

Contents

1	Introduction to the VV Simulator	15
1.1	Running the Simulator	15
1.1.1	CBT Deployment	15
1.1.2	LMS Deployment	15
1.2	Speech Recognition	16
1.3	Radar Systems	16
1.4	Setting up Keyboard Function keys:.....	16
1.5	Data Usage	17
1.5.1	CBT Deeployment	17
1.5.2	LMS Deployment	17
1.6	Data Locations	17
1.6.1	Published Data Area	17
1.6.2	Common Data Area.....	17
1.6.3	Personal Data Area	18
1.7	Program Data Contents.....	18
1.7.1	Program Files	18
1.7.2	Data Files	19
1.8	Personal Files.....	19
1.9	Custom URLs	20
2	Simulator Configurations.....	20
2.1	Standalone Simulation	20
2.2	LMS Simulation	20
2.3	Networked Simulation	20
2.4	Observer Position	20
2.5	Exercise Creator.....	20
3	Speech Recognition.....	20

3.1	Speech Users	21
3.2	Setting up a Speech User profile for a new user.	21
3.3	Setting the Audio Input for Speech.	23
3.4	Changing Audio Input	23
3.5	Configure the Microphone.	24
3.6	Observing the correct Speech User in the main course page	26
3.7	Training the Speech Recognition.....	26
3.8	Recognition Performance.....	27
3.8.1	Speech Grammars	27
3.8.2	Lag Times	27
3.9	Ancillary Settings.....	27
4	Display	28
4.1	Top Menu	28
4.1.1	Start/Stop Button.....	28
4.1.2	Clock Speed Indicator	28
4.1.3	Simulator Clock.....	28
4.1.4	Phrase Recognition Display.....	28
4.1.5	Exit Button	29
4.2	Side Menu	29
4.2.1	Setup Button.....	30
4.2.2	Maps Button	30
4.2.3	2W Button	30
4.2.4	Speed Probes Display Toggle.....	30
4.2.5	Speed Probes Entry	30
4.2.6	History Dots Display Toggle.....	30
4.2.7	History Dots Entry	30
4.2.8	Radio Call Light.....	30
4.3	The Main Simulator Display	31
4.3.1	Map Display.....	31
4.3.2	Aspect Ratio.....	31

4.3.3	Moving and Rescaling the Display	31
4.3.4	Mouse Zoom function	32
4.3.5	Aligning the Map	32
4.3.6	Changing Display Colours	32
5	Aircraft Tracks	33
5.1	Track Presentation	33
5.2	Display States	33
5.3	Label Colours	33
5.4	Label Highlight	34
5.5	Contents of the Data Block (VV System)	34
5.6	VV Radar System Label	35
5.7	Mouse Functions	35
5.8	Alerts	36
5.8.1	Conflict Alert (CA, STCA or PCA)	36
5.8.2	Cleared Level Alert: (CL or CLAM)	37
5.8.3	The Route Alert: (RTE or RAM)	37
5.8.4	Level Alert: (LVL)	37
5.8.5	Other Alerts:	37
5.10	Aircraft Track Functions	38
5.10.1	Aircraft Track Selection	38
5.10.2	Rotating the Data Block	38
5.10.3	Cleared Level Selection	38
5.10.4	Cleared Level Highlight (CLH) Function	38
5.10.5	X-Prompt function	39
5.10.6	Speed Info Display	39
5.10.7	J-Rings Function	39
5.10.8	Callsign Text Function	40
5.10.9	Graphic Route	40
5.10.10	Route Monitoring	40
5.10.11	Amending the Graphic Route	40

5.10.12	Mouse Click Control	41
5.10.13	Trail Information Display	42
5.10.14	The Quick Popup Menu.....	42
5.10.15	Reroute Direct window	43
5.10.16	The Handover Window	43
5.10.17	Assuming a Track	44
5.10.18	Cockpit Data display.....	44
5.10.19	Aircraft Data display	45
5.10.20	Aircraft Pair Conflict Assessment (APCA) Tool.....	46
6	Simulator Functions	46
6.1	Speech Recognition	46
6.1.1	Standard Recognitions	47
6.1.2	Emulated Recognitions.....	47
6.2	Speech Synthesis	47
6.3	Variable Speed	47
6.4	Rewind Functionality	47
6.5	Phrase Recognition Area and Transmission History	48
6.6	Screen Captures	48
6.7	Airspace Rotation	48
6.8	Custom Runway Positioning.....	48
6.9	Axis Stretching.....	48
6.10	Trail Measurement	48
6.10.1	Trail Distance Parameters.....	48
6.10.2	Exit Level Checks.....	49
6.10.3	Exit Frequency Checks	49
6.10.4	Strip Order Checks	49
6.10.5	Exit Sector Checks	49
6.11	Instruction Delays	49
6.11.1	Turn Delays	50
6.11.2	Level Delays	50

6.11.3	General Delays	50
6.12	Aircraft Performance Variation	50
6.13	Airline Management	50
6.14	Screen Functions	51
6.14.1	Second Radar Window	51
6.14.2	Bearing and Range Line (BRL).....	52
6.14.3	Range Rings	52
6.14.4	Compass Rose or Azimuth Scale	53
6.14.5	Screen Centre Marker	53
6.14.6	Scale Marker	53
6.14.7	Text Data Areas (TDA).....	53
6.14.8	Centreline Marker	54
6.15	Special Exercises.....	54
6.15.1	Simulator Task Trainers.....	54
6.15.2	Test Exercises	55
6.15.3	Exercises with Limited Functionality.....	55
6.15.4	Target Exercises.....	55
6.15.5	Maze Exercises.....	56
6.15.6	Random Exercises	56
6.15.7	Primer Exercises.....	56
6.15.8	Circuit Exercises	56
6.15.9	Time Arrival Exercises	57
6.15.10	Sub-Scenario Exercises	57
7	Script Events.....	57
7.1	System Script Events	57
7.1.1	Window Open/Close	57
7.1.2	Runway Open Close	57
7.1.3	Surveillance Changes	58
7.2	Communication Script Events	58
7.2.1	Coordination Exchange	58

7.2.2	Transmission	58
7.2.3	Play Audio.....	58
7.3	Graphic Script Events.....	58
7.3.1	Shapes	58
7.4	Question Script Events	58
7.5	Aircraft Script Events	58
7.5.1	CL Window On/Off	59
7.5.2	Descend/Climb.....	59
7.5.3	Direct Window On/Off	59
7.5.4	Alert On/Off	59
7.5.5	FDR Handover	59
7.5.6	Label Data.....	59
7.5.7	Report	59
7.5.8	Request	59
7.5.9	Set CL.....	59
7.5.10	Squawk Altitude On/Off	59
7.5.11	Squawk Code.....	59
7.5.12	Squawk Ident On/Off.....	59
7.5.13	Track Offset.....	60
7.5.14	Transponder Offset	60
7.5.15	Transponder On/Off	60
7.5.16	Vector	60
7.5.17	WX Selection On/Off	60
8	Settings Panel.....	60
8.1	The About Tab	60
8.1.1	Unlocking Settings	61
8.2	The Exercise Tab.....	61
8.2.1	Exercise Properties	61
8.2.2	Exercise Speed Scrollbar	61
8.2.3	Wind Settings	61

8.2.4	Autoreleases	62
8.2.5	Mute Alerts	62
8.2.6	Phrase Recognition	62
8.2.7	VV Visual Aids	62
8.2.8	Callsign Text	62
8.2.9	Display Speed Info	62
8.2.10	Mouse Click Control	62
8.2.11	Show Standards	62
8.2.12	Rotation	62
8.2.13	Speech Tuning Settings	63
8.2.14	Resetting Simulator Settings	63
8.2.15	Log Function	63
8.3	The Colours Tab	63
8.3.1	Background	64
8.3.2	Maps	64
8.3.3	Maps2	64
8.3.4	Sector	64
8.3.5	Range-Rings:	64
8.3.6	Compass	64
8.3.7	Highlight	65
8.3.8	Highlight2	65
8.3.9	Window	65
8.3.10	Window2	65
8.3.11	Clock	65
8.3.12	Label	65
8.3.13	Handoff	65
8.3.14	Pending	65
8.3.15	Handed	65
8.3.16	Unconcerned	65
8.3.17	Track	65

8.3.18	Tools1-Tools6.....	65
8.4	The Display Tab	65
8.4.1	Extended Label.....	66
8.4.2	Scale Marker Main	66
8.4.3	Range Rings Main	66
8.4.4	Shared Label.....	66
8.4.5	Scale Marker 2W	66
8.4.6	Range Rings 2W	66
8.4.7	Frame Label.....	66
8.4.8	Compass.....	67
8.4.9	10NM Range Rings Display and Selection	67
8.4.10	Display Speed Info.....	67
8.4.11	Align Magnetic.....	67
8.4.12	5NM Range Rings Display and Selection.....	67
8.4.13	AutoDeconflict Labels	67
8.4.14	Screen Ctr Marker	67
8.4.15	J-Rings Display and Selection	67
8.4.16	Route Alerts	67
8.4.17	Swap Mouse Buttons	68
8.4.18	Allow Aircraft Removal	68
8.4.19	Level Alerts	68
8.4.20	Mouse Zooming	68
8.4.21	Show Camera	68
8.4.22	Show VSCS Mouse.....	68
8.4.23	Zoom Double Click	68
8.4.24	Show Play/Record Icon.....	68
8.4.25	Conflict Alerts	68
8.4.26	Save Primer Data to File	69
8.4.27	STCA Trigger.....	69
8.4.28	Resolution	69

8.4.29	Aspect Ratio	69
8.4.30	Font Size.....	69
8.4.31	STCA Text	69
8.4.32	Assigning Screens	69
8.5	The Speech Tab.....	69
8.5.1	MCC Levels.....	70
8.5.2	Audio Source	70
8.5.3	Speech Synthesis	70
8.5.4	Audio Output.....	70
8.5.5	Extra Utterances	70
8.5.6	Use 'Altitude'	70
8.5.7	Average Lag Time.....	71
8.5.8	PTT Clear Lockups	71
8.5.9	Use 'Feet'	71
8.5.10	Maximum Lag Time	71
8.5.11	PTT Mute Radio.....	71
8.5.12	Use 'Metres'	71
8.5.13	Recognitions Count	71
8.5.14	Auto Radio Off	71
8.5.15	Use 'Flight Level'	71
8.5.16	Emulated Recognitions Count	71
8.5.17	Radio Always On.....	71
8.5.18	Use 'To'	71
8.5.19	Average Recognition Time	72
8.5.20	Report Leaving	72
8.5.21	Last Recognition Time	72
8.5.22	Alternate Callsigns.....	72
8.5.23	Climb Requests.....	72
8.5.24	Speech Rate.....	72
8.5.25	Append 'Heavy'	72

8.5.26	Descent Requests.....	72
8.5.27	Record TX	72
8.5.28	Decimal (TX)	72
8.5.29	Speech Volume	72
8.5.30	Decimal (RB)	72
8.6	Airspace Tab	73
8.6.1	Custom Runway Positioning	73
8.6.2	Trail Distance	73
8.6.3	Published and Custom Data	73
8.6.4	Disable Axis Stretch	74
8.6.5	QNH Settings	74
8.7	Aircraft Tab	74
8.7.1	Use Random Instruction Delays	74
8.7.2	Set General Delay	74
8.7.3	Set Turn Delay.....	75
8.7.4	Set Level Delay	75
8.7.5	Set Turn Rate.....	75
8.7.6	Set Normal Descent Rate.....	75
8.7.7	Set Expedited Descent Rate.....	75
8.7.8	Set Normal Climb Rate	75
8.7.9	Set Expedited Climb Rate.....	75
8.7.10	Process TCAS	75
8.7.11	Airline Selection	76
8.8	Configuration Tab.....	77
8.8.1	Network Information.....	77
8.8.2	User Information	77
8.8.3	Grammar Path.....	78
8.8.4	Language Locale.....	78
8.8.5	Camtasia Settings.....	78
8.9	Communications Tab	79

9	Strip Windows	80
9.1	VV Strip Windows	80
9.1.1	Inbound Strip Window	80
9.1.2	Taxi Strip Window	80
9.2	Other Strip Windows.....	81
10	Other Windows.....	81
10.1	Maps Panel.....	81
10.2	Arrival Management System.....	82
10.3	Voice Switch.....	83
10.4	Popup Panels	83
10.5	Termination Panel.....	83
10.5.1	Termination Reason	84
10.5.2	Result	84
10.5.3	General Details	84
10.5.4	Results.....	84
10.5.5	LMS Status.....	84
10.5.6	Detailed Feedback	84
10.5.7	Open Log Files	84
10.6	Question Panels	85
11	Summary of Keyboard Functions.....	86
12	Performance Measurement	87
12.1	Minimum Time in Simulation	87
12.2	Termination Window Information.....	87
12.3	Performance Record File.....	87
12.4	Last Exercise File.....	87
12.5	Tin Can Record	87
12.6	Scoring by Category	87
12.6.1	ATC Score.....	88
12.6.2	CompSep Score.....	88
12.6.3	Interface score	88

12.6.4	Question Score	89
12.6.5	Separation score	89
12.6.6	Vectoring Score.....	89
12.6.7	Sequencing score	89
12.6.8	Score Weighting.....	89
12.6.9	Overall score	90
13	Troubleshooting.....	91
13.1	Speech Recognition	91
13.1.1	Introduction	91
13.1.2	Use of the Phrase Recognition Display	91
13.1.3	General Strategies	91
13.1.4	Computer Lockups	91
13.1.5	Recognition Confidence Levels.....	92
13.2	Installation	92
13.3	Display.....	92
14	Appendix A: Phrases accepted by the Speech Engine	94
14.1	Level Change Phrases	94
14.2	Turn Phrases	94
14.3	Tracking Phrases	95
14.4	Frequency changes	95
15	Appendix B: Pronunciation	96
15.1	Phonetic Alphabet Pronunciation	96
15.3	Number Pronunciation	97
16	Appendix C: Data Storage and Performance Metrics.....	98
16.1	User Information	98
16.2	Exercise Information.....	98
16.3	Extra Data	99
16.4	Speech Data	99
16.5	General Data	100
16.6	Separation Data	101

16.7	Exit Information	102
16.8	Task Trainer Data	103
16.9	CompSep Data	103
16.10	Maze Data	104
16.11	Target Data	104
16.12	Question Data	104
16.13	Sequencing Data	105
16.14	Time Arrival Data	106
16.15	Primer Data.....	107
16.16	Scoring Data.....	107
17	Figures.....	109

1 Introduction to the VV Simulator

1.1 Running the Simulator

1.1.1 CBT Deployment

When run from the traditional course-based shell environment, the VV simulator is run by clicking the appropriate exercise tile in the main course interface. The simulator will then launch with the correct exercise loaded. Clicking on one of the orange Task Trainer, green Exercise or grey Random Exercise tabs will launch the simulator with the appropriate exercise (Figure 1).

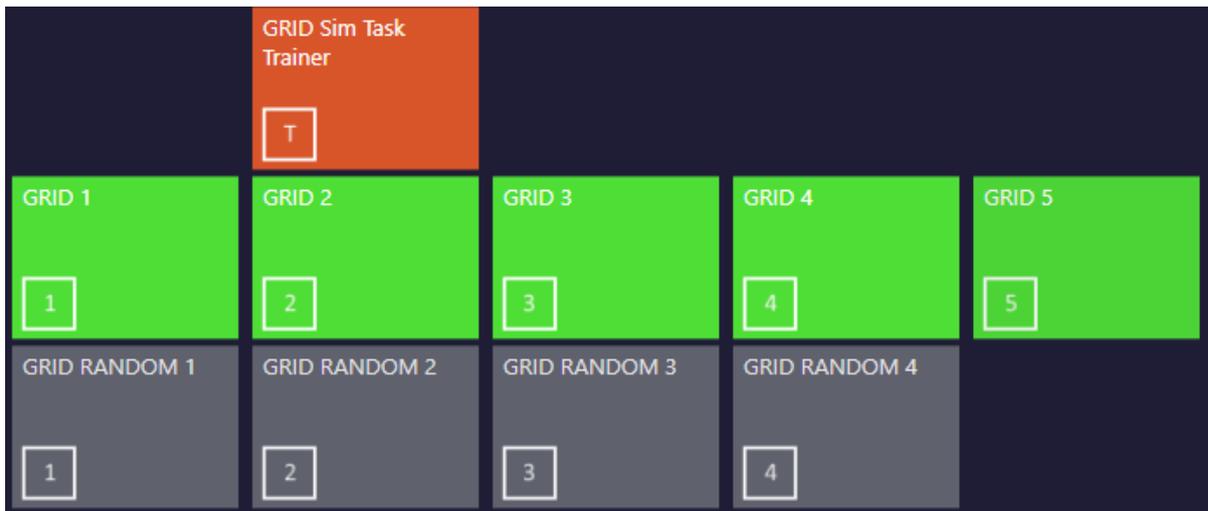


Figure 1. Launching the Simulator from the VV Enroute™ main screen

1.1.2 LMS Deployment

When run from the online LMS environment, the simulator is run from clicking the **Launch Simulator** button on any exercise activity page. Following this, the simulator will the required download airspace and exercise data.

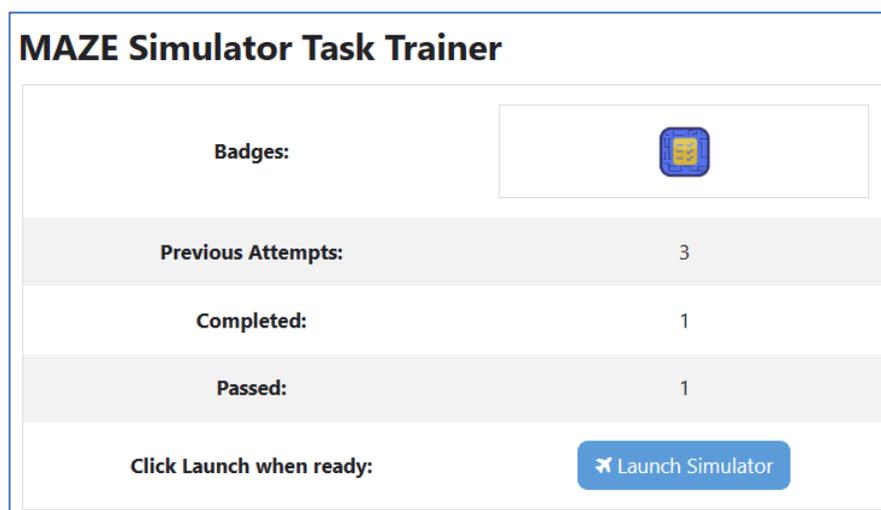


Figure 2. Launching the Simulator from a Simulator Activity Page

1.2 Speech Recognition

Prior to running simulation, the Speech Recognition function needs to be configured. In the CBT environment, this process is covered in course materials.

In the LMS environment, the Getting Started course contains detailed information about setting up the audio input/output, and training the speech function.

1.3 Radar Systems

The VV Simulator can support multiple radar systems commonly in use around the world. The VV System is the native Visual Vectoring radar system which provides most of the functions that are available in a typical advanced ATC radar system. This system is the default display for exercises run in the *VV Approach*, *VV Enroute* and *VV CompSep (ICAO)* products.

Other products may implement different radar system interfaces. The below table summarises the radar systems currently deployed:

Radar System	Description	Functions
VV Legacy	This system is used by VV Approach and has basic functionality.	Basic surveillance functions. Graphic Routes are not available.
VV System	This system is used by VV Enroute, and other generic trainers.	All surveillance functions, including graphic routes and APCA
Eurocat	Where licenced by the end-user a Eurocat emulator is available.	Extended functionality to mimic Eurocat systems. Flight Data processing is included.

1.4 Setting up Keyboard Function keys:

Several simulator functions are accessed with the keyboard Function (F) keys, such as clock instant double speed and Bearing and Range Lines. Some computers assign dual purposes to the F keys, frequently making the Function the secondary use. This means that, to press, for example, F5 requires simultaneous pressing of the Fn and the F5 keys. During busy simulation that can be distracting, particularly when the Fn and required F keys are too widely spaced to be operated simultaneously with one hand. The functionality of the F keys can be reversed in the System Setup for the computer, but the method will differ between brands and models. It is recommended that the method be searched on Google in the first instance.

