance the exercise to double (x2.0) speed, and F11 will return it to normal (x1.0) speed. When the simulator is running at other than normal speed, an indication will appear to the left of the clock at the top of screen. Left-clicking on this speed indicator will return the exercise to normal speed.

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5.1.4 Rewind Functionality

When an exercise is paused, a slide-bar appears just below the Start/Stop/Continue button on the simulator screen (figure 5.1). This enables the exercise to be rewound to any time to allow a particular traffic scenario to be repeated. Click *Restore* to return to the current time. Note that this feature is disabled for *MAZE* and *NEXUS* exercises.



Fig 5.1 Clock rewind control

5.1.5 Phrase Recognition Area and Transmission History

The most recently recognised phrase is displayed in the *Phrase Recognition Area*, to the right of the clock on the Top Menu (see figure 2.1). Previously-recognised phrases may be viewed by opening the drop-down menu. This feature may be disabled in the *Setup* window.

5.2 Screen Functions

5.2.1 Bearing and Range Line (BRL)

The *Bearing and Range Line* is a commonly-used tool in the *VV Enroute™* simulator. It provides a means of measuring the bearing (direction) and distance between map locations and aircraft; it also provides a time estimate for an aircraft at a point. There are three types of BRLs:

1. Ground-to-ground BRLs, which measure the bearing and distance between two points on the radar map
2. Air-to-ground BRLs, which measure the bearing and distance between an aircraft and a point on the radar map. A time estimate for the point is also displayed, based on the radar groundspeed of the aircraft.
3. Air-to-air BRLs, which measure the bearing and distance between two aircraft. The information is dynamically updated as the aircraft move.

To activate a BRL, place the cursor over an aircraft track or the geographical location from which you wish to measure. Press F5. Move the cursor to another point or aircraft and left click. To reactivate an existing BRL, left click on the data label of the BRL. To cancel an activated BRL, press F5 or left-click or centre-click. A total of ten BRLs are available at any one time.

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5.2.2 Range Rings

A set of range rings may be displayed on the radar screen, by selecting them in the *Setup* window.



Figure 5.2: Range Ring Selection

Up to 15 solid rings at 10-mile intervals (i.e. 10, 20, 30 ... 150nm), and up to 15 dotted rings at 5-mile intervals may be selected (i.e. 5, 15, 25 ... 155nm). The rings are initially centred at a defined point, but may be off-centred by moving the cursor to the new centre, and pressing the F6 key.

The rings may be returned to the default position by pressing Shift-F6. The colour of the range rings may be set in the *Setup* window. Range rings, other than shown by default in the *DIAMOND* exercises, should not be necessary in *VV Enroute™*.

5.2.3 Compass Rose or Azimuth Scale

The *Compass Rose* or *Azimuth Scale* is a display around the screen perimeter of the bearings from the *Screen Centre Marker* (see below). In *VV Enroute™* they are ON by default during the *MAZE* and *NEXUS* exercises and may be selected ON in *GRID* and *DIAMOND*; they greatly assist the assessment of aircraft headings 'by eye'. The method of doing this is shown in the *Radar Vectoring* lesson.

The rose will always be placed with respect to the alignment chosen. If the map is aligned magnetically, the bearings will be magnetic ones. If it is aligned to True, bearings will be True bearings.

5.2.4 Screen Centre Marker

The *Screen Centre Marker* is displayed at the centre of the radar screen and is independent of any map offset. Used in conjunction with the *Compass Rose* (see above), this tool is useful in the selection of headings for vectoring. It may be de-selected in the *Setup* window.

5.2.5 Scale Marker

The *Scale Marker* is a symbol used to provide a distance reference on the radar screen. It is ON by default, but may be removed in the Setup window. The dimensions of the Scale Marker are 6NM by 10NM, with indicators at 2nm intervals. Use of the *Scale Marker* to monitor distances on the radar screen is also detailed in the *Radar Vectoring* lesson.

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5.2.6 Text Data Areas (TDA)

Text Data Areas are used as a reminder of operational issues that may be of significance, such as airspace activation times, frequencies or transfer levels. A TDA may be created by pressing F4 or SHIFT-T. Enter the text, and press Enter. TDAs may subsequently be moved (by right-clicking on the TDA), deleted (centre-click) or edited (left-click).

TDAs are attached to a geographical location, so will also appear on the second radar window if the location is visible on that screen.

Shift-F4 will remove all TDAs from the screen.

5.2.7 The Mouse Zoom Function

This function provides a method by which a smaller area on the screen may be quickly enlarged to full-screen. It is enabled/disabled in the *Setup* window. Right-click on the screen - a frame will appear at the cursor's position. Drag the cursor and right-click again to complete the zoom. Press Home or F9 to return to the default centre and scale, or either End or F10 to revert to the centre and scale previously stored using Shift-End or Shift-F10.

5.2.8 Different Radar Systems Selection

The *VV* Simulator is designed to emulate radar systems used by various ATC agencies throughout the world. In this version of *VV Enroute*™, only the standard *VV* system is available.

5.3 Label and Aircraft Functions

5.3.1 The Cleared Level (CL) Function

The CL function allows the aircraft's assigned level (altitude) to be displayed in its label. This feature may be disabled in the Setup window. The CL is changed by opening the CL Selection window (see below).

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5.3.2 The Cleared Level (CL) Selection window

The Cleared Level is changed by left-clicking the CL in the label. This will open the *Cleared Level Selection* window (figure 5.3).

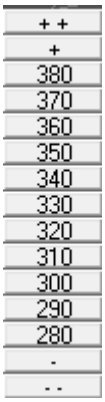


Figure 5.3: The Cleared Level Selection window.

Left-click the desired level in the Selection Menu to set a new Cleared Level for the aircraft. Click – or + to move down or up a page of levels, click - - or ++ to move down or up two pages of levels. Selecting a level closes the window. Centre-click any level or press the Esc key to close the window without entering a new Cleared Level.

When a new CL is entered, it will be highlighted in a different colour (white in this version of *VV Enroute™*). This is the CLH function (see below).

Note that when *Mouse Click Control* is enabled (5.4.2), the CL Selection menu may be used to issue climb and descent instructions without opening the *Mouse Click Control* window. A left-click on the selected level will result in an instruction to the aircraft to climb or descend to that level. It will be verbally acknowledged by the aircraft and shown as a recognised instruction in the *Phrase Recognition Display* window.

5.3.3 The Cleared Level Highlight (CLH) Function

When a new CL has been entered, or when an aircraft has been accepted on handoff, the CL will be highlighted in a different colour (white in this version of *VV Enroute™*). The CLH display may be toggled to the aircraft's track colour by right or centre-clicking the CL. This function is commonly used to highlight the level of incoming aircraft, and as a memory prompt for seeking a read-back of a level instruction. When the correct assigned level is read back by the pilot, the CL is returned to track colour. This is demonstrated in the training modules.

The *Cleared Level Highlight* function will not be available when *Mouse Click Control* is being used to assign levels. It will also be unavailable when the CL display is disabled (in the *Setup* window).

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5.3.4 The X-Prompt function

The *X-Prompt* function allows a memory prompt to be added to an aircraft's label. Centre or right-clicking above the first letter of the aircraft callsign in the label will toggle a highlighted X on and off. This prompt is commonly used to indicate whether coordination has been completed for an aircraft and/or when an aircraft has been told to transfer to the next frequency. This is detailed in the training modules.

5.3.5 The Speed Info Display

To assist the learning and understanding the normal speeds flown by aircraft, speed information for any aircraft may be displayed. This information is specific to aircraft type (and operating company where available). It is not available in early (basic vectoring) exercises. Select *Speed Info* in the *Setup* window and left click the radar groundspeed in the aircraft's label. The *Speed Info* display will open (figure 5.4).

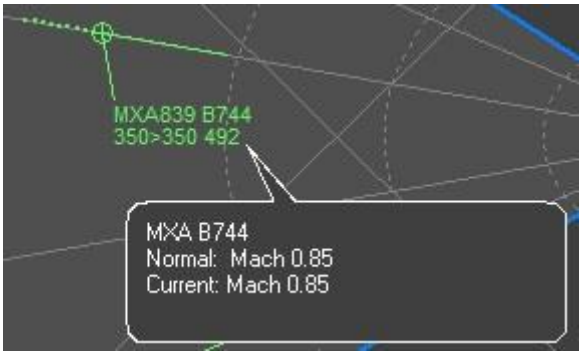


Figure 5.4: Aircraft Speed Info Display

The *Speed Info* display will remain open and move with the aircraft, but only for one aircraft at a time. Click on the popup shape to close it. The display will automatically close when another information window, such as the Cleared Level Selection window, is opened.

5.3.6 The Callsign Text Function

The *VV Enroute*™ simulator uses International Civil Aviation Organisation (ICAO) codes for aircraft callsigns. To assist learning them, the telephony for a callsign may be displayed in full text by 'hovering' the cursor over the callsign in a label. The text wording is what the speech recognition understands as the callsign for a particular aircraft.