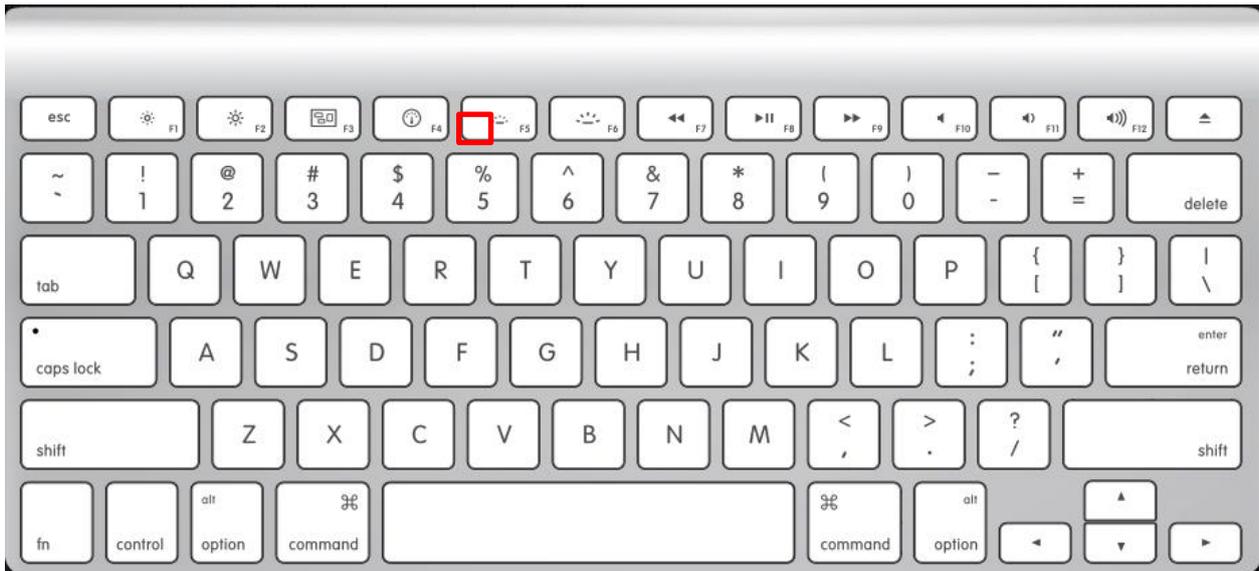


Figure 3. Keyboard layout

The keyboard above has the Function as the secondary use of the keys and should be reversed.

1.5 Data Usage

1.5.1 CBT Deployment

The VV Simulator makes use of a wide range of aircraft, airspace, speech, course and exercise datafiles. These files are packaged with the installation and are stored in the *Published Data Area*. To provide flexibility, and to enable data changes between versions of the program, the program will first look at the *Common Data Area* for alternative versions of datafiles. This makes it possible to make changes to, for example, exercises or speech recognition grammars without relying on a full product upgrade.

1.5.2 LMS Deployment

For simulation making use of the online LMS, all data is downloaded from an online server. A subset of data is stored permanently in the Published Data Area.

1.6 Data Locations

1.6.1 Published Data Area

VV software is commonly installed here, though the location is selectable during the installation process:

C:\Program Files (x86)\Visual Vectoring Pty Ltd\{(product name)}

1.6.2 Common Data Area

The *Common Data* area, often called the *CommonApplicationData* is an area in which common data between Windows Users is stored. All users have read/write privileges, so this area may be used for storing common data. The Common Data Area is normally located here:



C:\ProgramData\Visual Vectoring Pty Ltd\

1.6.3 Personal Data Area

The Personal Data Area is allocated for each Windows account and is normally located here:

C:\Users\{username}\AppData\Local\Visual Vectoring Pty Ltd

This area is accessible only by administrators and the Windows user for whom it has been allocated. This section is used to save personal data such as performance records and recorded transmissions.

1.7 Program Data Contents

1.7.1 Program Files

In a standard installation, the program files are in the Published Data Area. The simulator executable (VV_NET.exe) is located here, as well as a set of Dynamic Linking Library Files (DLLs).

That that the simulator executable cannot normally be run directly and requires use through a course interface screen.

The following DLLs are packaged with the VV Simulator:

DLL	Function
VVAircraft	Manages aircraft profile, airline data and flight plan processing;
VVAirspace	Manages airspace and airways structures, including runways, instrument procedures, aerodrome data, as well as geographical calculations;
VVControls	Contains a set of standard Windows interface controls for use in all VV products;
VVCourseware	Manages the visual display and processing of VV courses, as well as charts the lesson media player;
VVData	Contains a common set of constants and functions usable across all VV products;
VVDisplay	Manages the simulator mapping function and contains colour and other drawing capability for use across all VV products;
VVNetwork	Manages the networking function;
VVPerformance	Stores and analyses performance data;
VVPhone	Manages the VOIP communication function for networked simulation;
VVSpeech	Manages the speech recognition and synthesis function.

1.7.2 Data Files

Data files are stored in subfolders in the main installation folder. The table below summarises the content of these subfolders that are packaged with the simulator and enclosing course. Depending on the installation, some of the folders below may not be present.

Folder	Contents
ac	Airline fleet information, flight plan information and random traffic constructors;
briefs	Course briefing material and lesson transcripts;
documents	Simulator and course documentation;
exercises	Exercise scenarios;
geog	Geographical information such as that might be contained in an airspace handbook, including way-points, air-routes, instrument procedures, aerodrome information airspace maps, terrain maps, clearances and holding patterns;
logo	Image files for display on course interfaces;
lessons	Media files for course lessons and demonstrations;
network_config	Configuration files for network simulation;
nw	VSCS phone configuration;
sectors	Sector configuration files;
speech	Speech recognition grammars, readback information, speech recognition compiler tool;
speechtrainer	The VV SpeechTrainer App;
speechtrainerM	The VV SpeechTrainer App configured for metric phrasing;
volumes	Airspace volume definition files;
vscs	Voice switch configuration files.

1.8 Personal Files

Data and performance files are stored in the Personal Data Area, including:

- Performance Data Records;
- Recording of transmissions;
- Primer data;
- Program logs;



- Screenshots.

In addition, a folder structure is created in this area that mimics the structure in the Published Data Area.

1.9 Custom URLs

In the LMS deployment, Custom URL protocols are installed for easy access to the use of the **Speech Properties** panel and the **VVSpeechTrainer** app. Simply type into a web browser bar, the Windows Explorer navigation bar or the Windows Run dialog (opened with **Windows+R**). The URLs are tabulated below.

Speech Properties	vvsp://
VVSpeechTrainer	vwst://

2 Simulator Configurations

The VV Simulator can be configured in several ways:

2.1 Standalone Simulation

This legacy configuration for the VV Simulator is packaged as part of VV courseware. It intended for use by a single user. This is the most common configuration in which the simulator is used.

2.2 LMS Simulation

Most installations now make use of the simulator as part of an online delivery of courseware from a Learning Management System (LMS). A web link will launch the simulator using a custom URL, which encodes the location of the airspace and exercise data. The simulator uploads a range of metrics to the LMS for analysis, performance management and tracking.

2.3 Networked Simulation

This configuration makes use of one or more Controller positions and one or more Pilot positions to present more complex ATC scenarios.

2.4 Observer Position

An instance of the VV Simulator can be configured to present a real-time image of a standalone or networked Controller position. This provides the opportunity for an instructor to view the performance of a student.

2.5 Exercise Creator

The simulator may be opened as an exercise creation utility. See the separate Exercise Creator manual for information on how to create and edit exercises.

3 Speech Recognition

The VV Simulator makes use of Microsoft's speech recognition function. For best performance a speech recognition profile (or Speech User) should be set up for each user of the VV Simulator.

3.1 Speech Users

Under any Windows account, any number of Speech Users can be created, each with a unique speech recognition profile (see Figure 4), so it is possible for many users to make use of the VV Simulator under the same (shared) Windows account.

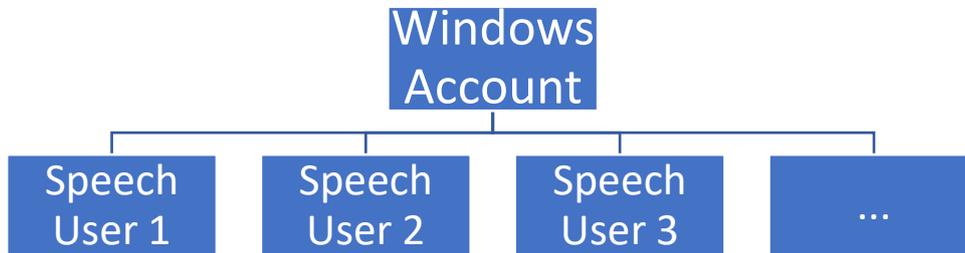


Figure 4. Speech profiles on a shared Windows account

Where users are making use of a private Windows account, a Speech User name will be generated automatically, and is usually named **Default Speech Profile**. This should be changed to something that uniquely identifies the user, such as a student identification number.

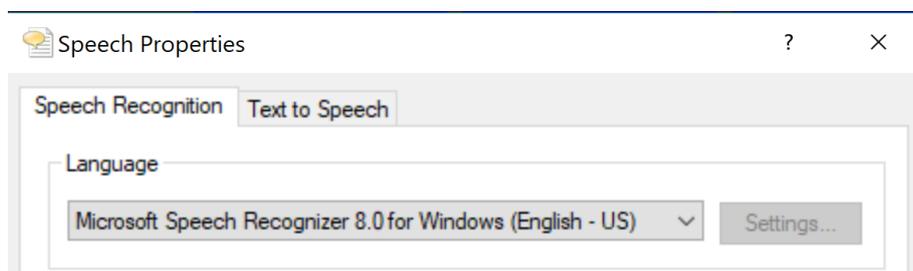
3.2 Setting up a Speech User profile for a new user.

In the CBT deployment, the **Speech Properties** dialog is opened by clicking **Speech Options** on the main course interface



In the LMS deployment, the **Getting Started** course provides instruction on setting up the speech profile. See the section above on Custom URLs for information about running the **Speech Properties** dialog, using a URL : <vosp://>

Once **Speech Properties** dialog is opened switch to the **Speech Recognition** tab:



Check that the language selected is as shown: **Microsoft Speech Recognizer 8.0 for Windows (English US)**. If this version is not available in the drop-down menu select one of the other English engines.

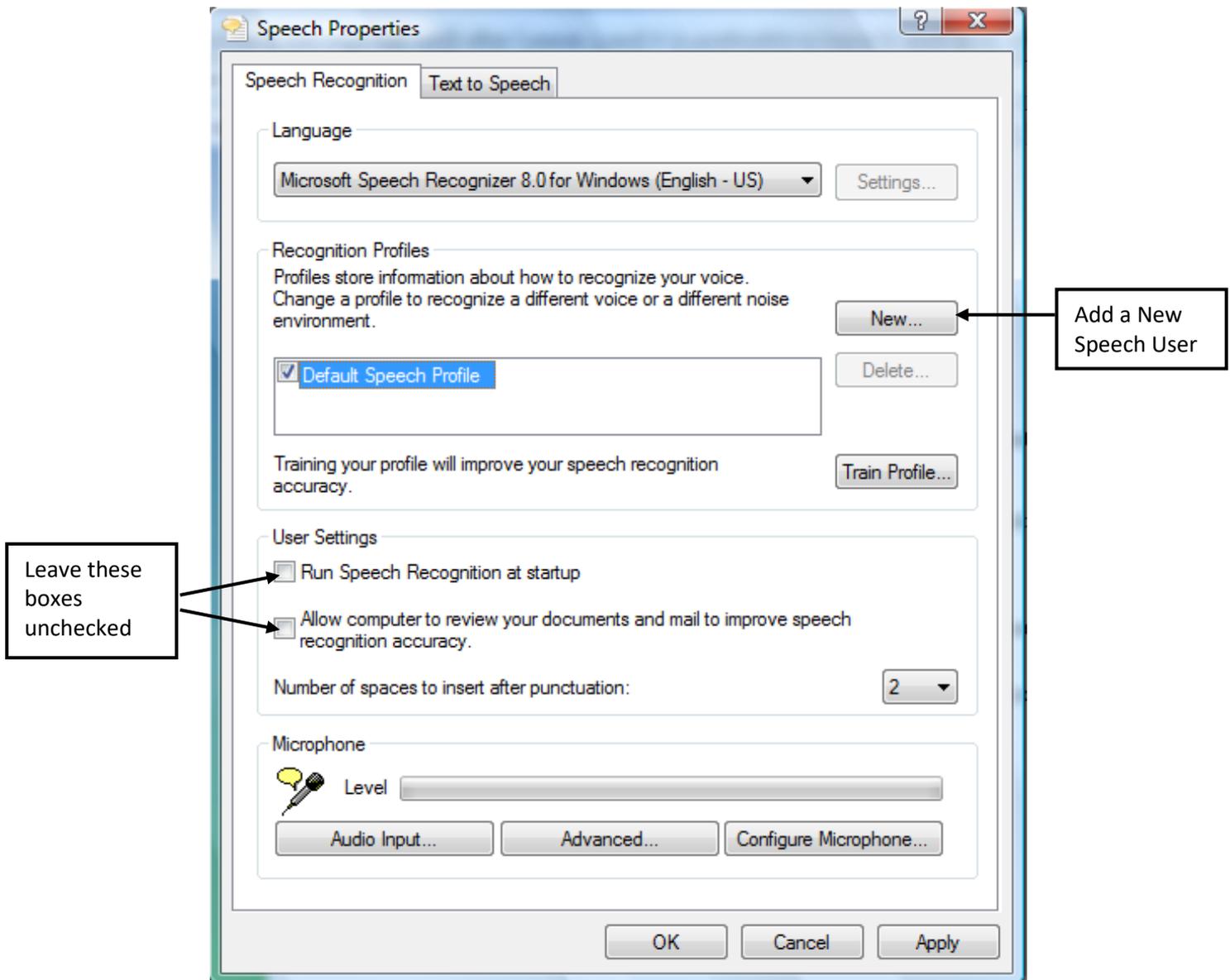


Figure 5. Speech Properties Window

Click **New** to add a New Speech User. This window will open:

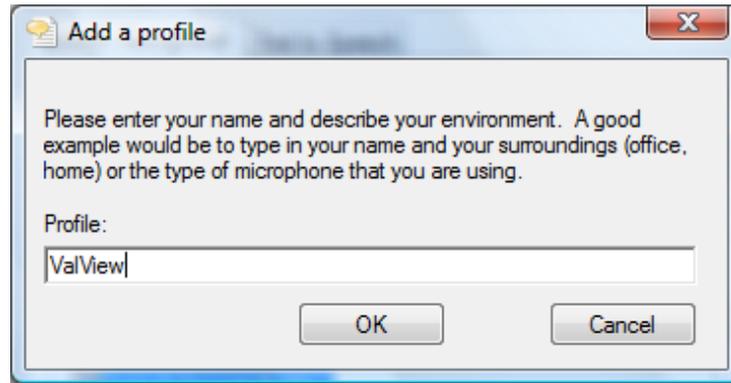


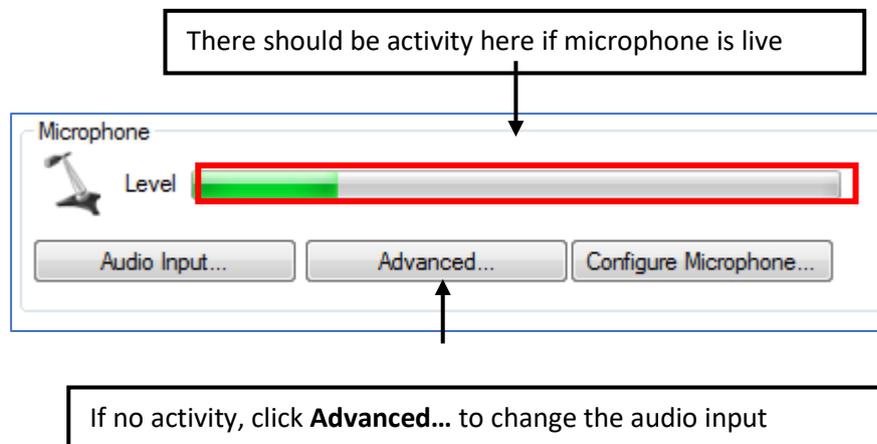
Figure 6. Adding a new Speech User

Type the user name or identification in the *Add a profile* window without spaces between names. There is no need to describe the environment.

Click **OK** to close the **Add a profile** window.

3.3 Setting the Audio Input for Speech.

Run a **Scratch Test** by ensuring the headset you will be using in simulation is plugged into the computer and scratch or tap the microphone boom. This method is used to ensure the input is from the headset and not an onboard mic. There should be movement in the level area at the bottom of the **Speech Properties** window:



3.4 Changing Audio Input

If no activity is observed, click **Advanced** to change the audio source. The dialog below (Figure 7) will appear. Click **Use this audio input device** and choose the correct input from the dropdown menu. Click **OK**. Also click **OK** in the **Speech Properties Window** to complete the process.

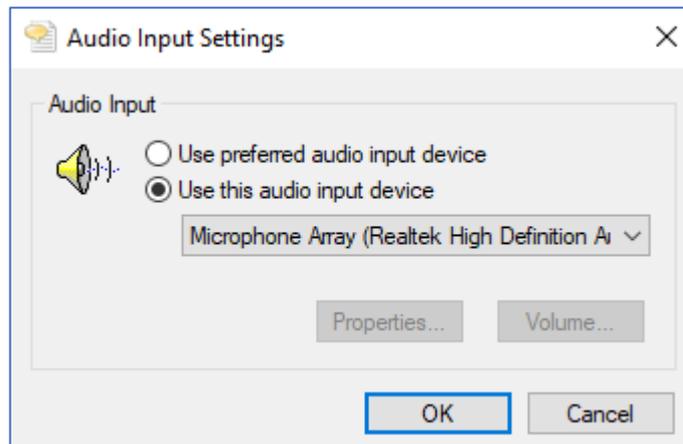


Figure 7. Audio Input Settings

3.5 Configure the Microphone.

Reopen the **Speech Properties Window** if it has been closed in the previous step

Click **Configure Microphone**. The **Microphone Setup Wizard** window (below) will open.

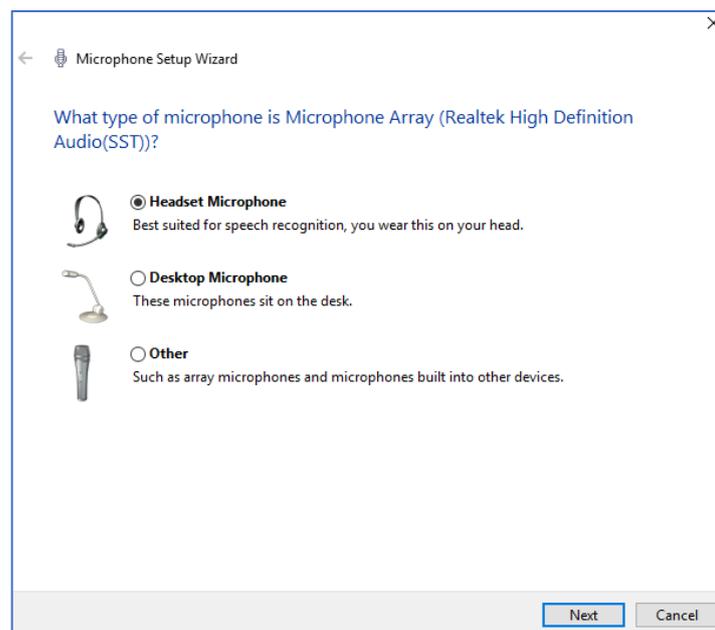


Figure 8. Microphone Setup Wizard 1

Select **Headset Microphone** and click **Next**. The window below will open:

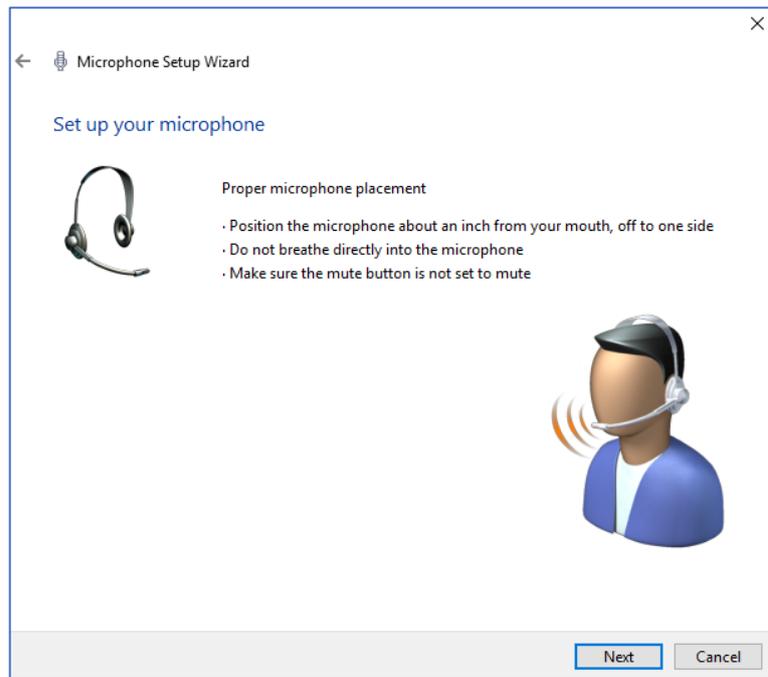


Figure 9. Microphone Setup Wizard 2

Click **Next** to acknowledge. The window below will open.

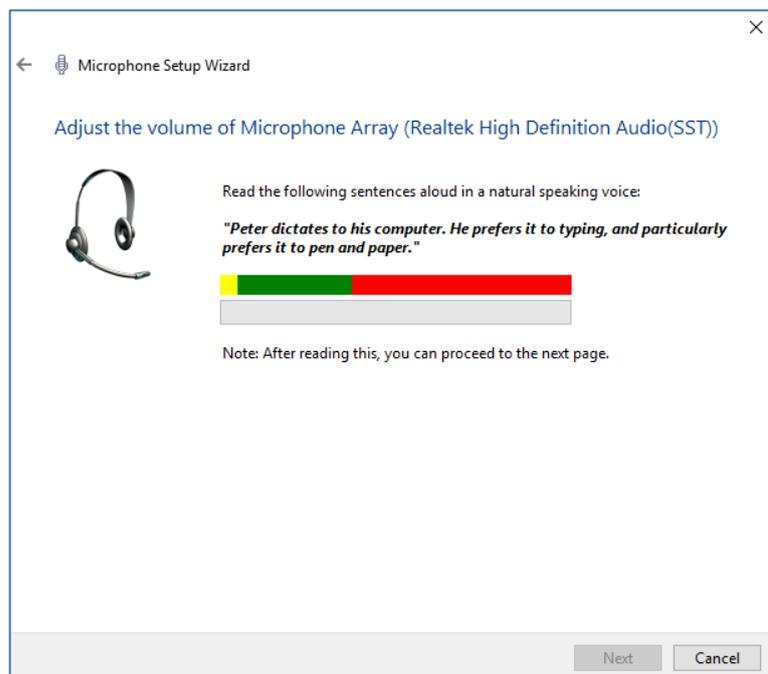


Figure 10. Microphone Setup Wizard 3

Read the sentence as instructed. Once the level has been set click the **Next** button will be enabled. Click **Next** and then click **Finish** to complete the process.

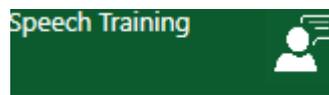
3.6 Observing the correct Speech User in the main course page

The course interface will display the current **Speech User** name at the bottom left of the display. It is very important that the correct speech user is displayed when using simulation, so that the correct speech profile is being used.

The **Speech User** name is also displayed in the Configuration tab of the **Settings** panel.

3.7 Training the Speech Recognition

For the CBT deployment, click **Speech Training** on the main course interface to open the **VV SpeechTrainer** App.



For the LMS deployment, the **Getting Started** course will provide direction on training the speech function. Alternatively, a Custom URL ([vvst://](#)) may be used to launch it.

On started the **VVSpeechTrainer** app, read the instructions in the dialog below and click **OK**.

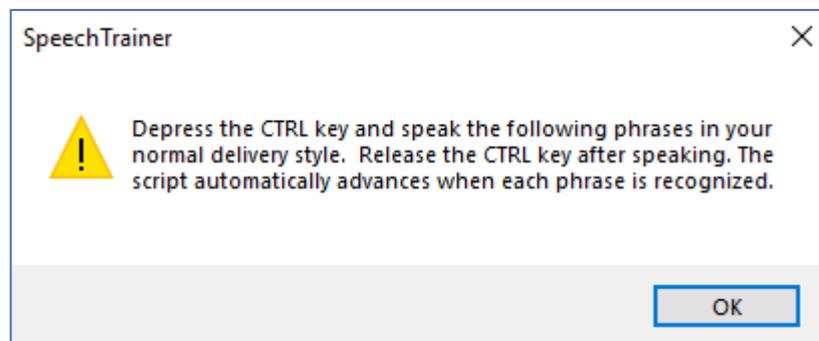


Figure 11. SpeechTrainer Instructions

With the CTRL key depressed read each phrase. It is recommended to pause slightly after pressing the CTRL button before commencing speech. If a phrase is recognised the next one will be automatically displayed. If not, the phrase that was recognised is displayed in the task bar, or (FALSEREC) is displayed for an unrecognised utterance. Click **Skip** to bypass a phrase that is persistently unrecognised.

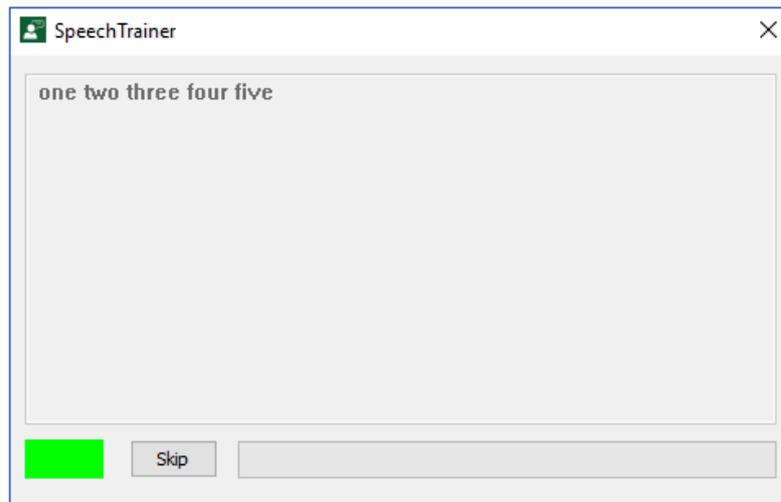


Figure 12. *SpeechTrainer interface*

The Speech Profile is updated after each recognised utterance.

When your voice is being quickly and correctly recognised the **Speech Trainer** can be closed. The training can be repeated if recognition in simulation proves to be less than satisfactory

3.8 Recognition Performance

3.8.1 *Speech Grammars*

A Speech Grammar defines the set of phrases that the speech recognition engine will recognise. Each exercise in the VV Simulator has a specific speech grammar associated with it. This is to limit the number of recognisable phrases to improve performance.

For example, an exercise that is designed for vectoring only (such as a Target exercise) may use a speech grammar that does not contain (and will not recognise) level change instructions. Similarly, a grammar used for an Enroute/Area sector will not contain instructions for issuing approach clearances.

The VV Simulator may use a different speech grammar depending on the language locale of the computer in use. Information on this is provided on the Configuration Tab of the Settings Panel. The location of the speech grammar and the language locale used is shown.

3.8.2 *Lag Times*

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.

Lag times are reported in the Speech Tab of the Settings Panel.

3.9 Ancillary Settings

A range of settings is available on the Speech Tab of the Settings Panel.

Note that these functions should be considered as troubleshooting only. In the majority of cases the Speech Recognition should function well without the use of these functions. 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.

4 Display

4.1 Top Menu

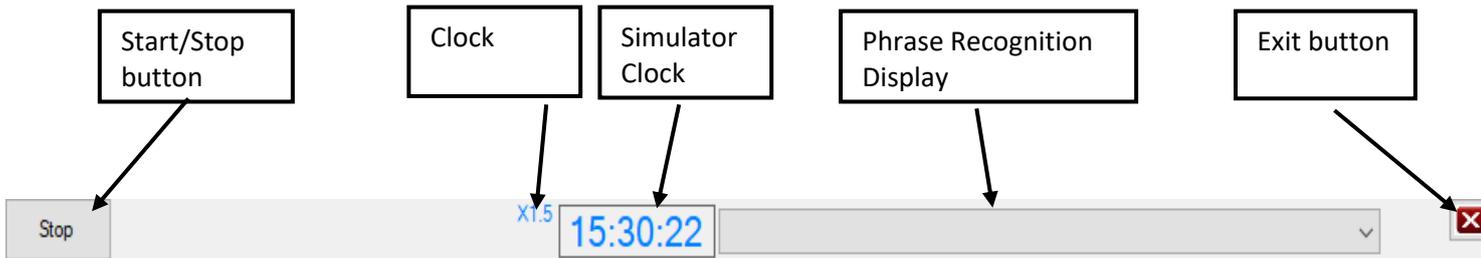


Figure 13. The Top Menu (VV System)

The Top Menu appears at the top of the main radar screen, as is depicted in Figure 2.1 for the VV System. Presentation will vary slightly for other radar systems.

4.1.1 Start/Stop Button

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

Some exercises in VV courseware are designated as Test Exercises. For these, once the exercise has begun, pausing and rewinding is not available. Here, the Start/Stop Button will be greyed out and contain the text 'Test'.

4.1.2 Clock Speed Indicator

The *Clock Speed Indicator* will show the current simulator speed, which may be varied in the **Exercise** Tab of the **Settings** Panel 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.

4.1.3 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.

4.1.4 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. This display is primarily for the purposes of checking that the speech recognition function is working. It should not be used as a replacement for readback confirmation. The *Phrase Recognition Display* may be removed by disabling it on the **Exercise** Tab of the **Settings** Panel.

4.1.5 Exit Button

Clicking the *Exit Button* will terminate the simulator exercise. If the exercise has been run for enough time (around ten minutes, depending on the exercise), a Feedback Panel will be displayed containing performance data. These data are saved to a database or uploaded to the LMS.

4.2 Side Menu

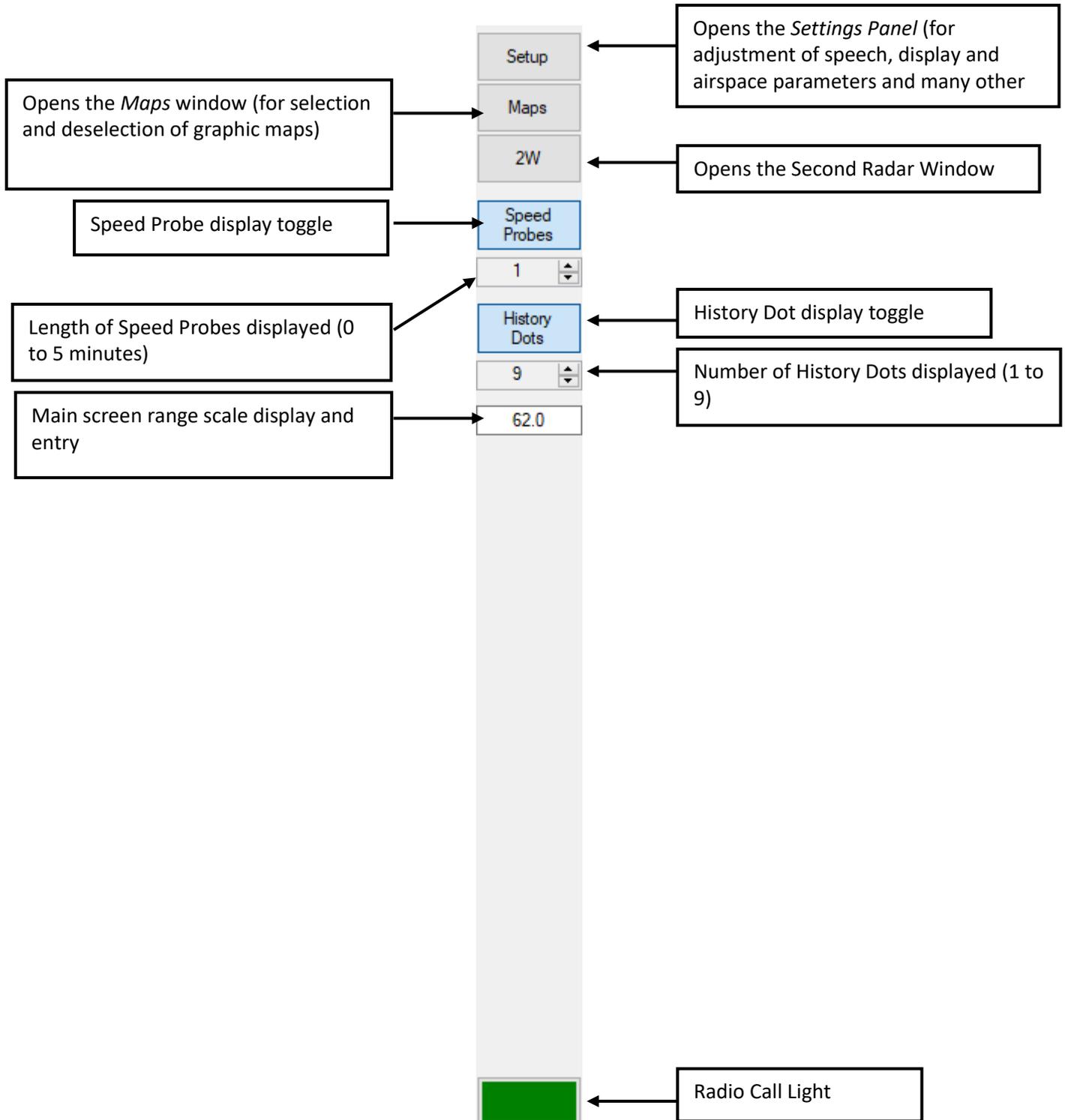


Figure 14. Side Menu of VV Simulator

4.2.1 *Setup Button*

This button opens the **Settings** panel (see Section 8), which provides access to screen display and simulator performance settings.

4.2.2 *Maps Button*

This button opens the **Maps** window, for selection and de-selection of radar map elements.

4.2.3 *2W Button*

This button opens the **Second** Radar window 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.

4.2.4 *Speed Probes Display Toggle*

This button will toggle the display of the speed probes on and off.

4.2.5 *Speed Probes Entry*

The length of the Speed Probes (1 to 5 minutes) can be selected here. Availability of this function requires the Speed Probes Display Toggle to be on. See the next section for more information on Speed Probes.

4.2.6 *History Dots Display Toggle*

This button will toggle the display of the history dots on and off.

4.2.7 *History Dots Entry*

The number of displayed History Dots (0 to 9) can be set here. Availability of this function requires the History Dots Display Toggle to be on. See the next section for more information on History Dots.

4.2.8 *Radio Call Light*

The Radio Call Light provides an indication that a transmission is in progress, either by the user, 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, the radio frequency is active.

Depending on the sector under simulation, there may be more buttons available in addition to the Radio Call Light. See the section on Voice Switch for more information.

4.3 The Main Simulator Display

4.3.1 Map Display

The main display will appear differently depending on the sector being simulated. As an example, the Basic Maze sector in the VV Enroute course is shown below.

Contained within the display will be various selectable maps. These may be toggled on and off from the Maps Panel.

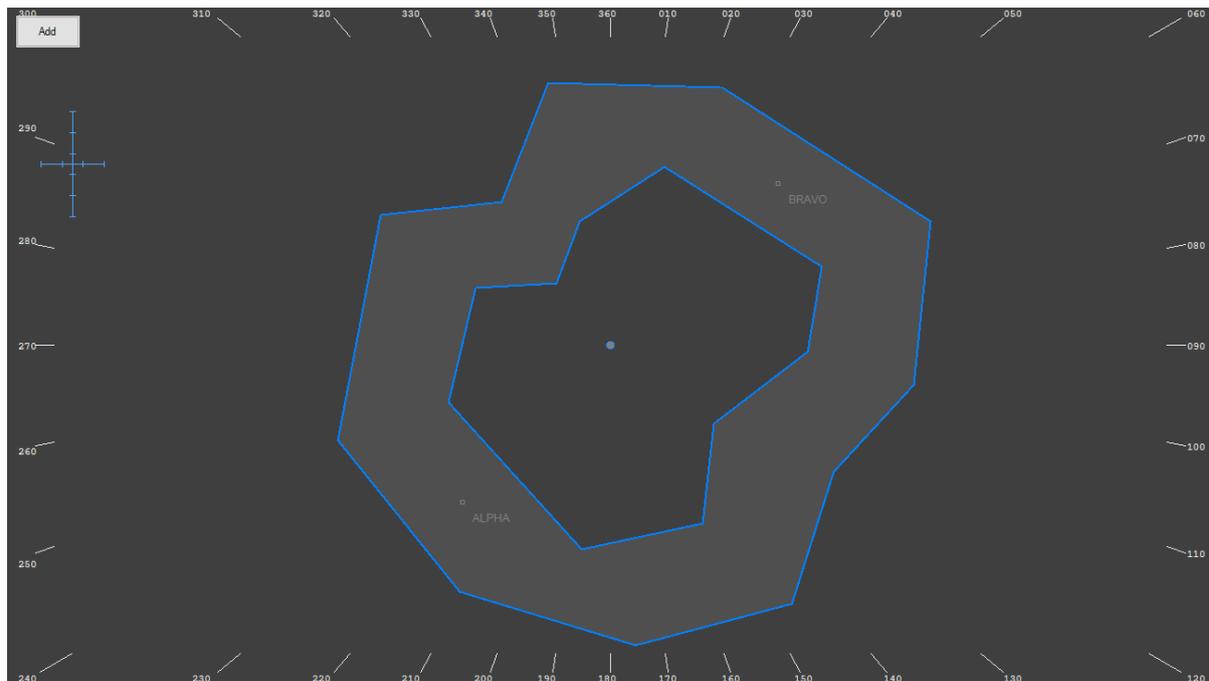


Figure 15. Basic Maze Display

4.3.2 Aspect Ratio

Factors such as the screen dimensions and resolutions settings will affect the way information appears on computer displays. This can result in skewing of the display in the lateral direction. It is very important in simulation that the map projection presents distances accurately in all directions, so that a given distance between equidistance points on the display map subtends the same distance visually on the screen, regardless of the geographic positioning of the two points. Map circles, such as DME distances or airspace boundaries should appear as circles on the map display, not as ellipses.

IN the VV Simulator the aspect ratio of the screen is settable in the **Display** Tab of the **Settings** Panel.

VV courseware will contain information on how to ensure that the aspect ratio is correctly set. This is commonly covered in the first Sim Task Trainer of any course, with a dedicated display map provided for the purpose.

4.3.3 Moving and Rescaling the Display

Commonly used functions in scrolling and rescaling 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 display 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.

4.3.4 *Mouse Zoom function*

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.

The feature may be disabled on the Display Tab of the Settings Panel.

4.3.5 *Aligning the Map*

The displayed radar maps are 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. This is settable in the Display Tab of the Settings Panel.

In VV courseware, the magnetic variation is always zero, so this setting will not influence the alignment of the simulator map.

4.3.6 *Changing Display Colours*

Map colours are specific to each type of radar system. They may be changed in the Colors tab of the Settings Panel.

5 Aircraft Tracks

5.1 Track Presentation

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 the VV Radar System, 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.

5.2 Display States

The colour and appearance of the aircraft track will depend on its display state, which effectively describes its disposition from the point of view of the controller undergoing simulation.