The *Callsign Text* feature may be disabled in the *Exercise Controls* window.

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5.3.7 The J-Rings Function

A *J-Ring* (or Halo) is a circle surrounding a radar return used to monitor a separation standard. *J-Rings* are available in the *VV* radar system, and may be enabled in the *Setup* window. Once enabled, individual J-Rings may be toggled on/off for a selected aircraft by pressing the J key. Three distance settings are available (3, 5 and 10 NM).



Figure 5.5: J-Ring Display

5.3.8 The Generic Profiles Function

To simplify the learning process in the early stages of training, *VV Enroute*™ adopts generalised descent and climb profiles for all aircraft. In some versions of *VV Enroute*™, different aircraft performance profiles may be generated by deselecting this function (in the Exercise Controls menu). Aircraft performance will then be specific to aircraft type and Airline Company information (where available).

5.4 Advanced Functions

5.4.1 Graphic Route

The *Graphic Route* function is available in the *VV* radar system. This function provides a graphic display of the planned track of a particular aircraft. The function is OFF by default in this version of *VV Enroute*™, but may be selected ON in the *Setup* window, to prepare for training on an operational system that incorporates route monitoring.

To display the *Graphic Route*, select the aircraft by left-clicking on the radar track. Press Shift-R or F8 to toggle the display on and off. Alternatively, the route may be displayed by clicking RTE in the Quick Popup Menu (5.4.4).

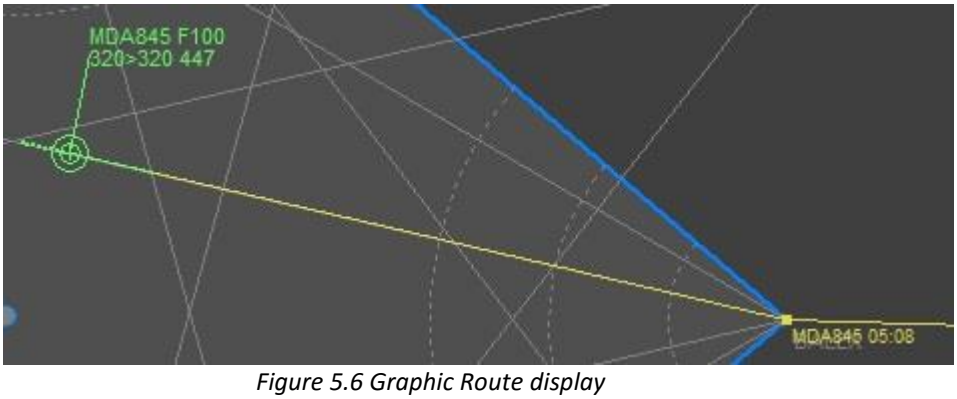


Figure 5.6 Graphic Route display

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Where the function is selected ON, the radar system continually monitors the position of each aircraft and compares it to its Graphic Route. If the aircraft deviates in excess of a pre-selected distance off-track, a RTE alert will be generated (see the section on alerts below). In *VV Enroute*™, when the function is enabled, this will commonly occur when you are vectoring an aircraft off-track in *GRID* and *DIAMOND*.

To avoid RTE alerts, and to maintain a correct record of where the aircraft is going, it is important to edit the Graphic Route where possible. This is called *Rerouting* an aircraft.

To reroute an aircraft, first Select it by left-clicking the radar track. Press Shift-E or click the RER button in the Quick Popup Menu (5.4.4) - this will activate Reroute Mode. Next, the reroute is started by left-clicking either on the aircraft track or on a point in the route. Move the mouse, and left-click on the radar map where the aircraft is expected (or cleared) to fly. The new route will be indicated with a dotted line. Complete the reroute by either:

1. Left-clicking on another point in the aircraft's graphic route to complete the reroute at that point; or
2. Right-clicking on the radar map to activate the Reroute Direct Window, which enables a point to be selected for completion of the reroute; or
3. Centre-clicking or pressing Escape to cancel the reroute.

A simple method of updating the graphic route is by the use of the DCT button in the *Quick Popup Menu* (see section 5.4.4).

5.4.2 Mouse Click Control

The *Mouse Click Control* function may be selected in the *Exercise Controls* window. This feature is primarily intended for use when speech recognition is not available, not practical, or unreliable. Once selected, it allows aircraft to be cleared and controlled using the mouse, in lieu of (or in conjunction with) speech recognition.

Right-clicking on the aircraft callsign in its label opens the *Mouse Click Control* window for aircraft that are on frequency (Figure 5.7). The clock must be running.

The general Mouse Control commands are as follows:

Control	Action
Turn	Click **L** (left), **R** (right) or **Fly** and enter the heading directly or by clicking on the desired compass heading. Click the green tick to execute.
Level Change	Click on the assigned level in the level box. Click the green tick to execute. Note that the label Cleared Level (CL) will change. Note also, changing the level using the drop-down CL menu is equivalent to issuing that level to the aircraft. Left-clicking a level in the drop-down CL menu is equivalent to issuing a discretionary descent (i.e. 'when ready' or 'at pilot discretion'). Right-clicking a level in the drop-down CL menu is equivalent to issuing an immediate descent.
Tracking/Clearances	Aircraft may be cleared to a waypoint on their planned route.

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Note that clearances involving turns and level changes may be grouped. For example, an aircraft may be cleared to "Turn right heading 150, climb to F310" by selecting the appropriate elements then clicking the tick to verify and execute.



Figure 5.7: Mouse Click Control window

The above display would be for an aircraft in a *DIAMOND* exercise about to be turned right onto heading 150 and climbed to F310 by *Mouse Click Control*. EFFIE and BALEX are waypoints on the aircraft's route.

Instructions executed through the use of the buttons at the bottom of the window (tracking direct to waypoints on its flight-planned track) are instant commands and do not require verification by clicking on the tick.

Note also that, once issued, a control command appears in the Speech Recognition area to the right of the clock at the top of the screen, just as if it had been issued by voice.

5.4.3 Trail Information Function

If this function is enabled (default is ON) a trail distance, or aircraft spacing, (in nautical miles) is displayed for a second aircraft that has been sequenced to follow. The trail display will appear for a few seconds when the first aircraft of a pair passes the Gate.

This provides some feedback on accuracy of the sequencing. Details of what may be considered an ideal trail are covered fully in the *VV Enroute*™ supporting modules. This function may be enabled/disabled in the *Setup* window, and is available only in *DIAMOND* exercises.

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5.4.4 Quick Popup Menu

The *Quick Popup Menu* is available in the *VV* radar system, by left-clicking on the aircraft callsign in the radar label. For controlled aircraft the following functions are accessible:

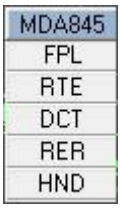


Figure 5.8: Quick Popup Menu

Callsign: Clicking on the callsign will close the window.
FPL: Opens the *Flight Plan* window for this aircraft.
RTE: Toggles the *Graphic Route* on and off for the aircraft
DCT: Opens the *Reroute Direct* window (see 5.4.5 below) to reroute the aircraft direct to a waypoint.
RER: Activates *Reroute* mode to edit the graphic route.
HND: Opens the *Handover* window to activate a handover to another unit or sector.



Figure 5.9: Handover window

If *Mouse Click Control* is active, a further button will be available (figure 5.10):

MCC: Opens the aircraft's *Mouse Click Control* window



Figure 5.10: Quick Popup window with Mouse Click Control

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5.4.5 Reroute Direct window

The *Reroute Direct* window (figure 5.11) is available in the *VV* radar system by left-clicking DCT in the *Quick Popup Menu*, or by right-clicking when in *Reroute* mode (see *Graphic Route* 5.4.1).

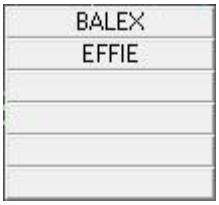


Figure 5.11: Reroute Direct Window

The *Reroute Direct* window will contain up to the next 6 points on the *Graphic Route* for the aircraft. Clicking on one of these points will:

1. (When the *Reroute Direct* window is opened from the *Quick Popup Menu*): Reroute an aircraft's graphic route from the present position of the radar track direct to that point.
2. (When the *Reroute Direct* window opened with a right-click in *Reroute* mode): Terminate the reroute at the selected point.

In *VV Enroute*™ the *Reroute Direct* window is most commonly used to instruct an aircraft to fly direct to a waypoint, usually at the completion of vectoring. This is detailed in the *Lesson: GRID Vectoring*.

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5.4.6 Aircraft Pair Conflict Assessment (APCA) Tool

The APCA tool provides a means by which a pair of aircraft may be assessed for a possible future confliction. Each aircraft's future position is projected ahead of it, based on heading and speed derived from current radar data. The tool will display the predicted closest point of proximity (CPP) between the aircraft, or an indication ("NO XING") if the aircraft are predicted not to come any closer that they presently are.

Activate the tool by pressing F7**,** then left-click the radar tracks of the two aircraft in turn. Each of these aircraft will be identified by a dotted circle around the its track. The radius of the circle will depend on the lateral radar standard in use for the Sector. If a future CPP is predicted, each aircraft will display a probe extending to that point. The closest distance will be displayed near the radar track for the first aircraft selected (figure 5.12).

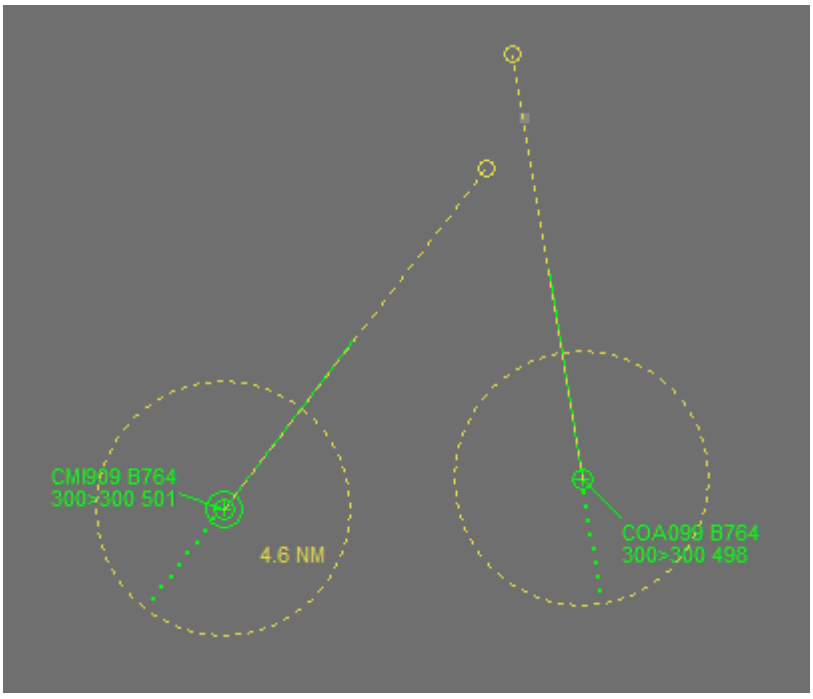


Figure 5.12: APCA Tool display

The APCA tool is very useful in high-level crossing sectors such as *GRID* and *DIAMOND*, in which aircraft are generally flying in straight lines at near-constant speeds. The CPP is calculated on current groundspeeds and headings, and does not take into account bends in aircraft tracks or changes in speed. Typical use of the APAC tool is shown in *Lesson: DIAMOND Traffic*.

The graphic data provided by the APCA is dynamic, and is updated with each radar sweep. The APCA display may be turned off by pressing F7.

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5.4.7 Weather Display

The *VV Enroute™* simulator has the facility to display areas of precipitation on the radar map. This tool is used to plan weather avoidance requirements for aircraft. The *Weather Display* feature is not included in any of the exercises in this version of *VV Enroute™*.

5.4.8 Cockpit Data display

The *Cockpit Data* display (figure 5.13) is used for ATC training purposes, to assist in understanding the navigation information presented to the pilot. Open the *Cockpit Data* display by selecting an aircraft and pressing Shift-P. The TCAS view is shown below. Press *Page Up* and *Page Down* to change the scale of the display, and *Home* to restore the default scale.

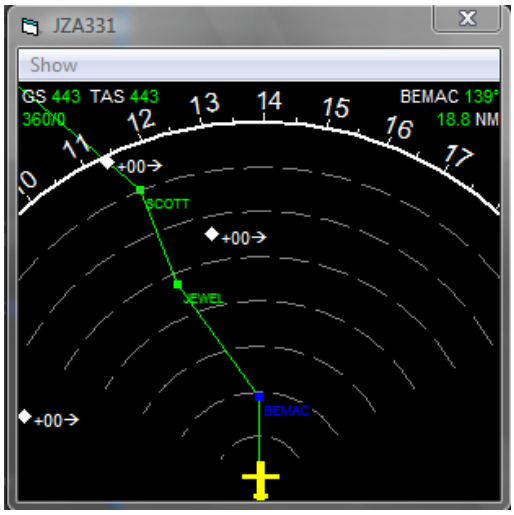


Figure 5.13: Cockpit Data Display

A range of displays is available by clicking on the Show button.



It should be noted that the *Cockpit Data* display is a unique feature of the *VV* Simulator and is designed for ATC training. It is not a feature that will be available in operational ATC systems.

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5.5 Alerts

An Alert is a visual display presented to the controller to indicate an operational anomaly is occurring. The type of alert will depend on the nature of the event.

5.5.1 Conflict Alerts

The separation minima for the *VV Enroute*™ Simulator are set at 5 nautical miles horizontally and 1000 feet vertically. Should two aircraft not have at least one of these minima between their positions a *Conflict Alert* (CA) will flash on the screen on a line joining the two aircraft.

5.5.2 Other Alerts

The *VV* radar system supports a range of other alerts that are designed to advise the controller that an action may be required**.**

CL: The *Cleared Level Alert*: Triggered when an aircraft is not *at*, or *climbing or descending towards* the Cleared Level in the radar label.

RTE: The *Route Alert*: Triggered when an aircraft is detected at a distance from the Graphic Route that is above a pre-set minimum. The allowable off-track distance will vary, depending on the sector.

LVL: The *Level Alert*: Triggered when an aircraft is detected outside the range of allowable levels, as in the *MAZE* and *NEXUS* exercises.

Other alerts for emergency conditions (**HJ**- Hijack, **EM** – General Emergency and **RF** – Radio Fail) are also supported by the *VV* system. These conditions are not simulated in this version of *VV Enroute*™.

Alerts may be acknowledged by centre or right-clicking on the alert indicator. The alert will subsequently disappear once the condition triggering it is no longer valid. For example, the **RTE** alert will disappear when a graphic reroute is completed, or the aircraft is detected to be again within the monitored off-track distance of the graphic route.

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5.6 Special Simulator Exercises

The simulator may be configured to run special exercises to meet specific training objectives.

5.6.1 Simulator Task Trainers

A *Simulator Task Trainer* is a short exercise that provides instruction and practice in common simulator functions ('which buttons to press'). A panel containing a list of functions is displayed (figure 5.14). An explanation of how to perform a particular action may be viewed by left-clicking the function in the pane. When the task has been performed correctly, a tick appears adjacent to the function. Ticks may be reset by left-clicking on the reset button at top right.



Figure 5.14: Simulator Task Trainer panel

5.6.2 Exercises with Limited Functionality

Some exercises in *VV Enroute™* are deliberately constructed with limited functionality. For instance, some exercises may allow only turn instructions, with no level assignment permitted. Full details are provided in supporting documentation.

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5.7 Simulator Features Summary

The table below illustrates the features that are available for the *VV* radar system.

Function	VV
Speech Recognition	Yes
Speech Synthesis	Yes
Bearing and Range Line	Yes
Cleared Level Function	Yes
Cleared Level Selection Menu	Yes
Cleared Level Highlight Function	Yes
X-Prompt Function	Yes
Graphic Route	Yes
Aircraft Timer Function	Yes
Mouse Click Control	Yes
Callsign Text	Yes
Current Speed Display	Yes
Console Information	Yes
Trail Information	Yes
Mouse Zooming	Yes
Conflict Alerts	Yes
Other Alerts	Yes
J Rings	Yes
Generic Profiles	Yes
Quick Popup Menu	Yes
Reroute Direct Menu	Yes
Handover Window	Yes
Aircraft Pair Conflict Assessment Tool	Yes
Lateral Deviation Entry Window	No