Different radar systems may have access to more display states, but the basic ones are as follows:

Display State	Description
Jurisdiction/Controlled	This is an aircraft that is controlled by the controller undergoing simulation. A full range of function is available.
Pending/Announced	This display state will highlight aircraft that will affect the controller in the future.
Handing-Over	Aircraft in Handing Over state are in the process of handing over between controllers.
Post-Jurisdiction	These aircraft have been handed over to the next controller.
Not - Concerned	These aircraft do not affect the controller undergoing simulation.

5.3 Label Colours

The colour of an aircraft's display is determined by its Display State. 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 pending not yet under your control. Details are contained in the individual courses.

For the VV system, Controlled labels are green in colour, those that are Handing-, and Pending aircraft are blue.

5.4 Label Highlight

A particular aircraft display may be toggled between normal and a highlighted (often called Quick-look) by centre-clicking the radar track. This is used as a memory prompt for highlighting aircraft for which a future action is required.

5.5 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/MCL)	System	The level of the aircraft above mean sea level, as determined from the aircraft altimeter. 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.
-------------------------	--------	---

5.6 VV Radar System Label

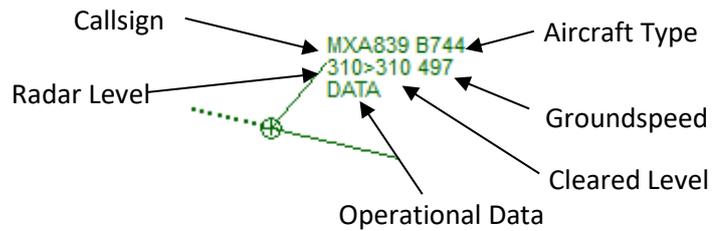


Figure 16. The label data block: VV radar system

5.7 Mouse Functions

The VV Simulator is designed for the use of a three-button mouse. A laptop touchpad or 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).

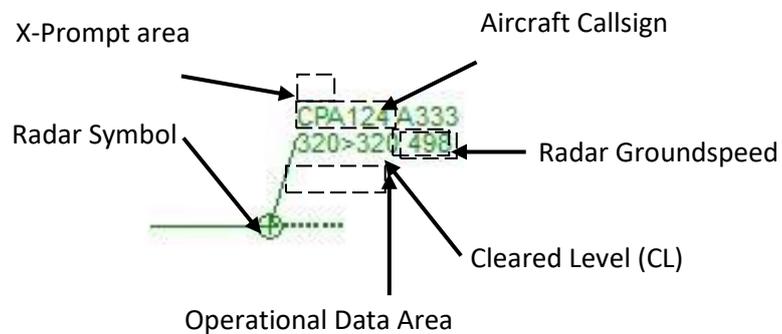


Figure 17. Clickable areas of the Radar Track (VV Radar System)

The functions available by clicking the elements of the aircraft track are as shown in the table below. Other mouse and keyboard actions available in the VV Simulator are detailed in the information and instruction modules.

Other radar systems and custom labels may provide different interaction functionality. This would be detailed in course content.

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/quicklook 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 Info Display (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.

5.8 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.

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.

5.8.1 Conflict Alert (CA, STCA or PCA)

The separation minima for the *VV Simulator* will depend on the sector under control but is generally 5 nautical miles horizontally and 1000 feet vertically. Should two aircraft not have (or is predicted not to 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.

The text of the conflict alert may be changed in the Display Tab of the Settings Panel.

5.8.2 Cleared Level Alert: (CL or CLAM)

This is triggered when an aircraft is not at, climbing or descending towards the Cleared Level in the radar label. Cleared Level Alerts may be disabled in the Display Tab of the Settings Panel.

5.8.3 The Route Alert: (RTE or RAM)

This is 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. Route Alerts may be disabled in the Display Tab of the Settings Panel.

5.8.4 Level Alert: (LVL)

This alert is triggered when an aircraft is detected outside the range of allowable levels, such as in a MAZE exercise.

5.8.5 Other Alerts:

Other alerts for emergency conditions (**HJ**- Hijack, **EM** – General Emergency and **RF** – Radio Fail) are also supported by the VV system. Other radar systems may allow additional alerts. These will be detailed in supporting course documentation.

5.10 Aircraft Track Functions

5.10.1 Aircraft Track Selection

An aircraft track can be selected by left-clicking the surveillance return. Once selected, a range of functions become available as detailed below.

5.10.2 Rotating the Data Block

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

5.10.3 Cleared Level Selection

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

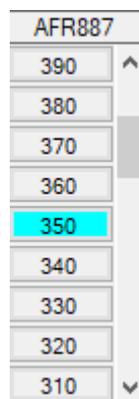


Figure 18. Cleared Level Selection Window

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 to close the window without entering a new Cleared Level.

When a new CL is entered, it will be highlighted in a different colour. This is the CLH function (see below).

Note that when Mouse Click Control (Exercise Tab of Settings Panel) and the MCC Levels feature (Speech Tab of Settings Panel) is enabled, 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. A right click will issue a conditional (when ready) climb or descent instruction.

Such an instruction would will be read back by the aircraft and shown as a recognised instruction in the Phrase Recognition Display window.

5.10.4 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. 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.

5.10.5 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 character 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. In some radar systems, a different character such as a C or a Z may be used.

5.10.6 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 Display Speed Info in the Display Tab of the Settings Panel and left click the radar groundspeed in the aircraft's label.

The Speed Info display will open showing speed information. The information within the display will change dynamically with every surveillance update and as the aircraft transitions between different phases of flight.



```
AFR887 B744
CURRENT: M085 (NORMAL)
PROFILE: M085
MIN: M079
MAX: M086
```

Figure 19. 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.

5.10.7 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 Display Tab of the Settings Panel. Once enabled, individual J-Rings may be toggled on/off for a selected aircraft by pressing Shift-J key. Five distance settings are available (3, 5, 10, 15 and 20 NM (non-metric) or 5, 10, 30 and 30 Km (metric)).



Figure 20. J-Ring presentation

5.10.8 Callsign Text Function

The VV 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 *Callsign Text* feature may be enabled/disabled in the Exercise Tab of the Settings Panel.

5.10.9 Graphic Route

The Graphic Route function is a function that enables the planned or cleared route of the aircraft to be shown.

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.

The availability of the Graphic Route will depend on the radar system in use.

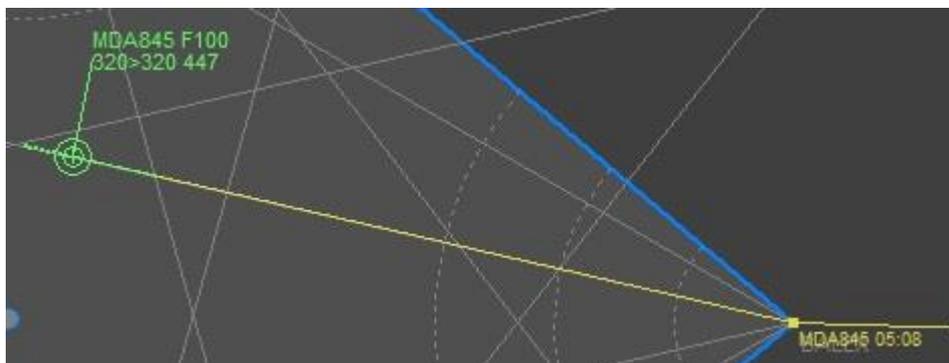


Figure 21. Graphic Route Presentation

5.10.10 Route Monitoring

Where the Route Monitoring 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, an RTE alert will be generated (see the section on alerts below).

Route Monitoring is automatically disabled for some exercises. It may be manually disabled in the Display Tab of the Settings Panel.

5.10.11 Amending the Graphic Route

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.

The availability of the Graphic Route is dependent on the radar system in use.

5.10.12 Mouse Click Control

The Mouse Click Control function may be selected in the Exercise Tab of the Settings Panel. 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.

When the function is enabled, to open the Mouse Control Panel, select an aircraft on frequency and type Shift-M, or click the callsign in the track or strip.

The general Mouse Control commands are detailed in the table below. The specific functions available will depend on the sector under control.

Control	Action
Turn	Click L(EFT) , R(IGHT) or F(LY) and click on the desired compass heading. Click the ISSUE button to execute.
Level Change	Click on the assigned level in the level box. Click the ISSUE button to execute. Note that the label Cleared Level (CL) will change. For taxiing aircraft, the level instruction "UNRES" will be available. Note also, changing the level using the drop-down CL menu is equivalent to issuing that level to the aircraft, provide that MCC Levels checkbox is checked. See below for more details.
Tracking/Clearances	Aircraft may be cleared to a waypoint on their planned route by selecting the point from the dropdown menu to the bottom left and clicking DCT .
Frequency Changes	Aircraft may be changed frequency by selecting from the dropdown menu to the bottom right and clicking FREQ .
ILS Clearances	For TMA sectors, an instruction to intercept the localiser and to make an ILS Approach are available by selecting the INT LOC and/or ILS APP options.

To use the Level Change Commands using the CL, the MCC Levels checkbox in the Speech Tab of the Settings Panel must be checked. In this case a left click will issue an immediate instruction to climb or descend, and a right click will issue a conditional (when ready) instruction.

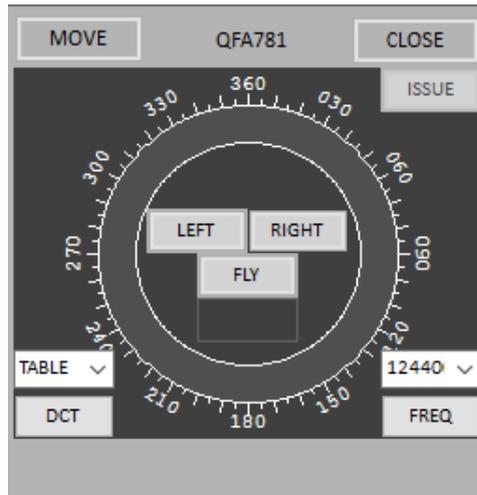


Figure 22. Mouse Click Control Interface

Instructions executed through the use of the buttons at the bottom of the window (tracking direct to waypoints on its flight-planned track and frequency changed) 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.

5.10.13 Trail Information Display

For sectors that have a sequencing function, a trail distance, or aircraft spacing, (in nautical miles or kilometers) is graphically 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 or runway threshold.

This provides some feedback on accuracy of the sequencing. Details of what may be considered an ideal trail are covered fully in supporting courseware.

The section on Trail Distance Parameters details the different distances that are used to determine the accuracy of the sequencing. The colour of the Trail Information Display may change depending on how the achieved distance relates to the Trail Distance Parameters.

5.10.14 The Quick Popup Menu

Where it is available, the Quick Popup Menu is available by left-clicking on the aircraft callsign in the radar label.

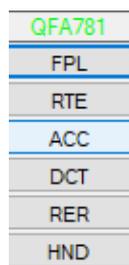


Figure 23. Quick Popup Menu

Depending on whether the aircraft is in controlled state, more or fewer buttons may be available. Generally, for controlled aircraft the following functions are accessible:

- 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
- RER:** Activates Reroute mode to edit the graphic route.
- HND:** Opens the Handover window to activate a handover to another unit or sector.

5.10.15 Reroute Direct window

The Reroute Direct window (below) 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).

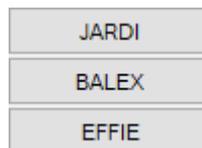


Figure 24. Reroute Direct Window

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 function as follows:

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.

5.10.16 The Handover Window

The Handover Window is used to initiate a handover to another controller. It is activated by selecting an aircraft track and pressing Shift-H or the number-pad + (plus) key. Alternatively, the Quick Popup Menu may be used.



Figure 25. Position Sectors Window for handover

Once button is clicked in window, the aircraft track will commence handing over to the designated sector. The track Display State will change to Handing-Over state. Once it has been accepted by the receiving controller, the Display State will change to Post-Jurisdiction.

5.10.17 Assuming a Track

If a track that is not controlled is selected and then accepted (without being in handover display state), it is said to have been 'assumed'. In this instance, a dialog is shown for confirmation of the action:

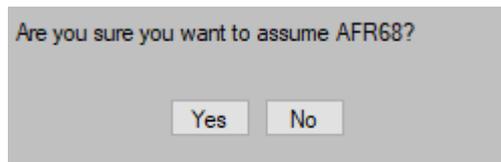


Figure 26. Track Assumption Confirmation

This feature is included for compatibility with operational systems. Track assumption should not be required in VV courseware and will adversely affect the Interface score for the exercise.

5.10.18 Cockpit Data display

The *Cockpit Data* display 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.

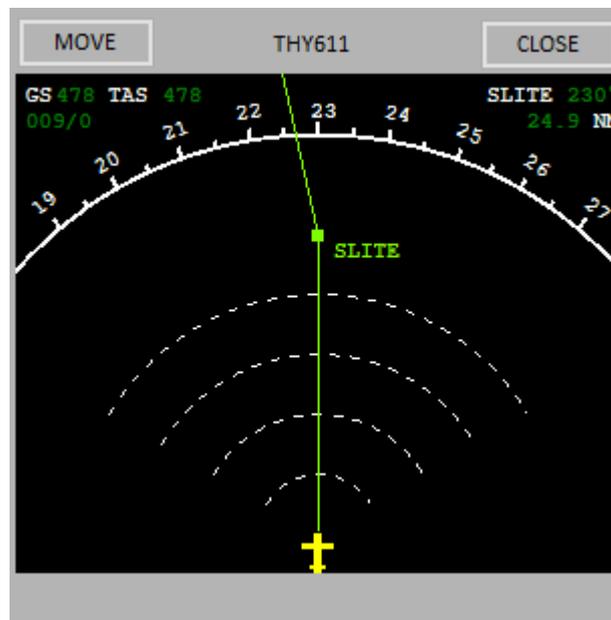


Figure 27. Cockpit Data Display

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.

5.10.19 Aircraft Data display

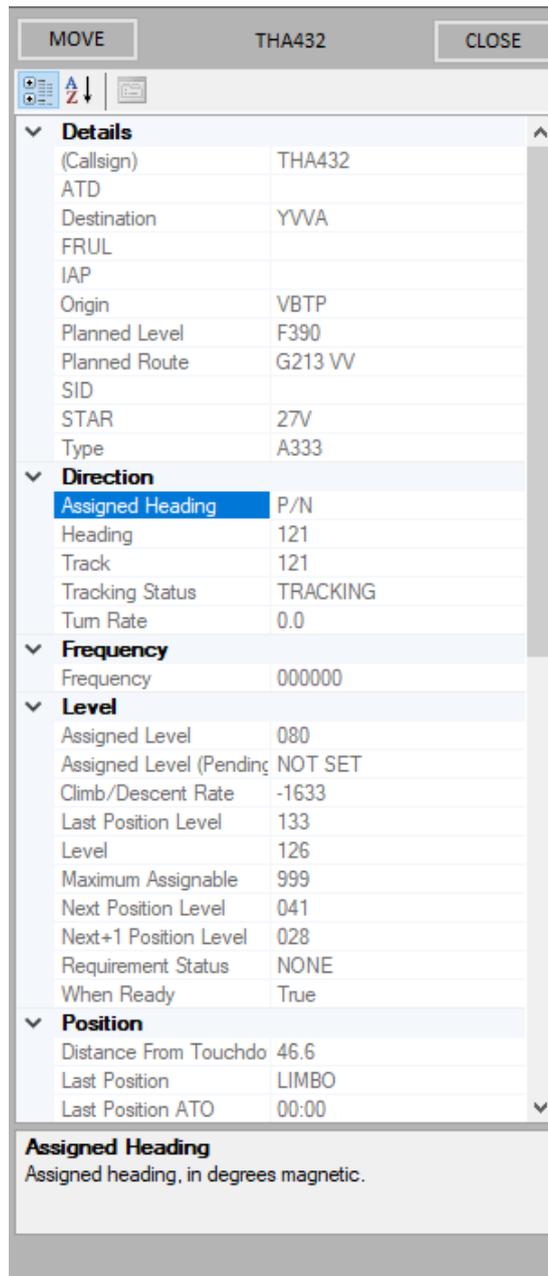


Figure 28. Aircraft Data Display

The *Aircraft Data* display is used for ATC training purposes, and for performance checking purposes. It enables a detailed display of the current flight parameters for an aircraft, enabling any performance variations to be identified. The *Aircraft Data* display is activated by selecting an aircraft track and pressing ALT+P.

5.10.20 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 conflict. 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 approach (CPoA) between the aircraft, or an indication ("NO XING") if the aircraft are predicted not to come any closer than 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 its track. The radius of the circle will be set to the lateral radar standard in use for the sector under control. If a future CPoA is predicted, each aircraft will display a probe extending to that point. The closest distance (in either NM or Km) will be displayed below and to the right of the radar track of the first aircraft selected.

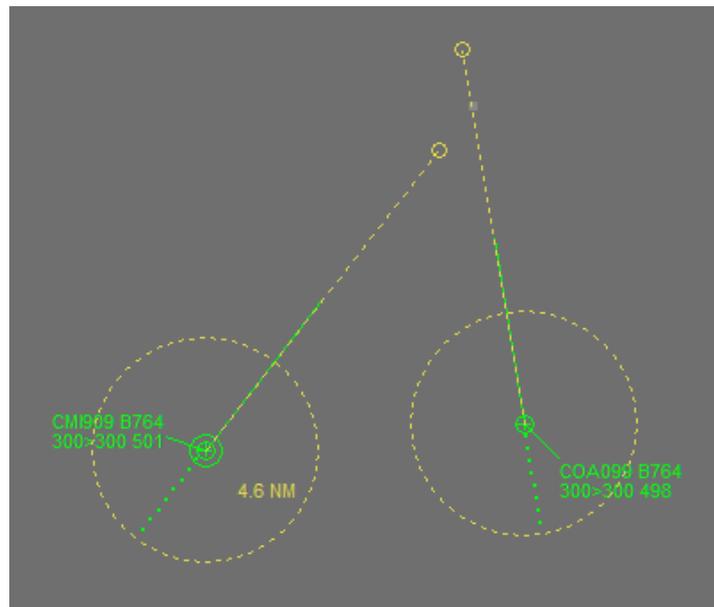


Figure 29. APCA Tool Display

The APCA tool is very useful in high-level crossing sectors in which aircraft are generally flying in straight lines at near-constant speeds. The CPoA 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 APCA tool is shown courseware for training sectors on which it is useful.

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

6 Simulator Functions

6.1 Speech Recognition

The VV Simulator utilises a speech recognition engine that can be trained to a high level of accuracy. Hints for improving accuracy are included in the troubleshooting section of this document. Note that a specific set of control phrases has been assigned for use in the simulator exercises; their use is detailed in the instruction modules. A general set of phrases is included in the appendices.

6.1.1 Standard Recognitions

A Standard Recognition occurs when the speech recognition identifies the spoken phrase with a high level of certainty.

6.1.2 Emulated Recognitions

An Emulated Recognition is a 'best guess' at the spoken phrase using the last hypothesised answer. The Emulated Recognition functionality can cause some issues with some soundcards, so the feature can be disabled on the Speech Tab of the Settings Panel.

6.2 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 Speech Tab of the Settings Panel. 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 the standard Microsoft® Voices. For a system that has other SAPI 5 compliant voices, these are selectable on the Communications Tab of the Settings panel.

6.3 Variable Speed

The speed of the simulator clock can be set from half to double speed. This is done in the Exercise Tab of the Settings Panel:

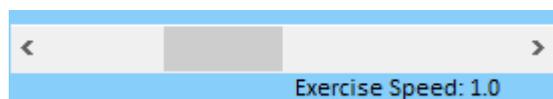


Figure 30. Exercise speed selection

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.

6.4 Rewind Functionality

When an exercise is paused, a slide-bar appears just below the Start/Stop/Continue button on the simulator screen. This enables the exercise to be rewound to an earlier 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 some exercises.

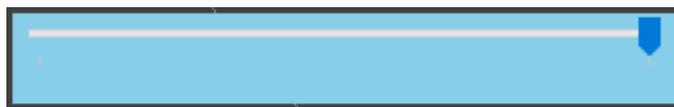


Figure 31. Rewind slide-bar

6.5 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. Previously-recognised phrases may be viewed by opening the drop-down menu. 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. This feature may be disabled in Exercise Tab of the Settings Panel.