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6. Exercise Controls window

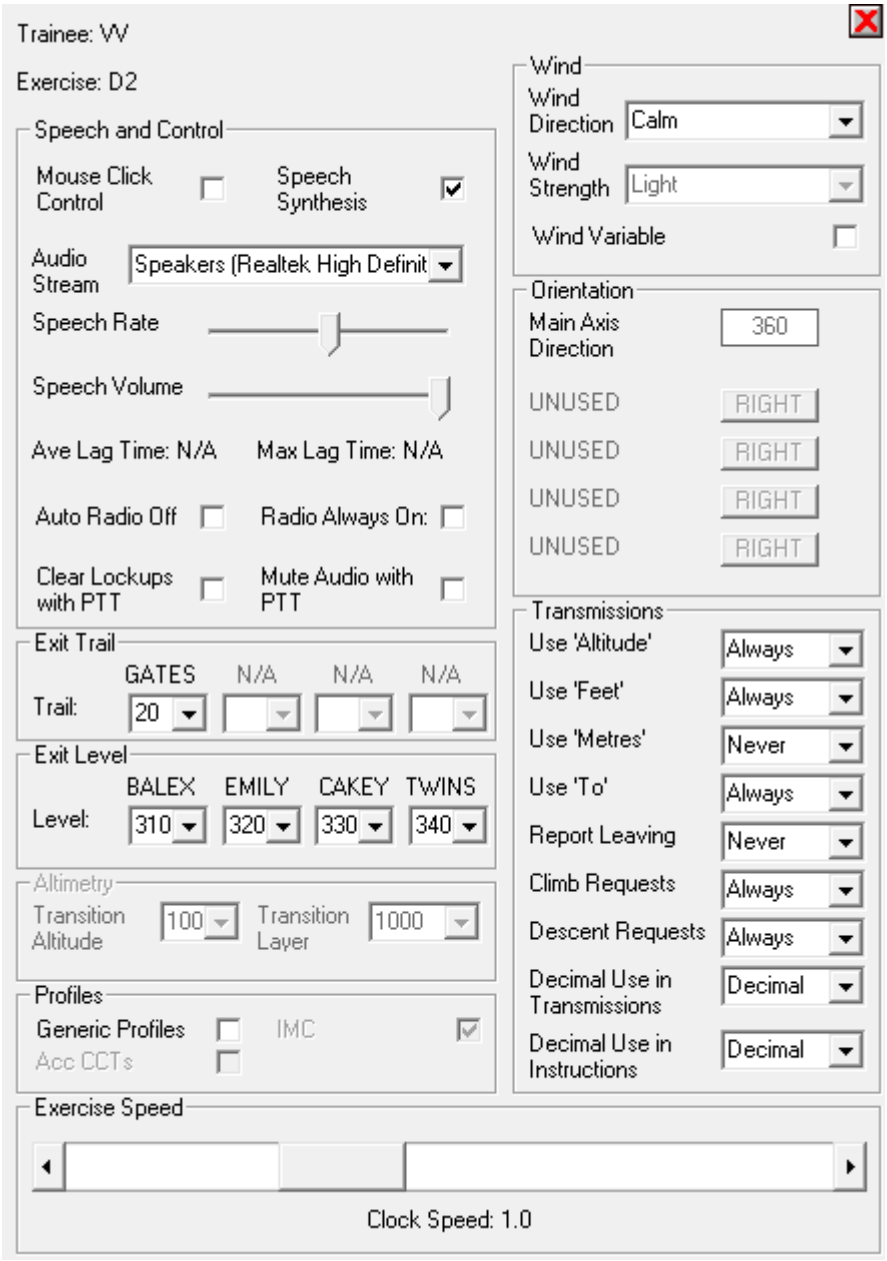


Figure 6.1: Exercise Controls window

The *Exercise Controls* window (figure 6.1) is opened by clicking associated button on the top right of the simulator main screen. It provides a facility for changing the basic running conditions of the exercise, including speech, wind and aircraft profile settings.

6.1 Speech and Control

The *Speech and Control* section contains settings for Speech Synthesis and control of aircraft as follows:

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6.1.1 Mouse Click Control Selection

Mouse Click Control, which provides the facility to control aircraft with the mouse rather than with speech (see section 5.4.2), may be enabled or disabled with this selection.

6.1.2 Speech Synthesis Selection

The generation of speech synthesised readbacks by aircraft and controllers may be disabled with this function. This is unlikely in *VV Enroute™.*

6.1.3 Audio Stream Selection

Depending on the audio setup of your computer, there may be more than one output to which speech synthesis audio can be directed; this dropdown menu allows you to change the output. If your computer does not default to the correct setting this may need to be done each time the simulator is run.

6.1.4 Speech Rate Selection

The rate at which the synthetic voices speak is settable with this slider. It may be of advantage to have the aircraft speak faster in busy exercises; it saves time and allows subsequent instructions to be issued sooner.

6.1.5 Speech Volume Selection

The slider will change the volume of the speech synthesis output. This will apply to aircraft calls and replies to instructions.

Note: The following functions, 6.1.6 to 6.1.10, should be considered as trouble-shooting only. In the vast majority of cases the Speech Recognition functions well without any need to resort to these measures. In all cases they are designed to overcome individual computer sound card irregularities. In particular these problems arise with very high performance laptop or notebook machines that incorporate sophisticated audio systems for entertainment purposes. In these machines the sound card takes a small time to become active after the Speech Recognition has been turned on (with the PTT in the case of the *VV* simulator).

6.1.6 Average/Maximum Lag Time

When the Transmit (CTRL) key is depressed it takes a short lag time for the soundcard to activate the speech recognition function. This time will vary with machine. The Average and Maximum lag time figures will provide some information on this function. Figures lower than 100 are normal. Figures higher than this may impact speech recognition and require a short delay (typically a half-second) to be allowed between pressing the Ctrl key and commencing speaking. The use of a USB microphone will also reduce the delay time.

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6.1.7 Auto Radio Off

This function will automatically turn the radio off when no transmissions are being made. Default is unchecked.

6.1.8 Radio Always On

For some soundcards, especially those with high lag times, accuracy will improve by having the speech recognition function on at all times, not just when the transmit button is pressed. Default is unchecked.

6.1.9 Clear Lockups with PTT

On some soundcards there is on occasional failure for the speech synthesis function to complete, resulting in speech lockups. This function will allow these lockups to be cleared by depressing the PTT (Press to Talk or Ctrl) key. Default is unchecked.

6.1.10 Mute Audio with PTT

This function will purge the Speech Synthesis stream when the PTT (Ctrl) key is pressed. Default is unchecked.

6.2 Exit Settings

6.2.1 Exit Trail

In some exercises the ideal trail to be achieved in the sequencing process may be varied. This allows practice with different spacing distances; the scoring is adjusted accordingly.

6.2.2 Exit Level

In some exercises the target level of aircraft as they pass an exit gate may be varied. This adds to the variety of the traffic scenarios.

6.3 Altimetry Settings

This section allows the transition altitude and layer to be set to correspond to local usage. Not available in this version of *VV Enroute™*.

6.4 Profile Settings

This section sets the performance of aircraft: climb/descent rates, speeds and turn rates - called a *profile*. The *VV* Simulator applies individual profile data to each aircraft. However, for training purposes, it may be desirable to generalise these performance characteristics to

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provide an ideal learning exercise. The ability to change profile and performance information is not available in this version of *VV Enroute™*.

6.5 Exercise Speed

The rate at which the simulator clock runs may be set using this slider. Clock speeds of between x0.5 (half speed) and x2.0 (double speed) are accepted, in 0.1 steps. As an alternative, the F11 and F12 keys may be used to change the clock speed instantly between x1.0 and x2.0 respectively. This facility allows 'slow' traffic times to be halved, thus maximising the use of available practice time.

6.6 Wind Settings

The *Wind* section enables the wind direction and speed to be defined. Note that in some *VV Enroute™* exercises, the ability to change the wind has been disabled.

6.6.1 Wind Direction

The *Wind Direction* dropdown menu enables the wind to be chosen from one of the eight cardinal compass directions, plus nil wind (calm). The wind will vary slightly around this direction and will generally increase in strength with altitude.

6.6.2 Wind Speed

The *Wind Speed* dropdown menu presents a choice of Light and Strong winds.

6.6.3 Wind Variable Selection

The wind may be set to be variable with this selection. When this function is selected, the wind will vary slightly, and in a random manner, over the course of the exercise.

6.7 Orientation

6.7.1 Main Axis Direction

The option to align the map to either True or Magnetic North is not provided in this version of VV Enroute™.

Other blanked-out functions in this area relate to holding pattern structure. As traffic holding is not covered in this version of VV Enroute™, the ability to vary the holding patterns is not available.

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6.8 Transmissions

This section allows the transmissions made for speech recognition and by speech synthesis to be changed to mimic local procedures more closely. Students new to Air Traffic Control should use the basic phrases taught in the lessons; local variations are easily adopted in live training later.

6.8.1 Use 'Altitude'

This setting controls the use of the word 'altitude' as a prefix to altitude transmissions.

6.8.2 Use 'Feet'

This setting controls the use of the word 'feet' as a suffix to altitude transmissions.

6.8.3 Use 'Metres'

This setting controls the use of the word 'metres' as a suffix to altitude transmissions in metres.

6.8.4 Use 'To'

This setting controls the use of the word 'to' in read-backs of level instructions.

6.8.5 Report Leaving

This setting controls whether aircraft report leaving levels that have been maintained.

6.8.6 Climb Requests

This setting controls whether aircraft make requests for climb.

6.8.7 Descent Requests

This setting controls whether aircraft make requests for descent.

6.8.8 Decimal Use in Transmission

This setting controls the use of the preferred word for *decimal* in speech synthesis.

6.8.9 Decimal use in Instructions

This setting controls the use of the preferred word for *decimal* in speech recognition.

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7. Setup Window

The Setup Window (figure 7.1) provides a great deal of functionality for adjusting the *VV Enroute™* radar screen. Open it by clicking the *Setup* button to the right of the Radar. The window may appear in a slightly different layout, depending on screen dimensions.

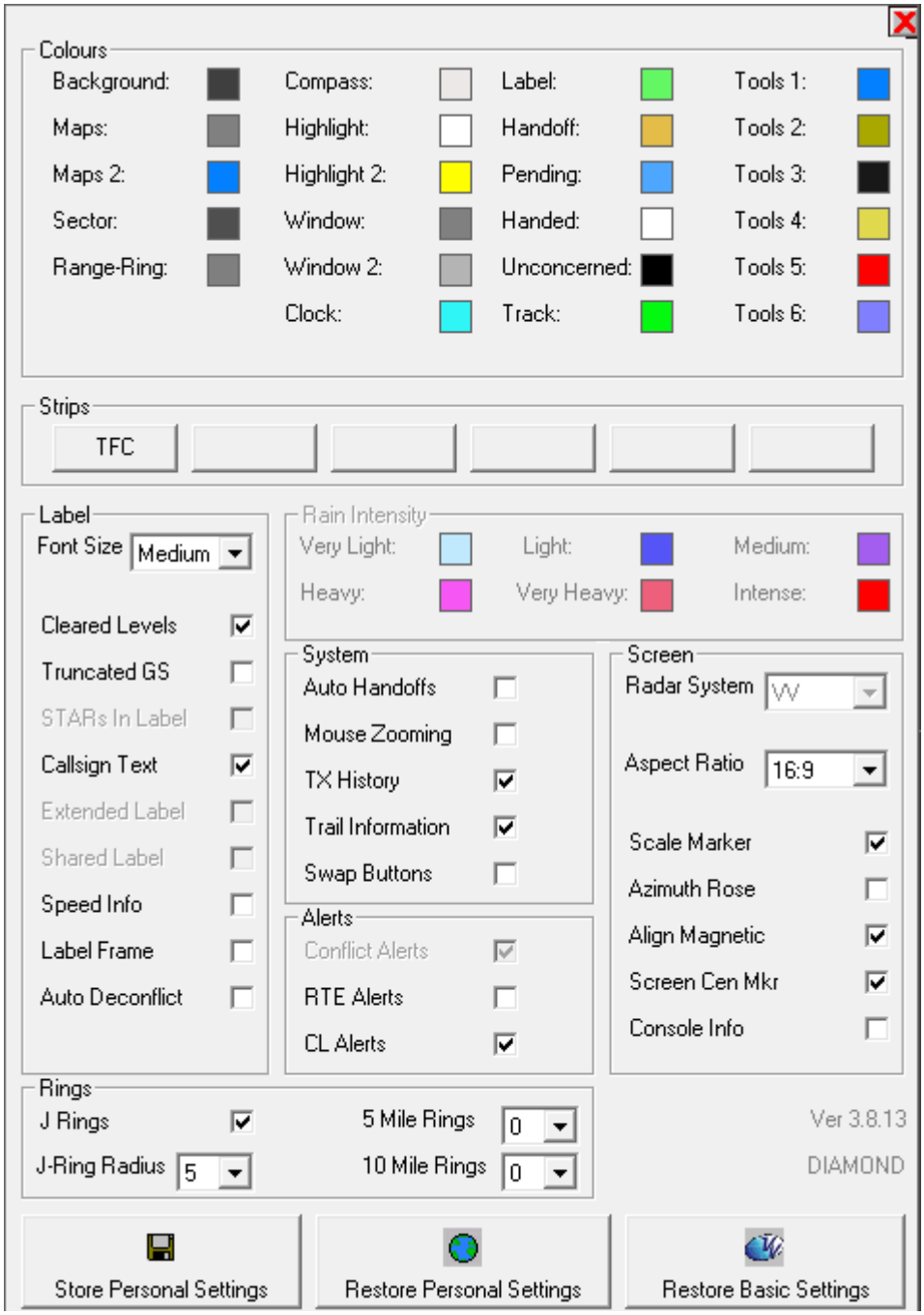


Figure 7.1: Setup Window

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7.1 Colour Controls

Clicking on one of the colour swatches will open a dialog that will enable the current colour of a particular display element to be changed. The default colours for *VV Enroute™* should not be changed without a definite purpose: it is best that the simulator be viewed in practice simulation exactly as it is presented in the lessons and demonstrations.

Changes to the colour palette can be saved by clicking the *Store Personal Settings* button. These colours and settings may be retrieved using the *Restore Personal Settings* button. More information on these functions is included below.

7.2 Label Controls

The Label Controls section contains settings that are primarily concerned with the display and functionality of the radar label (tag). There should be no need to change the default settings in *VV Enroute™.*

7.2.1 Font Size

This facility provides three label sizes, to accommodate different screen dimensions. The default (medium) should be satisfactory in most cases.

7.2.2 Cleared Levels

The *Cleared Level* display functionality may be de-selected with this setting. If deselected, the CL in area in the label will be blank.

Note that the use of level change instructions using *Mouse Click Control* from the CL selection menu (see section 5.3.2) will not be available. In addition, CL alerts will be inhibited and the de-selection of the *Cleared Level* function will adversely affect scoring.

7.2.3 Truncated GS

The *VV* radar system, by default, has a three-digit display of groundspeed in the label. Using the *Truncated GS* function this can be reduced to two digits (10kt resolution) in preparation for an operational system that will be encountered in future live training

7.2.4 STARs in Label

Display of an aircraft's STAR (Standard Terminal Arrival Route) is not relevant in this version of *VV Enroute™*.

7.2.5 Callsign Text

The display of Callsign Text (when the mouse is moved over the callsign in the radar label) may be disabled with this setting.

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7.2.6 Extended Label

Not relevant in this version of *VV Enroute™*.

7.2.7 Shared Label

Not relevant in this version of *VV Enroute™*.

7.2.8 Speed Info

Selecting this will enable use of the *Speed Info* display feature (see section 5.3.5) whereby the current Indicated Airspeed (or Mach number) of an aircraft may be dynamically displayed. This is a training feature of the *VV* Simulator and would not be available in operational systems.

7.2.9 Label Frame

Some radar systems use a label relocation method in which the label is moved (see section 4.2.2) with the use of a frame showing the future of position of the label. The frame is activated with one right-click, dragged, and then placed with a second right-click. The default method of label movement can be replaced with this framing one if it is expected to be encountered in an operational system in live training.

7.2.10 Label Auto De-conflict

When this option is selected, the system will periodically adjust the position of radar labels so they do not overlap. The *Label Auto De-conflict* function default is OFF. Depending on screen clutter and range, complete de-confliction for all labels may not be possible.

7.3 Rain Intensity

The *Rain Intensity* section allows the colours for the display of the weather model to be altered. As the use of weather modelling is not supported in this version of *VV Enroute™* the rain intensity settings are disabled.

7.4 System Controls

The *System* section contains settings for a range of features:

7.4.1 Auto-handoffs

Selecting this feature will automatically handoff an aircraft's radar display to the next sector when it is a predefined distance from the airspace boundary. For the *MAZE* and *NEXUS* exercises this will have no effect, because there is no sectorisation associated with the airspace. The advantage of auto-handoffs is that workload is reduced. The disadvantage is that the conscious process of handing an aircraft off is missing, which may result in poor frequency management. In *VV Enroute™* it is recommended that manual handoffs be done and that this auto feature remain in the default state - OFF.

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7.4.2 Mouse Zooming

The *Mouse Zoom* function provides a means by which a smaller area of the radar display may be quickly displayed (or zoomed) to full-screen. When the feature is enabled, the zooming is done by right-clicking on the radar map and dragging a window frame to the required dimension. A second right-click will complete the action. The *Home* or *F9* key returns the display to default settings.

This feature is OFF by default in this version of *VV Enroute™*.

7.4.3 Transmission History

The *Transmission History* function provides a drop-down list of previously-recognised transmissions. This gives information on the status of the simulator when the clock is back-stepped: which instructions have been issued up to the changed clock time. It may be disabled by deselecting *Transmission History*. The feature is supplied as a training and reference tool and does not have a significant role in *VV Enroute™* simulation. After some familiarisation with the simulator it is usually apparent what has and has not been done in a particular control scenario.

7.4.4 Trail Information

This *Trail Information* display is an indication of the longitudinal distance between aircraft as they pass a significant position (a Gate in *VV Enroute™*). The trail distance shows the result of a sequencing action between two aircraft, which demonstrates student skill level, and is recorded as part of scoring.

7.4.5 Swap Mouse Buttons

Selection of this setting will swap the right and left mouse buttons for the purposes of label movement and track selection. This may be useful for some track-ball and similar inputs for which right-clicking is problematic. Other mouse-clicking function (such as CL selection) are unaffected by this setting.