6.6 Screen Captures

A screen capture can be taken by first selecting the Show Camera checkbox on the Display Tab of the Settings Panel and clicking the camera icon on the Top Menu. The image will be saved to the Common Data area.

6.7 Airspace Rotation

For generic sectors, the VV Simulator offers the capability of rotating the sector through any angle. This enables the student to experience the same traffic but with a different orientation. The airspace rotation must be complete at the start of the exercise by entering in an angle into the text area on the Airspace Tab of the Settings Panel.

6.8 Custom Runway Positioning

Some TMA/Approach exercises may be configured to allow a parallel runway to be added. The positioning of the runway is settable with reference to the existing runway in the exercise. This enables the simulation of real world parallel runway operations using generic exercises.

The custom runway is positioned at the start of the exercise on the Airspace Tab of the Settings Panel.

6.9 Axis Stretching

Some ATC sectors that have a role in precision approach monitoring require a presentation on which the cross-runway distances are greatly skewed so that small lateral offsets are easily detectable. This *Axis Stretching* feature is available in the VV Simulator but will only be available for sectors that have this function. It may be disabled in the *Airspace Tab* of the *Settings Panel*.

6.10 Trail Measurement

To aid in the teaching of sequencing, a sector may be configured to measure the trail distances between aircraft through an arrival gate or landing at a runway. When the first aircraft passes the gate, or touches down, a Trail Display will appear on screen.

6.10.1 Trail Distance Parameters

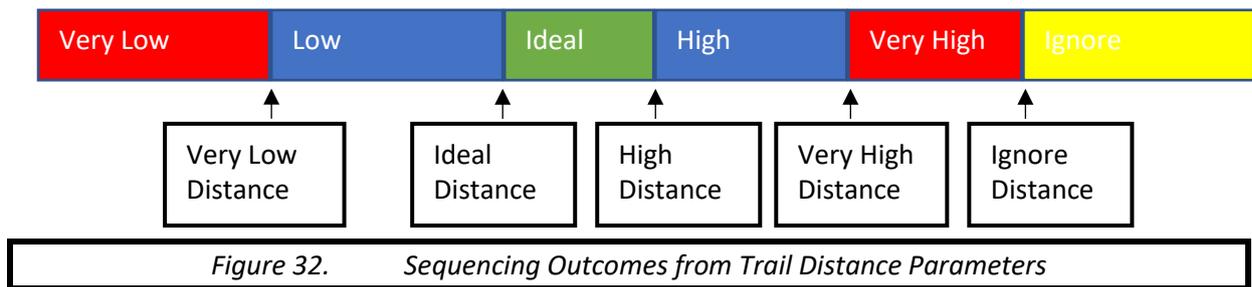
For each gate or runway threshold, a set of distances is defined to gauge the performance in sequencing the aircraft. These distances are defined in the sector file and may be overridden in the exercise file. They may also be set in the Settings Panel. These include:

- Very Low Distance: A distance in nautical miles or kilometres below which the sequencing outcome is poor;
- Ideal Distance: A distance in nautical miles or kilometres that represents the target distance. Below this distance, the outcome is not ideal;

- High Distance; A distance in nautical miles or kilometres that represents the upper level of the target distance. Above this distance, the outcome is not ideal;
- Very High Distance: A distance in nautical miles or kilometres above which the sequencing outcome is poor;
- Ignore Distance: A distance in nautical miles or kilometres above which aircraft are ignored for trail assessment.

Because the Trail Distance Parameter are adjustable, their values are reported for each exercise in performance data files.

The diagram below shows the sequencing outcomes that are reported based on the Trail Distance Parameters.



6.10.2 Exit Level Checks

For aircraft proceeding through an arrival gate, the level to be assigned to the aircraft may be defined as part of the sector and exercise files. Correctness in managing the exit level is recorded and stored as part of performance data.

6.10.3 Exit Frequency Checks

For aircraft proceeding through an arrival gate or landing, the frequency to be assigned to the aircraft may be defined as part of the sector and exercise files. Correctness in issuing the exit frequency is recorded and stored as part of performance data.

6.10.4 Strip Order Checks

For aircraft proceeding through an arrival gate or landing, the maintenance of a correct strip display may be required. Details on specific requirements would be outlined in course material. Compliance in the task is recorded and stored as part of performance data.

6.10.5 Exit Sector Checks

For aircraft proceeding through an arrival gate, the handoff sector may be checked. Details on specific requirements would be outlined in course material. Compliance in the task is recorded and stored as part of performance data.

6.11 Instruction Delays

An Instruction Delay is the amount of elapsed time between when a control action is received and when it is acted upon by the pilot. This delay is typically around five seconds and is encoded into the Exercise file for each aircraft.

In the VV Simulator, there are three categories of Instruction Delay, each with its own value defined in the exercise file.

Note that although each aircraft in the exercise may have its own unique delay value, this is not done in VV Courseware, with all aircraft have the same delay values. The only reason to specify a unique delay to an aircraft in an exercise would be for a specific learning outcome; for instance, demonstrating the effect that a slow-responding pilot can have.

It is possible to randomise the length of the delay in the Aircraft Tab Settings Panel. Setting specific delays to be applied to all aircraft (and overriding the exercise values) can also be done here.

6.11.1 Turn Delays

The Turn Delay is applied to vectoring instructions. The Turn Delay is level dependent, and in VV Courseware has the value 5 seconds below F300 and 8 seconds above this.

6.11.2 Level Delays

The Level Delay is applied to level change instructions. The Level Delay is level dependent, and in VV Courseware has the value 5 seconds below F300 and 10 seconds above this.

6.11.3 General Delays

The General Delay is applied to all instructions that do not involve a turn or a level change. This includes speed control, reporting, squawking codes. The General Delay is not level dependent, and in VV Courseware has the value 5 seconds.

6.12 Aircraft Performance Variation

Each aircraft in a simulator exercise has a defined performance data based on real-world profiles. For demonstration purposes, or for fine control of aircraft behaviour in research work, it may be desirable to fix aircraft performance figures. This is possible in the Aircraft Tab of the Settings Panel. Turn, climb and descent rates for all aircraft in the exercise can be fixed here.

6.13 Airline Management

Much of VV Courseware includes generic exercise containing a mix of aircraft types and airline companies. By their nature, the services provided by these companies tend to be regional in nature. For this reason, the VV Simulator provides the functionality to replace airline companies with ones that fly locally. There is a flexible system for ensuring that airlines are included, or positively excluded from simulator exercises.

There is a search and replace function that enables, for each aircraft in the exercise, the replacement of any airlines to be excluded with one that is to be included. Where possible, the airline type is preserved so that this is consistent with aircraft being flown by these companies.

This is particularly useful for including local airlines into exercises and excluding those that have a telephony that may be hard to pronounce for some users.

The Airline Management function is configured on the Aircraft Tab of the Settings Panel. See that section for full details on how it operates.

Note that airline conversion data is stored in the Common Data Area.

6.14 Screen Functions

6.14.1 Second Radar Window

The VV Simulator has the facility for the display of a second radar window, opened by clicking the 2W button on the Side Menu.

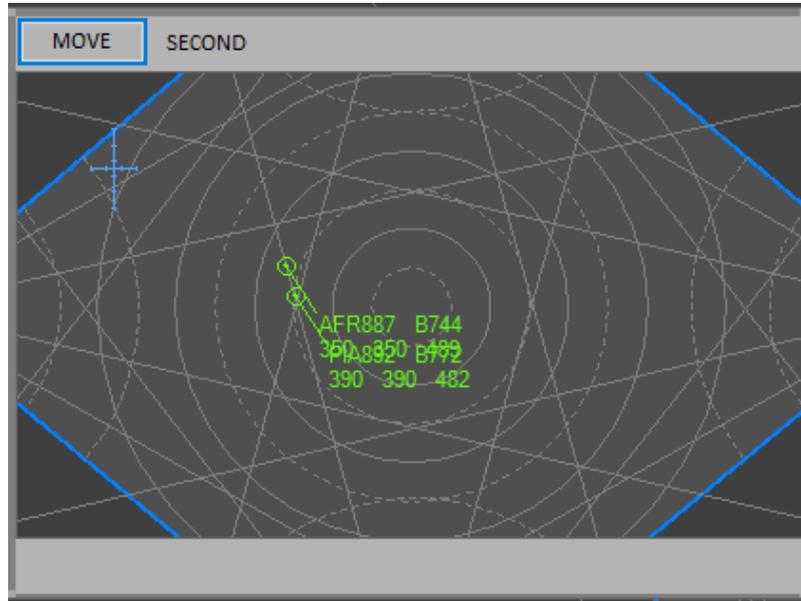


Figure 33. The Second Radar Window

This window may be relocated by left-clicking and the MOVE button and moving the mouse while the button is down. Resizing is done by positioning the mouse above the frame of the window and dragging, once again with the left-mouse button held down.

Once the mouse cursor is positioned within its border, the centre and range of the Second Radar Window display can be altered with the standard keystrokes for this (arrow keys, page-up, page-down and home).

Apart from the Compass Rose, the other graphic screen functions outlined in the section below are available on the *Second Radar Window*.

For some simulator exercises, a filter checkbox is available which, when selected, will remove some radar tracks and maps to remove clutter

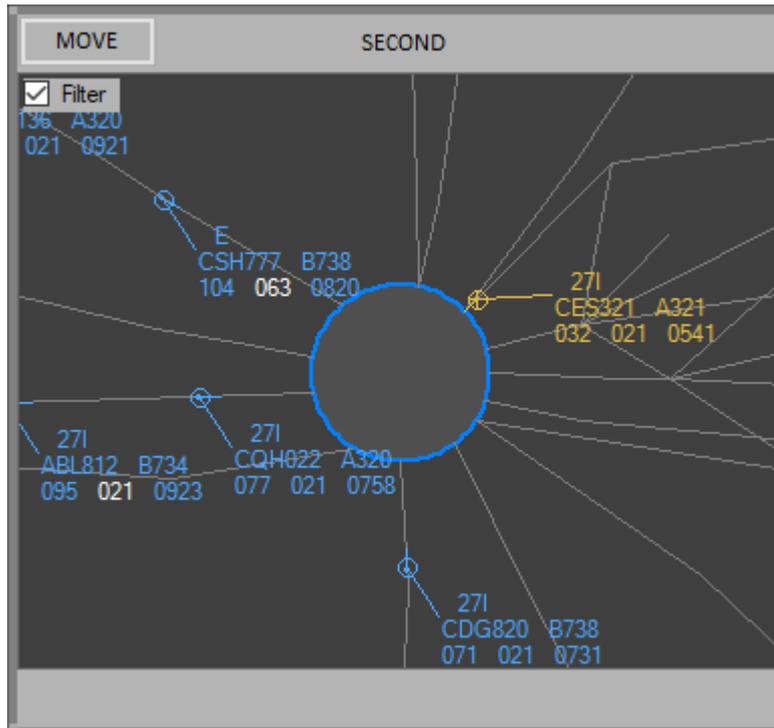


Figure 34. Filtering the Second Radar Window

6.14.2 Bearing and Range Line (BRL)

The Bearing and Range Line is a commonly-used tool in the VV 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.

6.14.3 Range Rings

A set of Range Rings may be displayed on the Main Display and the Second Radar Screen, by selecting them on the Display Tab of the Settings Panel. *Range Rings* 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.



Figure 35. Range-ring configuration

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 *Colours Tab* of the *Settings Panel*.

6.14.4 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). These greatly assist the visual assessment of aircraft headings. The method of doing this is shown in the VV courseware.

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.

The Compass Rose may be automatically deselected for some simulator exercises.

6.14.5 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 on the Display Tab of the Settings Panel

6.14.6 Scale Marker

The Scale Marker is a symbol used to provide a distance reference on the radar screen. Its visibility is selectable on the Display Tab of the Settings Panel.

The dimensions of the Scale Marker will vary depending on the radar system in use, but is generally 6NM by 10NM, with indicators at 2nm intervals.

6.14.7 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.

6.14.8 Centreline Marker

For TMA sectors, the capability to display the nominal position of an aircraft inbound to an aerodrome is available in the form of a Centreline Marker. The marker is positioned on the extended centreline of the runway and is labelled with the aircraft callsign. The Centreline Marker is only available for inbound aircraft that are operating under pilot navigation.

To select the marker, first enable VV Visual Aids on the Exercise Tab of the Settings Panel.

Then select an aircraft track and press C.

The Centreline Marker will update with each surveillance update. Press C again to remove the marker.



Figure 36. Centreline Marker

6.15 Special Exercises

6.15.1 Simulator Task Trainers

A Simulator Task Trainer is a short exercise that provides instruction and practice in common simulator functions. A panel containing a check-list of functions is displayed.

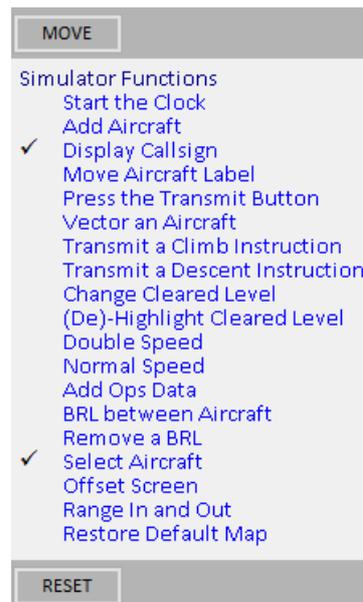


Figure 37. Simulator Task Trainer presentation

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 bottom left.

6.15.2 Test Exercises

Some exercises are designated as Test Exercises. For these, the exercise may not be paused and the student is required to complete it in one sitting. At the commencement of the exercise, the student is presented with a dialog that require acceptance of the commencement of the exercise.

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 bottom left.

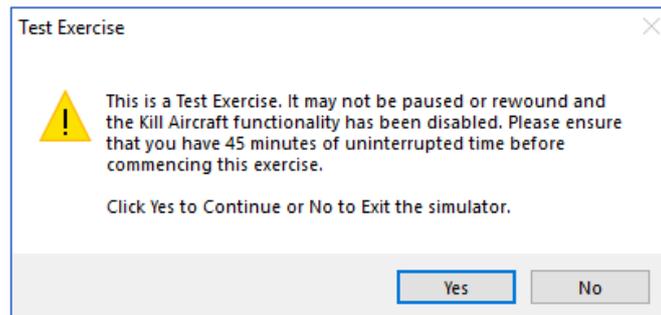


Figure 38. Test Exercise Dialog

6.15.3 Exercises with Limited Functionality

Some exercises in VV Courseware 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.

6.15.4 Target Exercises

Target exercises are designed for training in heading selection. During the exercise a series of targets will appear on the screen with the objective to vector an aircraft to fly towards the target.

Following the completion of the Target scenario, a graphic will be drawn indicating the angular difference between the chosen heading and the bearing of the aircraft to the target.

One of four outcomes will eventuate:

- **Excellent:** For headings within 10 degrees of the required heading;
- **Very Good:** For headings within 15 degrees of the required heading;
- **Good:** for headings within 20 degrees of the required heading;
- **Keep Trying:** For other outcomes.

These outcomes are stored in performance data and contribute to the score achieved in the exercise.

6.15.5 Maze Exercises

Maze exercises are designed for training in vectoring procedures, scanning, task management and separation. Aircraft are required to be vectored within airspace boundaries, and within a band of levels.

6.15.6 Random Exercises

Some exercises are provided in VV Courseware that provide randomly generated traffic. Airlines used in the exercises are generated from the Airline Selection process that is configured in the Aircraft Tab of the Settings Panel.

6.15.7 Primer Exercises

Primer Exercises are designed to provide a running set of instructions on what actions the user is expected to perform. This is ideal for training in interface management and in simple, repetitive control tasks.



Figure 39. Primer presentation

Primer exercises are structured to require the use to perform specific tasks. These include:

- Interface tasks, such as opening windows or clicking certain interact elements;
- Track tasks, including CFL changes and reroutes; and
- Control tasks, such as issuing voice instructions or performing coordination.

Tasks may be grouped into a logical, sequential group called a sequence. Sequences must be performed in the correct order and may contain prohibited tasks that should not be performed. These may be used to train for the correct processing of a complex set of tasks, such as issuing a level change with attendant interface changes.

The performance of individual tasks and sequences are recorded and stored in the Performance Record.

Note that Primer exercises differ from Task Trainer exercises in that Primer tasks are presented dynamically as the exercise unfolds and these tasks are required to be completed in a certain order. Task Trainer tasks are designed for interface familiarisation only. They are all available at the start of the exercise and may be completed in any order.

6.15.8 Circuit Exercises

Circuit Exercises are normally included TMA/Approach training to practice the process of vectoring a departing aircraft back to the runway for landing. In these exercises, an instruction is given to a Tower controller to approve a departure, and then this aircraft is vectored around a standard circuit pattern and allowed to land again, either via a visual or instrument approach procedure.

6.15.9 Time Arrival Exercises

Time Arrival Exercises are designed to teach the sequencing of aircraft through a gate at a nominated time. These exercises make use of the Arrival Management System and require students to make use of holding and vectoring techniques to achieve the correct outcomes.

Student performance in the processing of Time Arrivals is measured and stored in performance data files. See the Scoring section for details on the metrics that are recorded.

6.15.10 Sub-Scenario Exercises

The VV simulator may be configured to present many different sub-scenarios within the one exercise. Short scenarios can be present that target a specific competency. Compromised Separation exercises are an example of this.

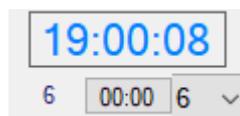


Figure 40. Clock Presentation for Sub-Scenario Exercises

Depending on the exercise, each sub-scenario may be selectable through a drop-down menu located near the clock. The sub-scenario number is also presented below the clock. Clicking this number will advance to the next sub-scenario. Right-clicking will advance by five sub-scenarios.

In some exercises, manual selection of sub-scenarios will be disabled. In this case, the exercise will be advanced to the next sub-scenario based on trigger conditions, for example:

- Elapsed time;
- A task, such as an HMI action or a control instruction being completed;
- An aircraft configuration, such as landing or passing a certain level;
- When a compromised separation issue has been resolved.

These conditions will be detailed in course content.

7 Script Events

Simulator exercises may contain scripted events that are triggered to occur based the simulator time.

7.1 System Script Events

7.1.1 Window Open/Close

Interface windows may be scripted to open and close, wither to set up a display at the start of a simulator session or as part of an instructional demonstration.

7.1.2 Runway Open Close

Runways may be scripted to open and close for the processing of landing and departing aircraft.

7.1.3 *Surveillance Changes*

Elements that contribute to surveillance coverage, such as radar heads and ADSB aerials can be scripted to fail and return to service.

7.2 *Communication Script Events*

7.2.1 *Coordination Exchange*

A coordination call from another controller can be scripted to occur.

7.2.2 *Transmission*

A transmission from a source not in the exercise, such as a general emergency call or a nuisance call can be scripted.

7.2.3 *Play Audio*

An audio clip can be played as part of a script. This would normally be for instructional purposes.

7.3 *Graphic Script Events*

7.3.1 *Shapes*

The simulator has the capability of drawing various shapes as a means of adding an instructional overlay to the simulator session. These shapes include:

- Lines;
- Circles;
- Arrows;
- Rectangles; and
- Text.

The shapes may be animated on entry and exit and may be locked to a geographical or screen position. They may also be scaled based on geographical or screen measurements.

7.4 *Question Script Events*

Quiz questions can be scripted to appear as an overlay to the simulator screen. Outcomes are recorded as part of performance data.

7.5 *Aircraft Script Events*

Rather than just using a start time, aircraft script events can make use of a wide range of factors to trigger the event. These triggers include:

- Ready for engine start;
- Ready for pushback;
- Ready for taxi;
- Taxying;
- Ready for departure;
- Commencing take-off;
- Becoming airborne;
- Passing an altitude
- Maintaining an altitude;

- Passing a position;
- Maintaining a heading
- Landing.

7.5.1 CL Window On/Off

The opening and closing of the aircraft's cleared level (CFL/CL) window may be scripted for constructing demonstrations scenarios.

7.5.2 Descend/Climb

The aircraft may be instructed to descend or climb.

7.5.3 Direct Window On/Off

The opening and closing of the aircraft's direct popup window may be scripted for constructing demonstrations scenarios.