7.5 Alerts

See Section 5.5 for full details on the various alerts generated by the *VV Enroute™* simulator.

7.5.1 Conflict Alerts

Conflict Alerts are always enabled. No user interaction is available. This is done to ensure that the student is always aware that he/she has lost the required separation between aircraft, an obviously serious event in Air Traffic Control, and that correction action is required.

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7.5.2 Route (RTE) Alerts

Selecting this feature will cause RTE alerts to be displayed. Disabling these alerts (default setting) will reduce distraction and screen clutter. The other alerts are not affected, and will display as normal.

7.5.3 Cleared Level (CL) Alerts

Selecting this feature will ensure that CL alerts are displayed. Default is ON.

7.6 Screen

This section contains controls for changing the display of the radar screen.

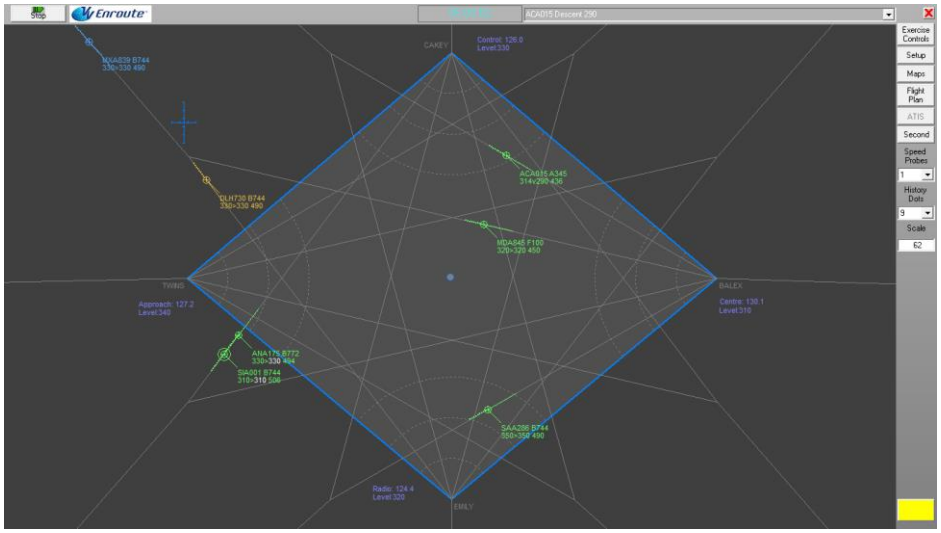
7.6.1 Radar System Selection

The *VV* radar system is the only display available in this version of *VV Enroute™*.

7.6.2 Aspect Ratio

ATC radar screens are usually square or round in shape, to represent displacements in the horizontal and vertical directions in a consistent manner. Computer monitors, on the other hand, vary widely in size, shape and screen resolution. To obviate the difficulty in projecting a consistent image onto differently-shaped screens, the *Aspect Ratio* (i.e. the ratio between the horizontal and vertical dimensions of the monitor) may be changed.

The best means of determining if your aspect ratio is set correctly is to look at a recognisable shape on the simulator and check it for correctness. A suitable shape for this purpose is the *DIAMOND* map. Open any of the sequencing or *DIAMOND Traffic* exercises; the diamond airspace should appear near-symmetrical, like this:



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If the diamond does not appear correctly, the aspect ratio will need to be changed. The default setting (16:9) should be correct for most modern 'widescreen' monitors. Another way of checking Aspect Ratio is to add one or more Range Rings (see 7.7.2 below) to a simulator map. The rings should appear as true circles. See also Section 13.3.2

Note that once the Aspect Ratio has been changed, it will be recorded and loaded automatically next time the simulator is run.

7.6.3 Scale Marker

The *Scale Marker* is a visual reference for distance measurement and may be deselected here. See Section 5.2.5 for details of its application.

7.6.4 Azimuth Rose

The *Azimuth Scale* (or *Compass Rose*) is a visual reference around the screen perimeter for bearing measurement and may be selected and deselected here. It is ON by default in the *MAZE* and *NEXUS* exercises when basic heading recognition is being learned but OFF in GRID and DIAMOND where the screen clutter is not warranted.

7.6.5 Align Magnetic

This feature allows the radar map alignment to be changed. Default setting is Magnetic North and that may be changed to True North here. See Section 4.1.2 for a discussion on map alignment.

7.6.6 Screen Centre Marker

The *Screen Centre Marker* is a training tool provided to assist learning the judgement of relative bearings (aircraft headings) on the screen (see Section 5.2.4). It may be selected or deselected here. Default setting is ON.

7.6.7 Console Info

The *Console Sector Information* is presented to the right of the main radar screen and contains sector-specific operational information, such as the radio frequencies of adjoining sectors. It is enabled and disabled here. It has only minor relevance in this version of *VV Enroute™*.

7.7 Rings

There are two types of rings available with the *VV Enroute™* simulator: J-Rings and Range-rings. They are used to monitor separation and spacing and for general judgement of distance on the radar screen. They could also be used to check the Aspect Ratio of your screen is set correctly (see section 7.6.2 above).

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7.7.1 J Rings

J-Rings (or halos) are a feature of the *VV* radar system. To make them available, ensure that the J-Rings box is ticked. Select the desired ring radius from the J-Ring Distance drop-down menu. A choice of 3, 5 and 10nm is available. Select an aircraft by left-clicking on its radar track, and press J on the keyboard to display a J-Ring for that aircraft.

An individual J-Ring is available for every aircraft, regardless of whether it is under your control. Press J again to deactivate the J-Ring for the selected aircraft.

7.7.2 Range Rings

Range Rings are circles with increasing radii at 5nm and 10nm increments, based on a fixed centre. The number of rings displayed may be set here.

7.8 Managing Personal Settings

A personal set of colour and simulator settings may be stored by clicking on the *Store Personal Settings* button. All colour values will be stored, as well as other simulator settings, such as the radar system, length of speed probes, and the number and position of range rings.

To restore these settings, click the *Restore Personal Settings* button. Note that the settings information is user and sector-specific. So, a unique group of settings is available for each user and sector combination.

For example, if it is your preference to make use of a particular colour palette and simulator settings for all sectors, it will be necessary to store these personal settings for each. This should normally be done the first time you run an exercise on a sector.

The *Restore Basic Settings* button will restore the radar system, colour and simulator settings to the *VV* default values for the sector in use.

A complete list of the settings that are stored is included in Appendix D.

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8. Maps window

Various map elements on the VV *Enroute™* radar screen may be selected or de-selected to suit local conditions using this window. The elements available will vary, depending on the sector being controlled. See figure 8.1 for an example.

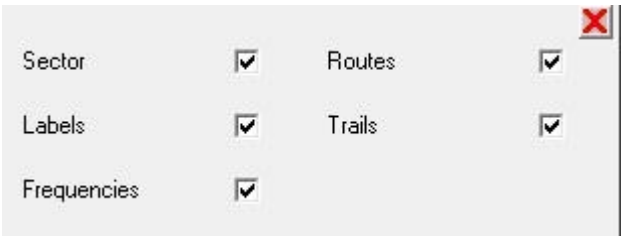


Figure 8.1: Maps Window

It will normally not be necessary to change any of the map settings for the *VV Enroute™* introductory sectors. However, you might find it advantageous to reduce some screen clutter by disabling some maps in other sector exercises.

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9. Flight Plan window

The *Flight Plan* window (figure 9.1) contains basic information about the flight plan for a particular aircraft. The window for an aircraft is opened by selecting the aircraft (left-clicking on the radar return) and clicking the *Flight Plan* button to the right of the main radar screen. The window may also be opened by clicking on *FPL* in the Quick Popup menu (see Section 5.4.4).

Once the *Flight Plan* window is open, the details of a different aircraft may be accessed by typing the aircraft callsign into the window.