7.5.4 Alert On/Off

Individual track alerts (such as the conflict alert) may be scripted to be activated or deactivated.

7.5.5 FDR Handover

The aircraft track alerts may be scripted to commence a handover to a defined sector.

7.5.6 Label Data

The aircraft's may be scripted to contain a certain text value.

7.5.7 Report

The aircraft may be scripted to make a report, such as an emergency beacon or hazard report.

7.5.8 Request

The aircraft may be scripted to make a request, such as a level change or amended destination request.

7.5.9 Set CL

The aircraft's Cleared Level (CL/CFL) may be set via a script entry. may be scripted turn on and off the altitude function.

7.5.10 Squawk Altitude On/Off

The aircraft's transponder may be scripted turn on and off the altitude function. This is to simulate transponder failure and for training in level verification.

7.5.11 Squawk Code

The aircraft's transponder may be scripted to change to a certain code.

7.5.12 Squawk Ident On/Off

The aircraft's transponder may be scripted to commence or complete a Special Position Indicator (Ident) squawk.

7.5.13 Track Offset

The aircraft's position may be set so the transponder reports an offset position from the actual position.

7.5.14 Transponder Offset

The aircraft's transponder may be scripted to read an incorrect value as an offset of the aircraft's real altitude. This is to simulate transponder errors and to train in level verification.

7.5.15 Transponder On/Off

The aircraft's transponder may be scripted to be on or off to simulate a transponder fail.

7.5.16 Vector

The aircraft may be scripted to commence a vector to a defined heading.

7.5.17 WX Selection On/Off

8 Settings Panel

The Settings Panel is opened by clicking the Setup button to the top right of screen. In some radar systems, a cog icon is used.

Contained in the Settings Panel are nine tabs that contain a range of options for configuring the VV simulator. All settings are stored for each Windows Account. Where the same Windows Account is used for multiple user, such as on a shared computer or a shared student account, the settings (with the exception of those on the Exercise Tab) may be locked so that changes do not affect other users. Whether the settings are locked is dependent on the installation.

8.1 The About Tab

The About Tab contains copyright and versioning information. It also contains a text entry area for unlocking the settings.



Figure 41. About Tab

8.1.1 Unlocking Settings

Some installations will disable the ability to change settings to ensure that the same training experience is available for each student. If so, the settings can be unlocked by entering a password into the textbox to the bottom of the Exercise Tab. The password may be customised to the installation but is normally **settings!!**

8.2 The Exercise Tab

The Exercise Tab contains a range of settings that are commonly used. They are not subject to locking.

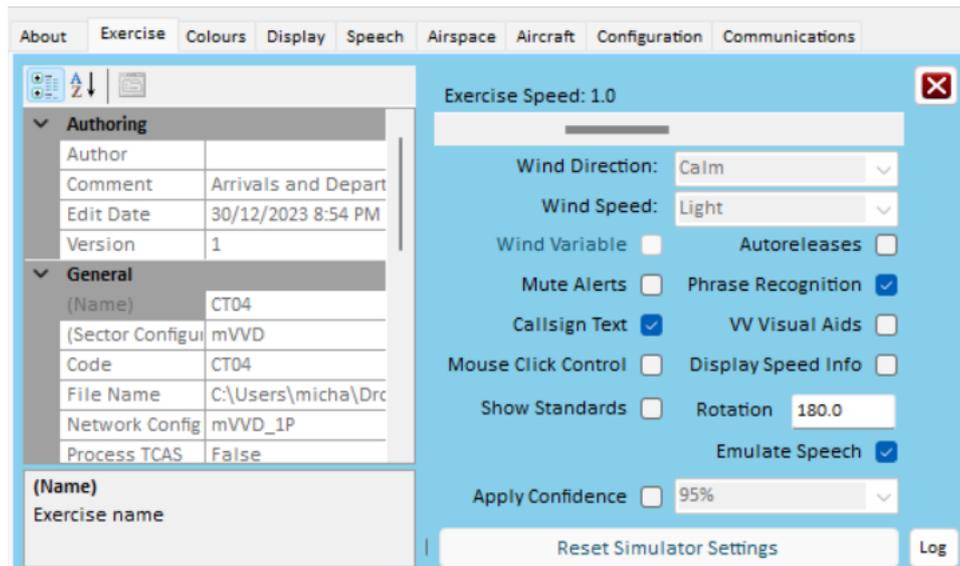


Figure 42. Exercise Tab

8.2.1 Exercise Properties

To the left of the Exercise Tab, a property grid contains detailed information about the exercise that has been loaded. These properties are read-only, and contain authoring and versioning information.

8.2.2 Exercise Speed Scrollbar

The exercise speed may be varied from between 0.5 and 2.0 by adjusting the Exercise Speed Scrollbar.

8.2.3 Wind Settings

The wind direction, speed and variability may be set here. Note that, for training purposes, some exercises may not allow the capability of changing the exercise wind.

8.2.3.1 Wind Direction

This setting specifies the wind direction. Eight compass points and 'calm' are the available settings.

8.2.3.2 Wind Speed

This setting specifies the wind speed. Two settings, 'light' and 'strong' are available.

8.2.3.3 *Wind Variable*

This setting specifies whether the wind is variable through the exercise. If set, the wind changes slightly in azimuth and speed over time.

8.2.4 *Autoreleases*

Enabling this setting will result in aircraft departing without the requirement for a release approval. This is applicable for Approach+Departures simulation in the TMA environment.

8.2.5 *Mute Alerts*

When this checkbox is checked, aural alerts will be disabled. This may be useful in an environment where such alerts are diverted to the speaker and there are multiple users.

8.2.6 *Phrase Recognition*

Disabling this will remove the Phrase Recognition Display and Transmission History from the main display. This is recommended in later stages of training to encourage active listening of readbacks.

8.2.7 *VV Visual Aids*

For sectors that support VV Visual Aids, selecting this checkbox will allow them to be utilised. In this version of the VV Simulator, the Centreline Marker feature will be enabled when this checkbox is ticked.

8.2.8 *Callsign Text*

The Callsign Text feature allows radiotelephony callsigns to be displayed when the mouse is hovered over the label. It allows users to learn these callsigns but is not normally a part of operational systems. Disabling this checkbox will disable to feature.

8.2.9 *Display Speed Info*

This feature allows a popup window displaying speed information to be shown when the radar track groundspeed is clicked. For some exercises this feature may be unavailable.

8.2.10 *Mouse Click Control*

Selecting this checkbox will enable mouse click control, which enables instructions to be issued to aircraft with the mouse rather than by voice. If the MCC Levels checkbox in the Speech Tab is also checked, then a level clearance will also be issued with a CL/CFL change.

8.2.11 *Show Standards*

Selecting this checkbox will result in the separation standards applicable for the exercise to be displayed on the Top Menu. It may not be available for some installations.

8.2.12 *Rotation*

Entering an angle in the Rotation textbox will result in generic sectors being rotated, resulting in a different traffic configuration. The north to south direction of 180 degrees is the reference orientation. Once a new figure is entered, the reference orientation will be rotated to that position. So, an entry of 190 will rotate the clockwise 10 degrees. An entry of 360 will rotate the map 180 degrees.

The map may only be rotated once. In addition, once the exercise has begun the map may no longer be rotated.

8.2.13 Speech Tuning Settings

Some adjustments may be made to the Speech Recognition function in this area:

8.2.13.1 Emulate Speech

Enabling this setting allows the speech engine to make a best guess at a failed recognition. Normally this will improve performance, but some soundcards may cause a lockup when the function is initiated. Should such behaviour be observed, this setting should be disabled.

8.2.13.2 Apply Confidence

Enabling the Apply Confidence will force the speech engine to reject some utterances that have a low confidence. This should be used if the speech engine is incorrectly recognising phrases that used incorrect words or phrases.

Confidence levels ranging from 65% to 97.5% are available in the dropdown list.

8.2.14 Resetting Simulator Settings

The *VV Simulator* maintains a persistent copy of the simulator settings for each Windows Account. Clicking the bottom button will reset all settings to their default values.

8.2.15 Log Function

Clicking the Log button to the bottom right will cause performance and debug information to be logged to file. On completion of the exercise, a button will appear on the Termination Panel allowing the folders containing the log files to be opened.

8.3 The Colours Tab

The *Colours Tab* allows the capability of changing the colours of various elements of the display.

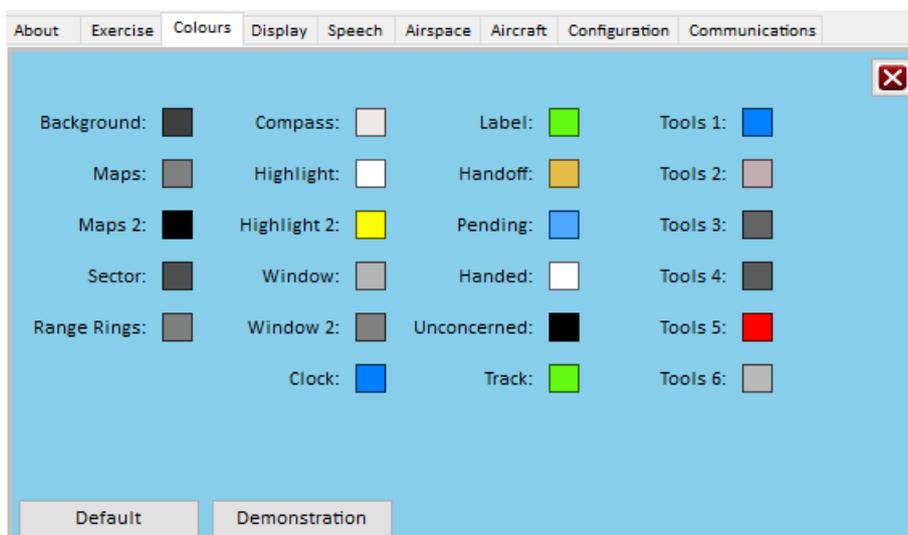


Figure 43. Colours Tab

To change a colour, simply click on one of the colour swatches and a dialog will open:



Figure 44. Colour selection

Select the desired colour or construct a custom colour defined by HSL or RGB by clicking **Define Custom Colors >>**. Click **OK** to assign the new colour.

Any new colour will be saved and used for each subsequent simulator session. Clicking **Default** in the *Colours Tab* will revert the colours back to default values. Clicking **Demonstration** will configure the palette to colours used in VV Training content.

The assignment of colours to various display elements will vary, depending on the radar system in use. The following details are applicable to the default VV radar system.

8.3.1 Background

This is the colour of the display background.

8.3.2 Maps

This is the primary colour used in airspace maps, air routes and position labels.

8.3.3 Maps2

This is the secondary colour used in airspace maps.

8.3.4 Sector

This is the colour used as the infill on sector maps.

8.3.5 Range-Rings:

This is the colour used for drawing range-rings.

8.3.6 Compass

This is the colour used for drawing the compass or azimuth rose.

8.3.7 *Highlight*

This is the colour used for highlighting tracks and map features.

8.3.8 *Highlight2*

This is a secondary colour used for highlighting tracks and map features. It is used in the display of the APCA tool and in the Centreline Marker.

8.3.9 *Window*

The Window colour is used in some radar systems in displaying the framing of the display.

8.3.10 *Window2*

This is used in some radar systems as a secondary colour in displaying the framing of the display.

8.3.11 *Clock*

This is the colour used in displaying the clock when the simulator is running.

8.3.12 *Label*

This is the colour used for controlled (jurisdiction) aircraft tracks and labels.

8.3.13 *Handoff*

This colour is used for aircraft labels and tracks that are handing off between controllers.

8.3.14 *Pending*

This colour is used for aircraft labels and tracks that are pending (announced).

8.3.15 *Handed*

This colour is used for aircraft labels and tracks that have been handed to another controller.

8.3.16 *Unconcerned*

This colour is used for aircraft labels and tracks that are not of concern to the controller.

8.3.17 *Track*

This colour is used in some radar systems for aircraft tracks.

8.3.18 *Tools1-Tools6*

These colours are used as extra colours in display maps.

8.4 *The Display Tab*

The *Display Tab* contains settings for a range of display elements.

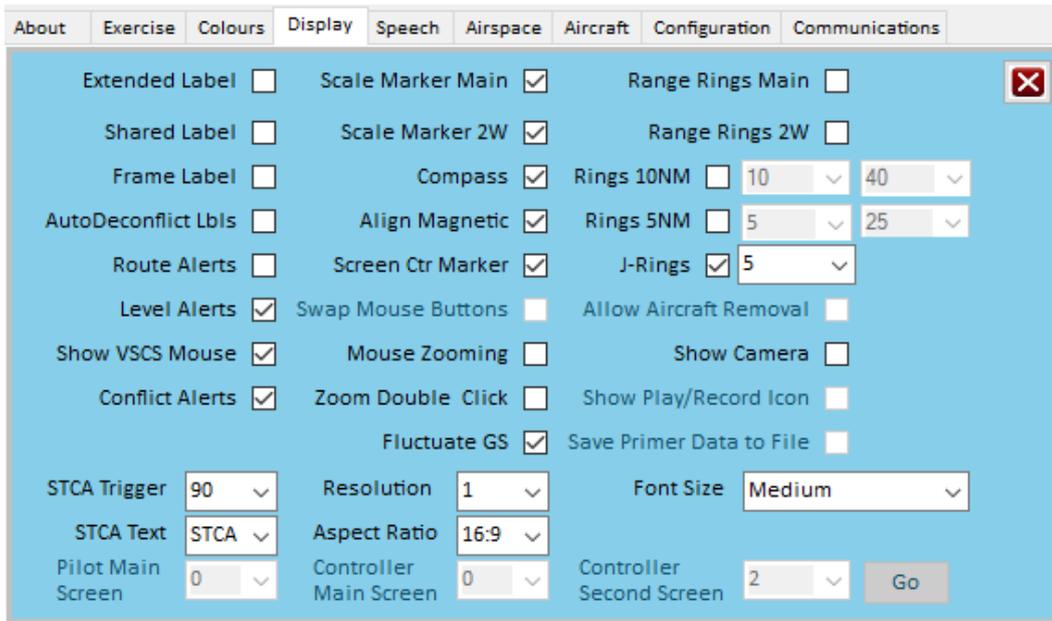


Figure 45. Display Tab

8.4.1 Extended Label

Where the radar system supports this function, selecting *Extended Label* will display extra or alternative information in the radar label. Depending on whether *Shared Label* is selected, extra information may also be available.

8.4.2 Scale Marker Main

This setting enables or disables the display of the *Scale Marker* on the main screen.

8.4.3 Range Rings Main

This setting enables or disables the display of the *Range Rings* on the main screen.

8.4.4 Shared Label

Where the radar system supports this function, selecting *Shared Label* will result in the label containing two separate data blocks, each with separate data elements, such as destination code, aircraft type, and weight category. The label will flash between the two different sets of information about once every second.

8.4.5 Scale Marker 2W

This setting enables or disables the display of the *Scale Marker* on the *Second Window*.

8.4.6 Range Rings 2W

This setting enables or disables the display of the *Range Rings* on the *Second Window*.

8.4.7 Frame Label

The default VV radar system makes use of a mouse-drag to move the label, whereas some radar systems use a label relocation method in which the label is moved 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.

8.4.8 *Compass*

This setting enables or disables the display of the *Compass* (Azimuth Rose) on the main screen.

8.4.9 *10NM Range Rings Display and Selection*

Selecting the *Rings 10NM* checkbox will result in range rings being displayed on the main and second screen (subject to the selection of the *Range Rings Main* and/or *Range Rings 2W* checkboxes). Range rings at 10NM intervals are displayed between the minimum and maximum radii defined in the adjacent drop-down combos.

For metric exercises, the radial differences will be in 20km increments.

8.4.10 *Display Speed Info*

Selecting this will enable use of the *Speed Info* display feature 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.

8.4.11 *Align Magnetic*

This feature allows the radar map alignment to be changed between Magnetic and True north. Default setting is Magnetic North and that may be changed to True North here.

8.4.12 *5NM Range Rings Display and Selection*

Selecting the *Rings 5NM* checkbox will result in range rings being displayed on the main and second screen (subject to the selection of the *Range Rings Main* and/or *Range Rings 2W* checkboxes). Range rings at 5NM intervals are displayed between the minimum and maximum radii defined in the adjacent drop-down combos.

For metric exercises, the radial differences will be in 20km increments.

8.4.13 *AutoDeconflict Labels*

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

8.4.14 *Screen Ctr Marker*

This setting enables or disables a small circular marker that is placed in the centre of the main screen. This marker is useful for training in heading selection.

8.4.15 *J-Rings Display and Selection*

This section allows individual aircraft J-Rings to be displayed. The checkbox determines whether the J-Rings are globally displayed. The dropdown combo allows the radius of the J-Rings to be selected.

8.4.16 *Route Alerts*

The Route alert (displayed in the label as RTE or RAM depending on the radar system) is an indication that the aircraft is operating off-track by a certain margin.

The alerting may be disabled by deselecting the checkbox. This may be desirable in some simulator exercises that require a lot of vectoring.

Note that for some simulator exercises, this function will be disabled.

[8.4.17 Swap Mouse Buttons](#)

This feature allows for the left and mouse buttons to be swapped for accessibility reasons. Depending on the version of the *VV Simulator*, this may be disabled.

[8.4.18 Allow Aircraft Removal](#)

The Aircraft Removal (Kill) function allows aircraft to be removed from the exercises, normally for better training outcomes. Checking this checkbox will disable the ability to perform the function. In Test Exercises this feature is unavailable. In some installations this feature may be unavailable.

[8.4.19 Level Alerts](#)

This checkbox will enable and disable the level alerting function, which is used in Maze exercises.

[8.4.20 Mouse Zooming](#)

This setting enables and disables the *Mouse Zoom* function.

[8.4.21 Show Camera](#)

Selecting the Show Camera checkbox will result in a camera icon being displayed to the top of the display. Clicking the camera will result in a screen capture being taken. See the section on Screen Captures for more information on this.

[8.4.22 Show VSCS Mouse](#)

Some installations for the *VV Simulator* may have the facility for a separate voice switch (VSCS) screen. Where this screen has been designated a touchscreen, the cursor can be hidden by deselecting this setting. This prevents touches on the VSCS resulting in a movement of the mouse cursor.

[8.4.23 Zoom Double Click](#)

Enabling this function will result in the *Mouse Zoom* function requiring a double-click for activation. This may be useful for users with poor mouse skills or for whom the *Mouse Zoom* function is unfamiliar.

[8.4.24 Show Play/Record Icon](#)

The *VV Simulator* has the capability of recording tasks used for creating a Primer, and for making a screen recording of a scenario. Selecting this setting will result in a play/record icon being shown, allowing the recording process to commence or replay.

This feature may not be available in some installations.

[8.4.25 Conflict Alerts](#)

For some simulator exercises, it may be desirable to disable conflict alerting. This may be done by unchecking this setting.

8.4.26 *Save Primer Data to File*

If this setting is selected, user actions will be recorded so that they may be later used in a Primer exercise.

This feature may not be available in some installations.

8.4.27 *STCA Trigger*

This sets the number of seconds before a projected loss of separation that a conflict alert will occur.

8.4.28 *Resolution*

For high resolution screens, Windows may scale screen rendering which may affect to capture of screenshots. If this occurs, it may be rectified by experimenting with the Resolution setting.

8.4.29 *Aspect Ratio*

This setting should be changed to reflect the aspect ratio of the monitor in use so that radar maps are displayed correctly. See the section on Aspect Ratio for more information.

8.4.30 *Font Size*

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

8.4.31 *STCA Text*

Some radar systems make use of different text indications of conflict alerts. This setting allows this presentation to be changed.

8.4.32 *Assigning Screens*

The set of three combo-boxes at the bottom of the Display Tab are used when the VV Simulator is being run with a multi-screen setup. Where a single screen is being used, or if the radar system is designed for only a single screen, this functionality will be disabled.

The VV Simulator screens can be configured as following:

- For a Pilot position, two screens are available. The Main screen can be configured to position 0 or 1. The second screen will default to the other position;
- For a Controller position, three screens are available. These are normally a Main screen, a Secondary screen and a VSCS screen. Where available, it allows the Pilot position to be configured to one of two screens, and the controller screens to be configured

Once the desired screen configuration is selected, the change is made by clicking the **Go** button.

8.5 *The Speech Tab*

The Speech Tab is used for configuration of the speech recognition and speech synthesis functions, as well reporting on the response to speech commands.

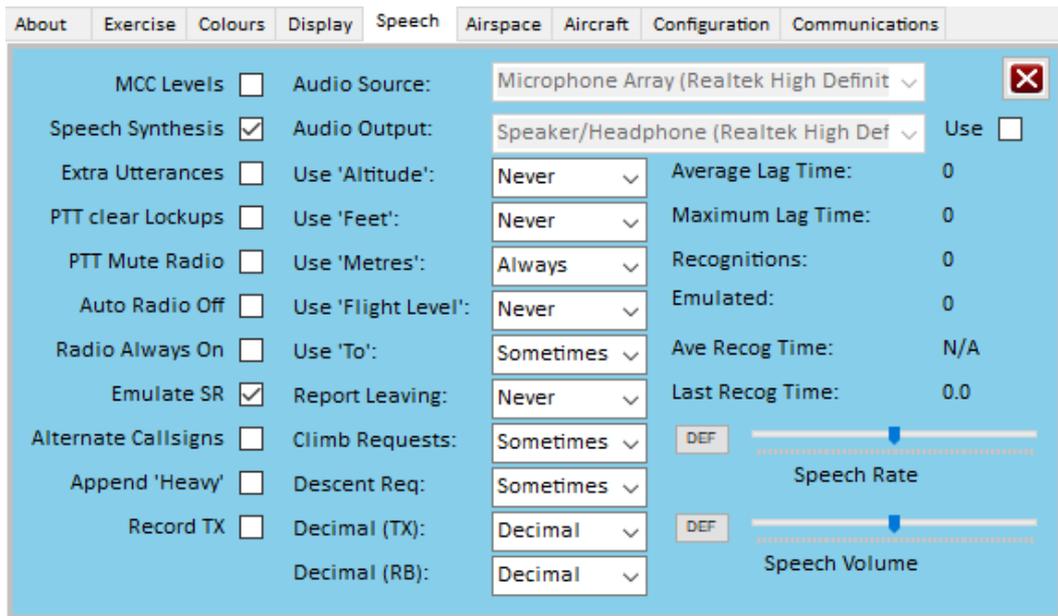


Figure 46. Speech Tab

8.5.1 MCC Levels

Checking this setting will allow the Mouse Click Control function to be utilised for level changes. When the Cleared Level (CL/CFL) is changed in the label, this level will be issued to the aircraft as if it had been issued by voice. This requires the Mouse Click Control feature to be enabled in the Exercise Tab.

8.5.2 Audio Source

This dropdown menu allows for the selection of microphone for the speech recognition system. Depending on the installation, the selection function may be disabled. If so, the audio source may be set in the Speech Properties on the main course interface.

8.5.3 Speech Synthesis

The generation of speech synthesised readbacks by aircraft and controllers may be disabled with this setting.

8.5.4 Audio Output

This dropdown menu allows for the selection of speaker for the speech synthesis system. Depending on the installation, the selection function may be disabled. If so, the audio output may be set in the Speech Properties on the main course interface.

8.5.5 Extra Utterances

For realism, the VV Simulator has been programmed with extra utterances such as “OK” and “Willco” that may not always be strictly standard phraseology. Unchecking the setting will disable this feature.

8.5.6 Use ‘Altitude’

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

8.5.7 Average Lag Time

This field will display the average Lag Time (in milliseconds) that has been reported by the speech recognition system.

8.5.8 PTT Clear Lockups

On some soundcards there is an 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.

8.5.9 Use 'Feet'

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

8.5.10 Maximum Lag Time

This field will display the maximum Lag Time (in milliseconds) that has been reported by the speech recognition system.

8.5.11 PTT Mute Radio

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

8.5.12 Use 'Metres'

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

8.5.13 Recognitions Count

This field will display the number of phrases that have been recognised by the speech system. This does not include Emulated Recognitions.

8.5.14 Auto Radio Off

This function will automatically turn the radio off when no transmissions are being made. For some soundcards, there may be occasions when the end of a speech synthesis phrase is not detected by the system. Selection of this setting will overcome this rare issue. Default is unchecked.

8.5.15 Use 'Flight Level'

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

8.5.16 Emulated Recognitions Count

This field will display the number of Emulated Recognitions that have been made by the speech system.

8.5.17 Radio Always On

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

8.5.18 Use 'To'

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

8.5.19 *Average Recognition Time*

This field displays the average time (in seconds) it has taken for the Speech Recognition system to make a phrase recognition.

8.5.20 *Report Leaving*

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

8.5.21 *Last Recognition Time*

This field displays the time (in seconds) it has taken for the Speech Recognition system to make the last phrase recognition.

8.5.22 *Alternate Callsigns*

When checked, the aircraft will use secondary or alternate telephonies for their callsigns. This is to facilitate use of the product by users who are familiar with, for example, grouped number callsigns. This feature would normally be left disabled.

8.5.23 *Climb Requests*

This setting controls whether aircraft make requests for climb.

8.5.24 *Speech Rate*

The slider will change the volume of the speech synthesis output. This will apply to aircraft calls and replies to instructions. Clicking the **DEF** button will return the speech synthesis volume to a default value.

8.5.25 *Append 'Heavy'*

This setting controls whether aircraft of heavy (H) weight category will append their callsign telephony with the word "heavy" as is done in some jurisdictions.

8.5.26 *Descent Requests*

This setting controls whether aircraft make requests for descent.

8.5.27 *Record TX*

When selected, the transmissions made by the user are saved to file. This may be useful for training purposes.

8.5.28 *Decimal (TX)*

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

8.5.29 *Speech Volume*

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. The DEF button will return the speech rate to the default value.

8.5.30 *Decimal (RB)*

This setting controls the use of the preferred word for *decimal* in speech synthesis readbacks. The words 'daycimal' and 'point' are available or a combination of both.

8.6 Airspace Tab

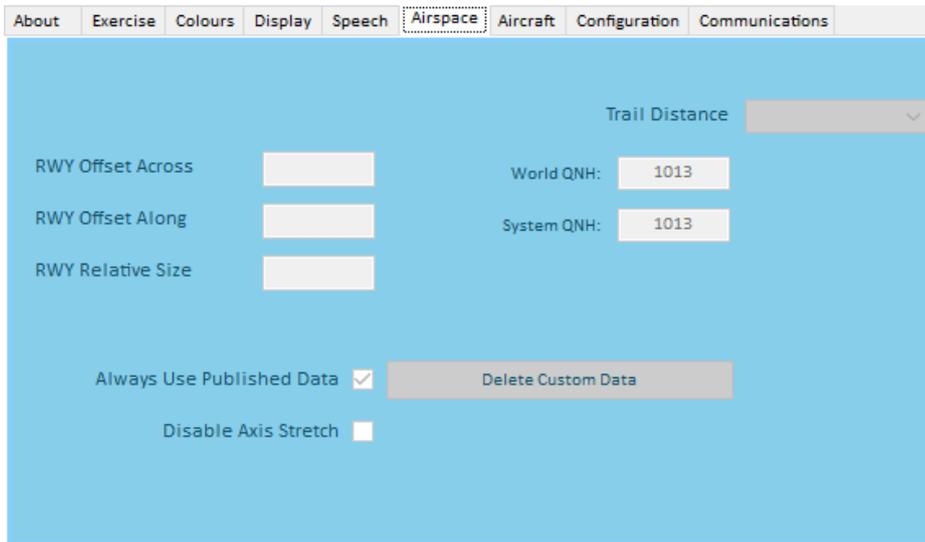


Figure 47. Airspace Tab

8.6.1 Custom Runway Positioning

Some generic Terminal Area sectors allow for addition of a custom parallel runway. Traffic will be programmed to land on both runways, allowing for practice simulation in this environment.

The settings are:

- **Offset Across** (in NM) provides the value that will position the custom runway laterally from the existing one. A negative value will position it to the north or west, whereas a positive value will position it to the south or east.
- **Offset Along** (in NM) provides the value that will position the custom runway longitudinally from the existing one. A negative value will position it so that the landing threshold is before that of the existing runway in the direction on landing. A positive value will position it so that the landing threshold is after that of the existing runway in the direction on landing.
- **Relative Size:** This value provides a value for the length of the custom runway as a fraction of that of the existing runway. For example, a value of 0.8 will result in a runway that is 80% of that of the existing one.

8.6.2 Trail Distance

For sectors with a sequencing function, for which defined ideal trails are defined, the value of the ideal trail may be adjusted here. This feature is only available prior to the commencement of the exercise. The new setting is applied to the ideal trail distance, and other Trail Distance Parameter are adjusted proportionally.

8.6.3 Published and Custom Data

The VV Simulator makes use of a wide range of aircraft, airspace, speech, course and exercise datafiles. These files are packaged with the installation and are stored in the Published Data Area. To provide flexibility, and to enable data changes between versions of the program, the program will first look at the Common Data Area for alternative versions of datafiles. This makes it possible to

make changes to, for example, exercises or speech recognition grammars without relying on a full product upgrade.

If **Always Use Published Data** is clicked, the custom data will be ignored. If **Delete Custom Data** is clicked, then the custom data will be removed.

8.6.4 Disable Axis Stretch

Disabling this setting will disable the cross-runway skewing of the map display that is used for sectors providing a precision approach monitoring function. For other sectors, the setting will be unavailable.

8.6.5 QNH Settings

QNH changes may be made to simulate events such as transponder inaccuracy, pressure changes and level alerting.

The **World QNH** represents the atmospheric pressure in the simulated world, and is relevant in position the aircraft vertically above the ground when these aircraft are operating on QNH.

The **System QNH** is the value that the system uses to convert the raw pressure data from the aircraft into a level value for display in the label

Each aircraft contains a unique **Aircraft QNH** that may vary from the World and System QNH.

8.7 Aircraft Tab

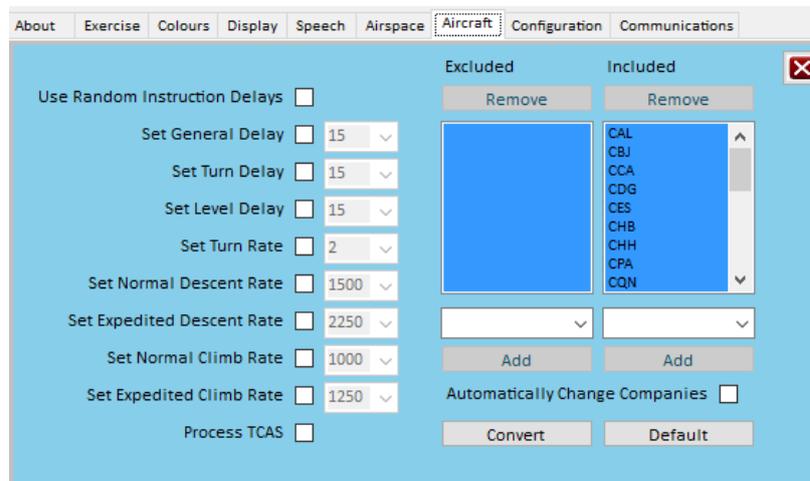


Figure 48. Aircraft Tab

8.7.1 Use Random Instruction Delays

When set, a small tolerance is randomly applied to the amount of time that aircraft take to respond to instructions.

8.7.2 Set General Delay

When set, the General Delay is set to the value in the dropdown menu for all aircraft and overrides the value specified in the exercise file.

8.7.3 Set Turn Delay

When set, the Turn Delay specified in the dropdown menu is applied to vectoring instructions issued to all aircraft and overrides the value specified in the exercise file.

8.7.4 Set Level Delay

When set, the Level Delay specified in the dropdown menu is applied to level change instructions issued to all aircraft and overrides the value specified in the exercise file.

8.7.5 Set Turn Rate

The turn rate for all aircraft in the exercise can be fixed by checking the check-box and selecting a value from the dropdown menu. Values are in degrees per second.

8.7.6 Set Normal Descent Rate

The descent rate for all aircraft in the exercise can be fixed by checking the check-box and selecting a value from the dropdown menu. Values are in feet per minute.

8.7.7 Set Expedited Descent Rate

The expedited descent rate for all aircraft in the exercise can be fixed by checking the check-box and selecting a value from the dropdown menu. This value is used when an aircraft is responding to a TCAS alert or in response to an instruction to expedite descent. Values are in feet per minute.

8.7.8 Set Normal Climb Rate

The climb rate for all aircraft in the exercise can be fixed by checking the check-box and selecting a value from the dropdown menu. Values are in feet per minute.

8.7.9 Set Expedited Climb Rate

The expedited climb rate for all aircraft in the exercise can be fixed by checking the check-box and selecting a value from the dropdown menu. This value is used when an aircraft is responding to a TCAS alert or in response to an instruction to expedite climb. Values are in feet per minute.

Values are in feet per minute.

8.7.10 Process TCAS

When this setting is set, the VV Simulator will perform TCAS logic and initiate TCAS Resolution Advisories, together with the appropriate phrasing and avoidance action.

8.7.11 Airline Selection

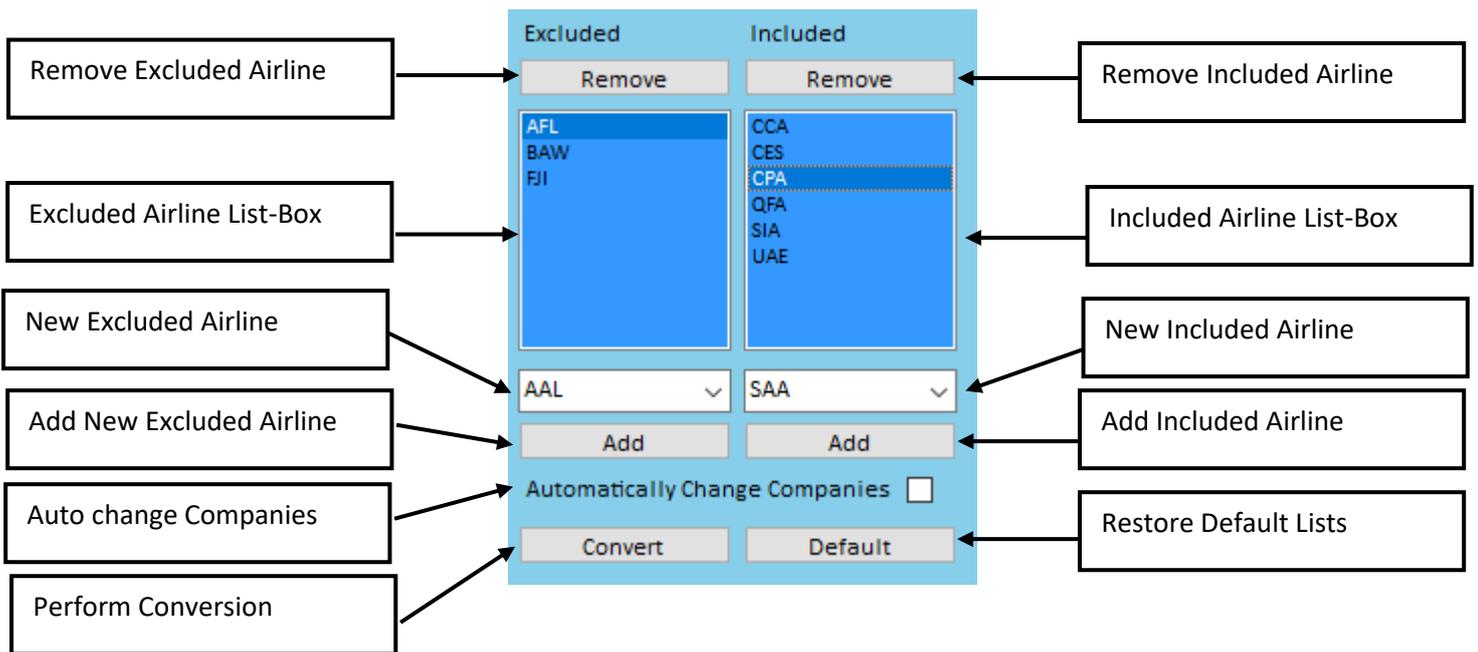


Figure 49. Airline Management

The Airline Management area of the Aircraft Tab contains the functionality for replacing certain airline company callsigns in a simulator exercise. The replacement process can either happen automatically when the simulator is run or be completed manually. It will only be available for exercises that have been marked as generic, as is the case for exercises included in VV courseware.

There are two lists of airline company designators maintained by the simulator. These are contained in the blue list-boxes. The leftmost box contains the list of excluded airlines that will be removed from the exercise. Any aircraft of this airline in the exercise will be replaced by one of the included companies in the rightmost box.

The replacement process will attempt to retain the aircraft type of the excluded airline. That is, in the figure above if there is a BAW B773 aircraft in the exercise, the simulator will randomly choose one of the airlines from the included list of airlines that fly the B773 type. The flight number is retained.

Excluded and Included airlines are removed from their respective list-boxes by first selecting them and clicking the associated **Remove** button above the list-box.

Excluded and Included airlines are added to their respective list-boxes by first selecting them from the dropdown list and clicking the associated **Add** button below.

If **Automatically Change Companies** is checked then, for generic exercises, the simulator will always change the airline companies at the commencement of simulation.

Clicking the **Convert** button will make a one-time conversion. It may only be done once at the commencement of the exercise.

Clicking the **Default** button will reload the exclusion/inclusion lists that were provided with the installation.

Following completion of the process above, a converter file is created and saved in the Common Data Area, in the **ac/airlines** subfolder.

8.8 Configuration Tab

The Configuration Tab contains general information and settings for the VV Simulator.

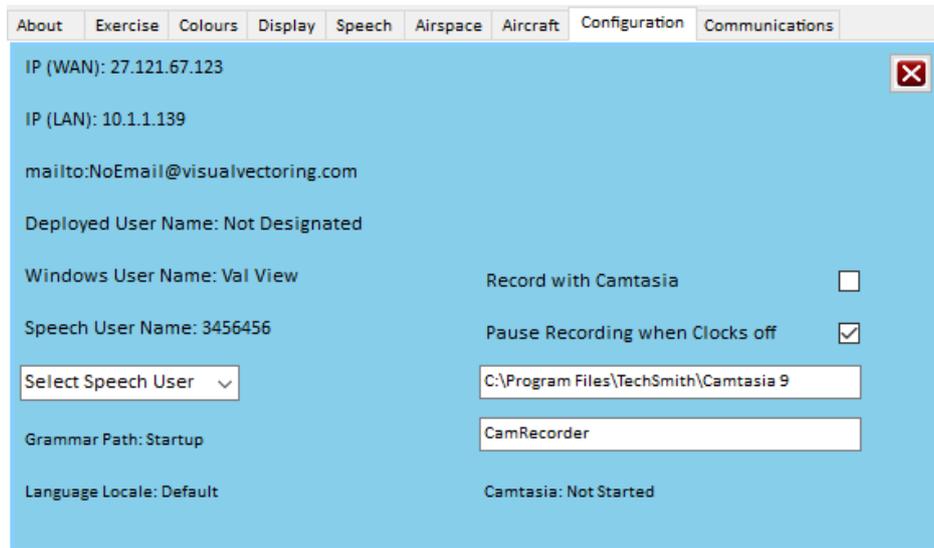


Figure 50. Configuration Tab

8.8.1 Network Information

The external (IP WAN) and local (IP LAN) IP addresses are displayed here. This information is sometimes required when the simulator is deployed from an online website.

8.8.2 User Information

User identification information is shown here. This information may be used for logon to online service and for storage in performance data records. It includes:

8.8.2.1 Email Address:

Where the email address has been supplied by external credentials, it is displayed here. This is used for delivery from an online website.

8.8.2.2 Deployed User Name:

Where the user name has been supplied by external credentials, it is displayed here. This is used for delivery from an online website.

8.8.2.3 Windows User Name:

This is the current windows user account name.

8.8.2.4 *Speech User Name:*

This is the current Speech User Name from which the simulator makes use of speech profile information. The Speech User Name is included in performance reports and is used in some installations to uniquely identify students in performance databases.