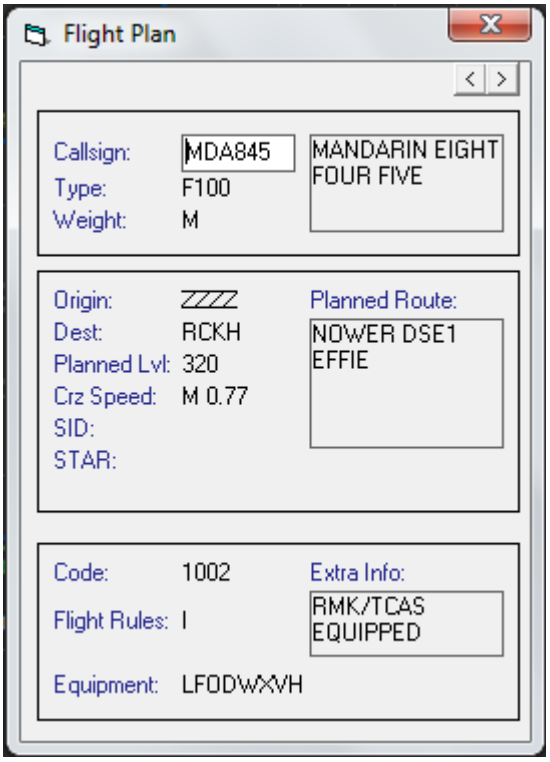


Figure 9.1: Flight Plan window

Details included in the *Flight Plan* window include:

- Callsign and Radio Telephony identification
- Aircraft Type Designator
- Weight Category (**H**eavy, **M**edium or **L**ight)
- Origin Aerodrome Designator
- Destination Aerodrome Designator
- Planned Level
- Planned Cruise Speed
- SID Designator (if issued or assigned)
- STAR Designator (if issued or assigned)
- Planned Route
- System assigned Squawk Code

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- Flight Rules (or Category) (**I**(FR) or **V**(FR))
- Navigational Equipment
- Extra Flight Plan Information

Note that, other than the callsign field, the information in this window is not dynamic - no user interaction is available. In *VV Enroute™* simulation, the information in this window is rarely of interest.

10. Second Radar Screen

The Second Radar Screen is opened by clicking the *Second* button on the right side of the VV *Enroute™* main radar screen. This screen may be independently configured to show a section of airspace at a different scale from the main screen.

This feature is commonly used to zoom-in on a part of the map that might need to be shown in more detail. Graphic controls for off-setting and rescaling the radar map, as well as other simulator functions are the same as for the main screen.

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11. Summary of Keyboard Functions

The table below contains the full list of keyboard functions available in this version of the *VV Enroute™* Simulator.

Key	*Action*
Arrow Keys	Offset Map Centre
Home (or F9)	Return to Default Centre and Range.
Page Up	Decrease Scale
Page Down	Increase Scale
Shift-End (or Shift-F10)	Store current Centre and Scale
End (or F10)	Restore current Centre and Scale
Insert	Centre Map at Current Cursor Position
Ctrl	Initiate radio call
ENTER (or Shift-A)	Accept an aircraft Handing Off
F2	Move the Scale Marker to the cursor position
F3 (or Shift-L)	Show Latitude/Longitude at current cursor position
Shift-F3	Remove all Lat-Longs
F4 (or Shift-T)	Create a Text Area at current cursor position
Shift-F4	Remove all Text Areas
F5	Generate a Bearing and Range Line
Shift-F5	Remove all Bearing and Range Lines
F6	Position Range Rings at current cursor position
Shift-F6	Position Range Rings at default position
F7	Activate/Remove the Aircraft Pair Conflict Assessment
F8 (or Shift-R)	Display graphic route for selected aircraft.
Shift-F8	Remove all graphic routes from display
F9	Return to Default Centre and Range.
F10	Restore current Centre and Scale
Shift-F10	Store current Centre and Scale
F11	Return clock speed to normal (1.0)
F12	Double clock speed (2.0)
Shift-A	Accept an aircraft hand-off
Shift-E	Activate reroute mode for selected aircraft
Shift-H	Handoff the selected aircraft
Shift-I	Display the selected aircraft in highlight colour
Shift-J	Add a J-Ring for the selected aircraft
Shift-K	Kill an aircraft (remove it from the exercise)
Shift-P	Open cockpit view for selected aircraft
Shift-R	Display graphic route for selected aircraft.
Shift-T	Create a Text Area at current cursor position

Note that graphic-based functions will appear on the second radar screen.

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12. Scoring

Note: The evaluation of performance of the task of Radar Control is a very complex process. Ultimately, it is the observance of a student's actions by a live instructor that determines suitability for the job. The aim of the scoring system in *VV Enroute™* is to measure some of the definable aspects of performance for comparison and assessment of progress in learning, both *by* a student and *between* students. No claim is made by Visual Vectoring that the scoring system gives an absolute indication of the suitability or otherwise of a student for live Air Traffic Control without confirmation from a suitably-qualified training expert.

Following completion of a *VV Enroute™* exercise, provided a minimum amount of run-time has elapsed, a scoring report window will be displayed (figure 12.1). An individual score will be given in up to six different disciplines, as well as an overall score. The availability of scoring for a particular discipline will depend on its applicability. For instance, the *MAZE* and *NEXUS* exercises have no sequencing function, so a score will not be generated for that discipline.

Scoring performance over a range of exercises is available by viewing the *Scoring Centre* under the *File* menu of the main exercise screen.

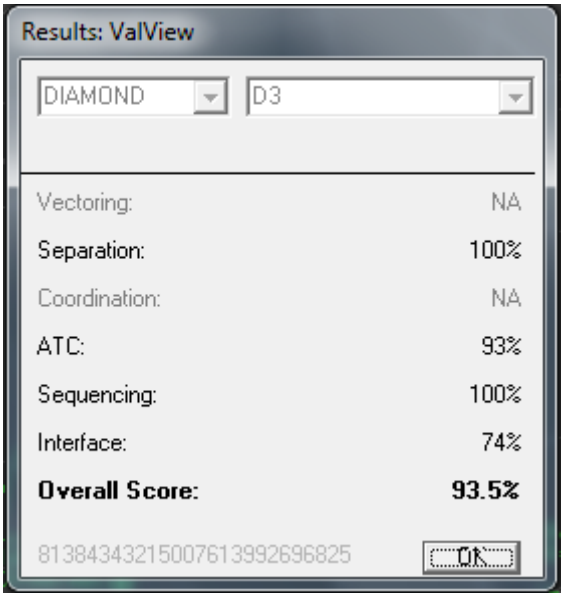


Figure 12.1: Score Report

At the bottom left of the window is a unique code used by the system to verify score validity.

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12.1 Vectoring score

Vectoring score is provided in the *MAZE* and *NEXUS* exercises. The score is based on the retention of the aircraft within the airspace boundaries. In the *GRID* exercises the vectoring score is determined by the number and length of radar vectors used to resolve conflicts.

In the *DIAMOND* exercises, *Vectoring* score is based on the number of extra track miles given to aircraft in the process of maintaining separation. A higher efficiency in vectoring that minimises extra track miles will result in a higher score.

12.2 Separation score

Separation score is reduced for each conflict alert that is received, and for the length of time the alert is active, that is, the length of time taken to restore separation between the aircraft.

12.3 Coordination score

For exercises that require inter-unit coordination, this score is reduced for incomplete or late coordination.

12.4 ATC score

The *ATC* score takes into account a range of performance metrics. In general, this score is reduced when:

- Aircraft cross exit gates at an incorrect level.
- Aircraft are transferred to the wrong frequency.
- Aircraft are not accepted or handed-off in a timely fashion.
- The exercise is run at reduced speed.
- The exercise is paused.
- Aircraft are killed (removed from the exercise).

12.5 Sequencing score

The *Sequencing* score is designed to measure student performance in sequencing an aircraft to a gate. The score will be reduced when the ideal trail spacing is not achieved. In general, the penalty is higher if the achieved trail is *less,* rather than *more,* than the ideal one.

For example, in the *DIAMOND* exercises, the nominal ideal trail is 20nm (but can be set for other distances). A lesser penalty is applied if a 22nm trail is achieved than for an 18nm one. A slight correction is applied when the following aircraft is still on vectors (i.e. not yet tracking direct to the gate) when the first aircraft passes the Gate, because in such cases the spacing has not yet been set.

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12.6 Interface score

The *Interface* score is a measure of performance in operating the radar system. The score is reduced when:

- Aircraft are handed to an incorrect unit
- Aircraft are instructed to call an incorrect frequency
- CL Alerts are disabled
- An aircraft is subject to a CL Alert.

12.7 Overall score

For a particular exercise, results in all of the six disciplines are assessed, based on a weighted average, to provide an overall score. The separation score has the highest weighting.

Where a group of exercises is being viewed in the scoring centre the overall score is further weighted for time spent in each exercise. For example, a high score in an exercise that has been run for 30 minutes will have more influence over the final score than a low score in an exercise run for ten minutes.

Absolute overall scores should not be compared across exercises. It is easier, for instance, to achieve a 100% score in the *MAZE* and *NEXUS* exercises than in *GRID* or *DIAMOND*.

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13. Troubleshooting

13.1 Problems with Installation

The installation for this software has been tested on Microsoft Windows XP, Vista and Windows 7. However, it is possible that regional settings and other hardware configurations will cause the software to fail on installation, or on subsequent execution. If this is the case, provide details of your licence number, Windows version and details of processor, RAM and soundcard to help@visualvectoring.com. We will endeavour to provide a solution to the problem.

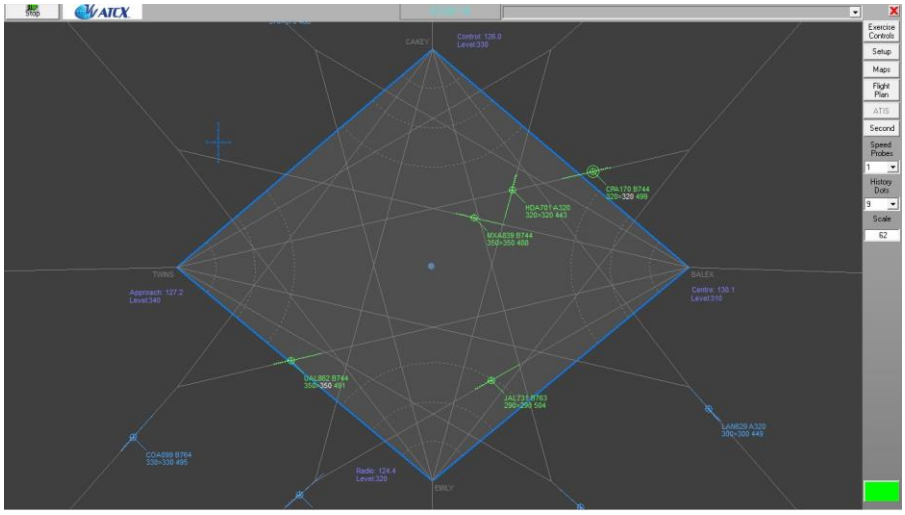
13.2 Problems with the display

13.2.1 Displaying Lesson/Demonstration movies

The Lesson and Demonstration movies are designed to be displayed on an XGA screen (1024 pixels across by 768 pixels down). Monitors with lesser resolution are not suitable, because the full radar screen needs to be in view; such monitors are now very rare. Modern computers typically have 'Widescreen' displays which have 1366x768 resolution. These monitors are very satisfactory - they display the VV instruction movies with full vertical dimension and narrow black vertical bands at the sides. If you are viewing on a screen with higher than 1366x768 resolution, the movies will be presented on a small pane at the centre of the screen. This can usually be corrected by re-setting the computer's screen resolution to 1366x768, but it is no impediment to the viewing of the movies.

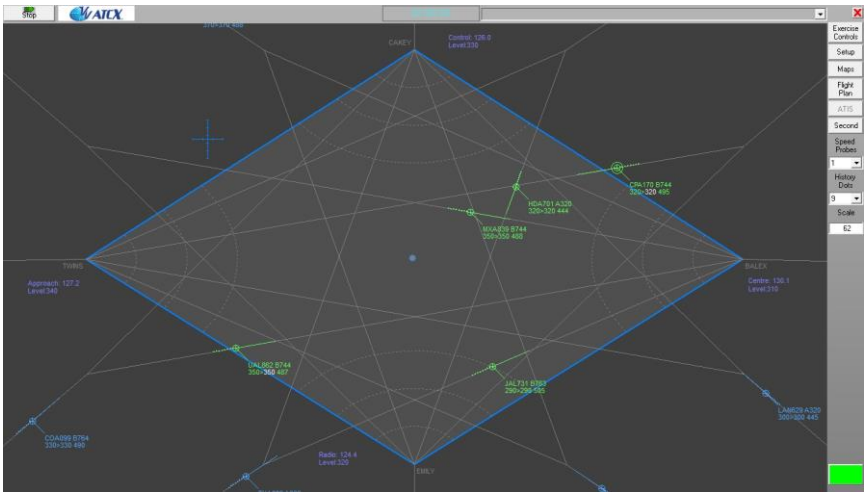
13.2.2 Displaying the simulator

The *VV Enroute™* simulator map needs to be displayed with the correct Aspect Ratio (width:height) or angles (compass bearings) will not be correct. The Aspect Ratio default is set at 16:9, which should be correct for most displays. To check a display, launch a *DIAMOND* exercise and observe the shape of the diamond. It should be near-symmetrical, like this:

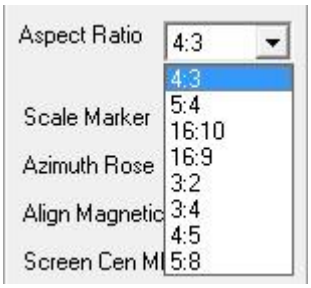


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If the diamond is obviously distorted, like this:



Adjust the Aspect Ratio in the Setup window:



The selected ratio will be retained by the simulator.

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Appendices

Appendix A: Phrases accepted by the Speech Engine

The Speech Engine is programmed to understand only the precise control phrases needed to perform the *VV Enroute™* exercises. It does not understand 'general English'. So, the correct instructions must be used at all times; these are taught in the instruction modules.

The phrase structures are in the following format. Note the rules for phrase structure:

- **(callsign)** should be replaced with the appropriate callsign, spoken phonetically (eg "CATHAY ONE HUNDRED")
- **(level)** should be replaced with the appropriate level, again spoken phonetically (eg "NINER THOUSAND, FLIGHT LEVEL ONE EIGHT ZERO,)
- **(heading)** is the three digit magnetic heading (e.g. ZERO EIGHT ZERO, TWO SIX FIVE)
- Where two or more phrases are separated by a stroke, either one or the other might be used. For example: RIGHT/LEFT

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A.1 Level Change Phrases

Phrase Structure	Examples
(callsign) CLIMB/DESCEND [TO] (level)	"Cathay One Hundred, descend to flight level three two zero" "X-ray Golf Delta, climb (to) niner thousand (feet)"
(callsign) MAINTAIN (level)	"American one three zero, maintain six thousand"

A.2 Turn Phrases

Phrase Structure	Examples
(callsign) TURN LEFT/RIGHT HEADING (heading)	"Cathay One Hundred, turn right heading one seven zero" "Eastern One Two Three, turn left heading two four zero"
(callsign) FLY HEADING (heading)	"American one three zero fly heading three zero zero"
(callsign) STOP/CONTINUE TURN HEADING (heading)	"Speedbird One Six, stop turn heading one eight zero"
(callsign) TURN RIGHT/LEFT, I SAY AGAIN RIGHT/LEFT HEADING (heading)	"Korean Eight One Seven, turn right, I say again right, heading zero six zero"
(callsign) MAKE ONE LEFT/RIGHT HAND ORBIT	"Cathay One Hundred, make one right hand orbit"

A.3 Tracking Phrases

Phrase Structure	Examples
(callsign) TRACK DIRECT TO (position)	"American one three zero, track direct to BALEX"

A.4 Frequency changes

Phrase Structure	Examples
(callsign) CONTACT (agency) ON (frequency)	"Cathay One Hundred, contact Approach on one two seven decimal two "KLM two six, contact Centre on one three zero point one"

Note that phrases may be grouped together in a single instruction. For example: "Cathay One Hundred, turn right heading two five zero, climb to Flight Level three four zero".

Variations to the standard phrases are settable to match local procedures, see Section 6.8.

The section on Speech Recognition use at the end of *Lesson: MAZE vectoring* should be read thoroughly before commencing simulation.

Note that the simulator will query instructions that are not realistic, for example an instruction to climb to a level *below* the aircraft. Be aware that a 'say again' reply indicates an instruction has been understood but appears incorrect.

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Appendix B: Phonetic Alphabet pronunciation

Phrase	Pronunciation
ALPHA	As spoken
BRAVO	As spoken
CHARLIE	As spoken
DELTA	As spoken
ECHO	As spoken
FOXTROT	As spoken
GOLF	As spoken
HOTEL	As spoken
INDIA	As spoken
JULIET	As spoken
KILO	KEELO
LIMA	LEEMA
MIKE	As spoken
NOVEMBER	As spoken
OSCAR	As spoken
PAPA	PAPPA
QUEBEC	KEEBECK
ROMEO	As spoken
SIERRA	As spoken
TANGO	As spoken
UNIFORM	As spoken
VICTOR	As spoken
WHISKEY	As spoken
X-RAY	As spoken
YANKEE	As spoken
ZULU	As spoken

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Appendix C: Number Pronunciation

Number	Pronunciation	Alternative
1	One	
2	Two	
3	Three	Tree
4	For	
5	Five	Fife
6	Six	
7	Seven	
8	Eight	
9	Niner	Nine
10	Ten	One Zero
11	One One	
12	One Two	
20	Two Zero	
86	Eight Six	
100	One Zero Zero	One Hundred

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Appendix D: Data Stored as Personal Settings

The following data are stored when the **Store Personal Settings** button is pressed:

- Number of History Dots
- Number of Speed Probes
- Callsign Text Display
- Cleared Level Display
- Truncated Groundspeed Display
- J-Ring Settings
- Range-ring Settings
- Mouse Zoom Functionality
- Speed Information Display
- Label Frame Functionality
- Console Information Display
- Compass Rose /Azimuth Scale Display
- Label Size
- Label Auto De-conflict
- Aspect Ratio (stored automatically)
- Auto-handoff functionality
- Screen Colours
- Inhibition of CL Alerts
- Inhibition of RTE Alerts
- Swapping of mouse buttons

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