8.8.2.5 *Select Speech User:*

The Speech User Name may be changed by selecting a new name from the dropdown menu. Depending on the installation, this setting may not be available. Speech User Name can be changed from the main course interface, or through the Advanced Speech Options applet in the Windows Control Panel.

8.8.3 *Grammar Path*

This read-only field contains information about the location of the main speech grammar that is being used in the simulation. This location may change depending on the language locale installed on the computer.

The values provided here will either be **Startup**, indicating that the grammar is stored in the default start-up folder, or will contain some locale information, such as:

- Common US: the grammar is located in the Common Data Area in the US folder (for United States English);
- Common UK: the grammar is located in the Common Data Area in the speech UK folder (for British English);
- Common CH: the grammar is located in the Common Data Area in the speech CH folder for Chinese.

8.8.4 *Language Locale*

This read-only field contains information about the language locale of the computer in use. This will be the language variant used by the speech recognition.

8.8.5 *Camtasia Settings*

Where a version of the Camtasia screen recorder has been installed on the system, the simulator session may be recorded using this program. This feature may be disabled depending on the installation and whether Camtasia has been detected on the system.

The use of Camtasia requires an appropriate licence for its use. This licence must be purchased separately and is not included with any VV product unless this is specified in licencing documentation.

8.8.5.1 *Record with Camtasia*

Clicking this checkbox will enable the recording function.

8.8.5.2 *Pause Recording when Clocks Off*

If this is checked, the screen recording will pause when the simulator is paused.

8.8.5.3 *Camtasia Path*

This text area contains the location for the Camtasia program.

8.8.5.4 *Camtasia Executable*

This text area contains the name of the executable file Camtasia program.

8.8.5.5 *Camtasia Status*

This read-only label contains the current status of the Camtasia program.

8.9 *Communications Tab*

The Communications Tab allows TTS voices to be selected for use in simulation. Voice that are of poor quality or of an incorrect region can be made unavailable.

Clicking the Commit button will store the selected voices. Note that the voices are allocated with the simulator exercise is loaded, so the exercise must be restarted to allow any changes to be applied.

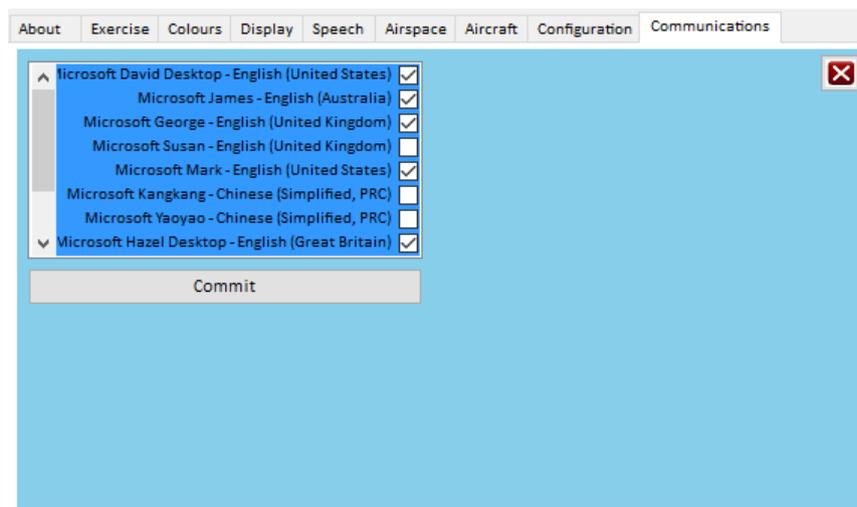


Figure 51. *Communications Tab*

9 Strip Windows

9.1 VV Strip Windows

9.1.1 Inbound Strip Window



Figure 52. The Inbound Strip Window presentation

9.1.2 Taxi Strip Window



Figure 53. The Taxi Strip Window presentation

9.2 Other Strip Windows

Depending on the VV product and the radar system in use, other strip window presentations may be used. An example is shown below. Details on the content and functionality of these windows are contained in course documentation.

MOVE		JURISDICTION						CLOSE
▼ GRI CONT	CSN335		370	BEMAC	JEWEL	SCOTT		
	4453 B788		370	1400	1404	1406		
	1256 NZAA	Z	200	370	370	370		
	/TCAS EQU*							
LOWER								

Figure 54. The Eurocat Jurisdiction Strip Window

10 Other Windows

10.1 Maps Panel

The Maps Panel is opened by clicking the Maps button to the right side of the main display. The sector under control will have a range of selectable maps. Note, that some maps may be not selected as specified in the exercise file. Clicking the selection area to the left of the map description will hide or display that the corresponding map.

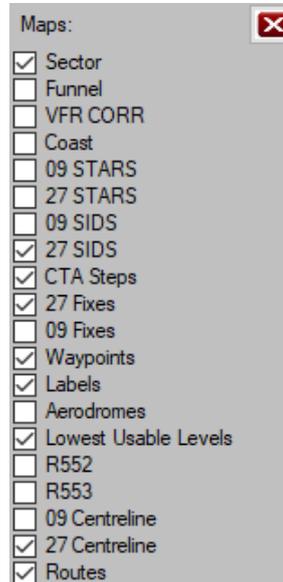


Figure 55. Maps Panel presentation

10.2 Arrival Management System

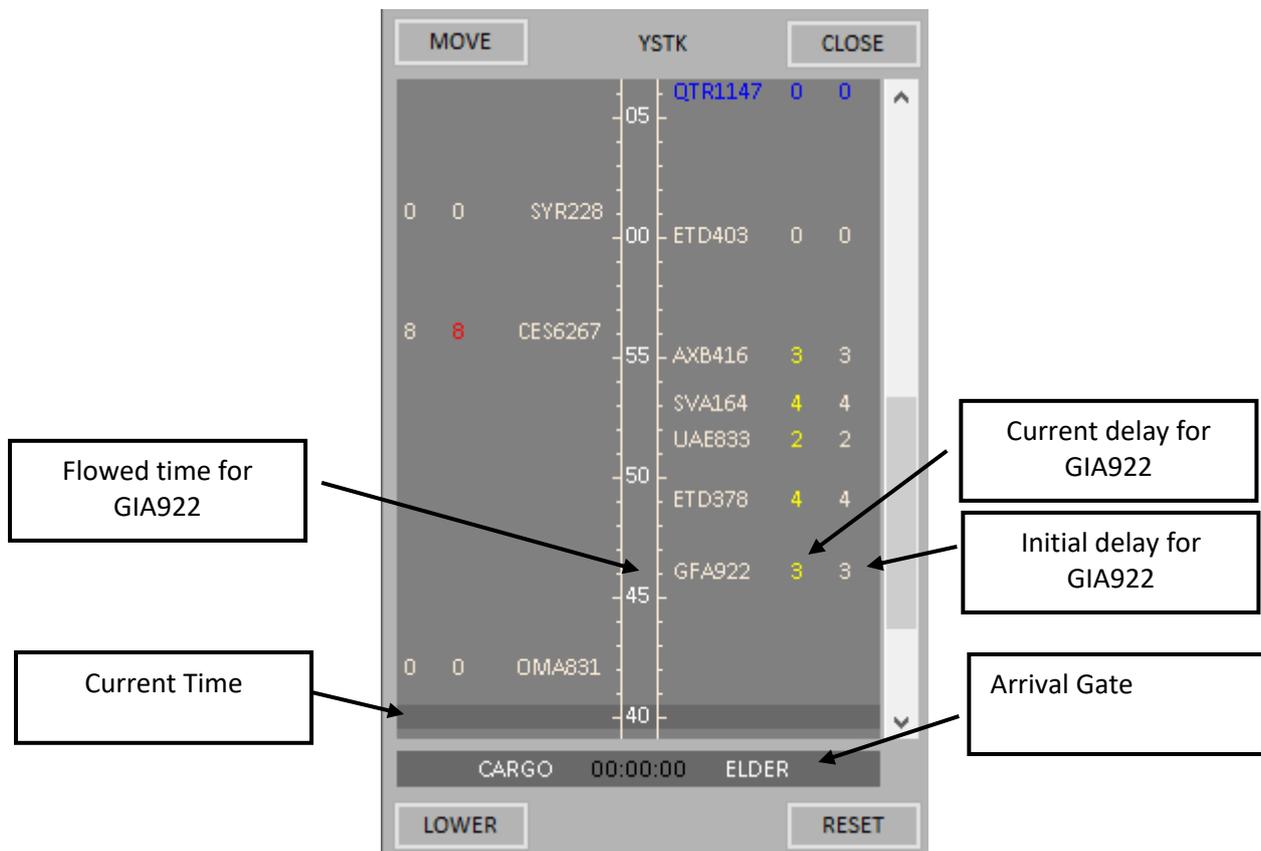


Figure 56. Arrival Management System

The Arrival Management System (AMAN) is used for sequencing training. In particular, it simulates a stream of aircraft arriving through one or more gates with a requirement that they pass the gate at a given time.

The AMAN panel shows the aircraft callsigns placed against a moving ladder that shows the required arrival time and the calculated delays. Two delay times are supplied:

- **Initial Delay:** the delay time (in minutes) that was required to be applied, based on the aircraft's natural (untouched) time at the gate;
- **Current Delay:** the delay time calculated by the system based on a projection of expected speeds that remains to be applied. When this time goes to zero, the sequencing has been completed.

Through a colour-coding system the AMAN also provides some indication of the amount of sequencing intervention required:

- **Red:** More than six minutes delay required. Holding likely to be required;
- **Yellow:** Some sequencing action is required;
- **Green:** The aircraft may need to be promoted in the sequence;
- **White:** No sequencing required.

Full details on the interpretation and use of the AMAN system are provided with as part of courseware.

10.3 Voice Switch

For some sector configurations, one or more extra buttons will appear to the bottom right of screen above the call light. These buttons are used to simulate coordination exchanges. A full explanation of the appropriate phraseology and usage is included in course documentation.



Figure 57. The Voice Switch presentation

10.4 Popup Panels

On occasion, information panels may appear on the screen, providing information or direction about the exercise. For example, at the completion of a CompSep scenario, the outcome will be displayed in a Popup Panel.



Figure 58. Sample of a Popup Panel in a CompSep Scenario

10.5 Termination Panel

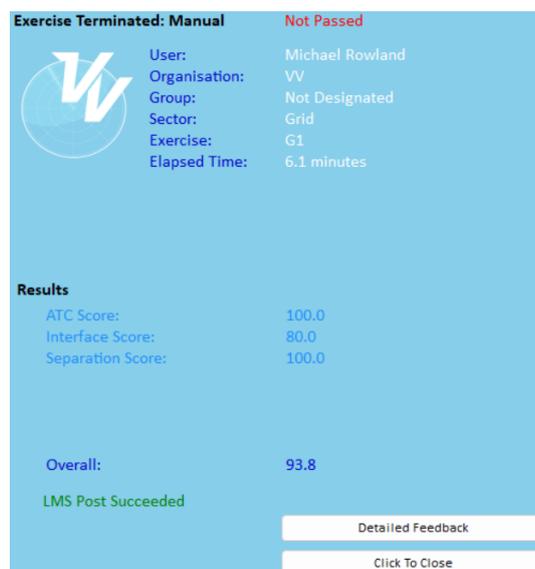


Figure 59. The Termination Panel

The Termination Panel is displayed at the completion of a simulator exercise. It contains information about the completed exercise, including user information, elapsed time and various performance metrics.

10.5.1 Termination Reason

The top left text will display the Termination Reason; that is the event that triggered the end of the exercise. The possible Termination Reasons are:

- **Manual:** The user has closed the exercise using the exit button;
- **Normal:** The exercise has reached its end time;
- **Maze:** The exercise has completed its design termination point in a Maze exercise where users are required to continue working traffic for some time interval after the last aircraft is added to the Maze.
- **Security:** A required security device has not been detected;
- **Error:** The simulator has crashed;
- **Server:** A network server message has terminated the simulator server;
- **Marked Completed:** The user has marked the exercise as completed on the main course interface. In this case, the simulator was never started.

10.5.2 Result

To the right of the Termination Reason, where feedback has been enabled, a general result for the exercise is displayed, typically Passed or Not Passed. Note that this result may be subject to moderation by the training organisation.

10.5.3 General Details

Below this, a set of general details are listed, including the name of the exercise, and the elapsed simulation time.

10.5.4 Results

The Results section contains scoring information or other metrics related to the type of exercise simulated. For instance, following the completion of special exercises such as Maze and Target exercises information related to the learning outcomes of these exercises will be shown

10.5.5 LMS Status

If the simulator is running from an LMS link, the status of the uplink of the performance record is indicated. If it has been successfully uploaded, the text will appear in green.

10.5.6 Detailed Feedback

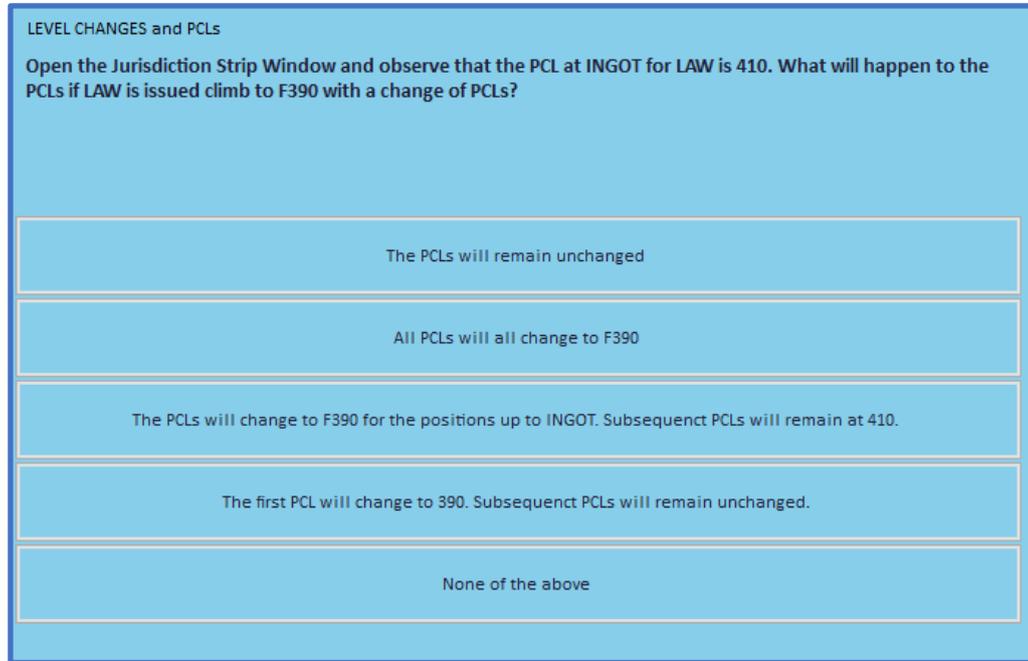
Where feedback has been enabled, the Detailed Feedback button will open a report containing information about scoring, deductions and recommendations for improvement. For a full description of the metrics reported, consult the Performance Measurement section of this document or the course manual.

10.5.7 Open Log Files

If the simulator has been run in logging mode, then a button will appear to the bottom of the Termination Panel, allowing the log file folders to be opened.

10.6 Question Panels

Some exercises may have quiz questions encoded into the exercise files as part of a Script Event. The questions are presented in a Question Panel containing two or more answer options. Where present, these will be described in course documentation.



LEVEL CHANGES and PCLs

Open the Jurisdiction Strip Window and observe that the PCL at INGOT for LAW is 410. What will happen to the PCLs if LAW is issued climb to F390 with a change of PCLs?

The PCLs will remain unchanged

All PCLs will all change to F390

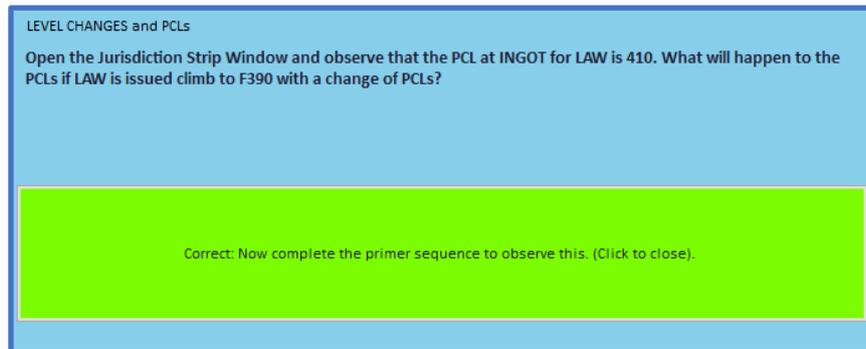
The PCLs will change to F390 for the positions up to INGOT. Subsequent PCLs will remain at 410.

The first PCL will change to 390. Subsequent PCLs will remain unchanged.

None of the above

Figure 60. Sample of a Question Panel

When an answer is selected from the available options, an Outcome Panel is displayed.



LEVEL CHANGES and PCLs

Open the Jurisdiction Strip Window and observe that the PCL at INGOT for LAW is 410. What will happen to the PCLs if LAW is issued climb to F390 with a change of PCLs?

Correct: Now complete the primer sequence to observe this. (Click to close).

Figure 61. Question Outcome Panel

11 Summary of Keyboard Functions

The table below contains the full list of keyboard functions available in this version of the VV 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	Store current Centre and Scale.
End	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 Data Area (TDA) at current cursor position.
Shift-F4	Remove all Text Data 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, where supported by the exercise and radar system.
Shift-F8	Remove all graphic routes from display.
End	Restore current Centre and Scale.
Shift-End	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.
C	Displays or hides a Centreline Marker for selected aircraft.
Shift-E	Activate reroute mode for selected aircraft, where supported by radar system.
Shift-H	Hand-over 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 Data Display for selected aircraft.
Alt-P	Open Aircraft Data Display for selected aircraft.
Shift-Q	Copy an aircraft track to clipboard
Alt-Q	Copy an aircraft track and surrounding aircraft to clipboard
Shift-R	Display graphic route for selected aircraft, where supported by radar system.
Shift-T	Create a Text Data Area at current cursor position.

Note that graphic-based functions will be processed on the second radar screen if the cursor is located over that screen at the time of the keypress.

12 Performance Measurement

Note: The evaluation of performance of ATC Radar Control is a very complex process. Ultimately, it is the observance of a student's actions by a qualified instructor that determines suitability for the job. The aim of the scoring system of the VV Simulator 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. It is recommended that end-users use a moderation system to confirm any scoring system matches with performance capability that has been assessed by a qualified instructor.

12.1 Minimum Time in Simulation

Following completion of a VV Simulator exercise, provided a minimum amount of run-time has elapsed, some scoring and performance information will be reported in the Termination Window and to file. The minimum time is encoded into installation data and is normally set to two minutes.

12.2 Termination Window Information

The Termination Window will contain various metrics that are relevant to the completed exercise. This is primarily for initial feedback for students. The content of the Termination Window will vary depending on the exercise.

12.3 Performance Record File

Once an exercise is completed of minimum duration, a datafile containing raw information is stored in the **exerciserecords** folder of the Personal Data Area. Depending on the installation, this data can be exported from the main course interface or be transmitted automatically over a local network to a performance database. See the Appendices for complete information on the specific data that is stored.

12.4 Last Exercise File

In addition to the Performance Record File, which contains raw data, a text file which contains a full performance readout for the recently completed exercise is generated. This is stored in the **lastexercise** folder of the Personal Data Area.

The content of this file is available for viewing by the student from the main course interface. In addition, in some installations, it may be transmitted over a network to a server computer for viewing by an instructor.

12.5 Tin Can Record

The simulator has the capability of reporting the full performance record information to a Learning Record Store in the form of a Tin Can (Experience API) statement. This is normally applied in inline deployments of the simulator rather than local installations that have access to the standard exercise performance files.

12.6 Scoring by Category

An individual score may be given in up to six different categories, as well as an overall score.

These categories are:

- ATC: measures performance in the management of traffic;
- CompSep: measures performance in the management of Compromised Separation events;
- Interface: measures performance in the use of the simulator interface;
- Questions: provides feedback on the quiz questions that have been answered;
- Separation: measures performance in the separation of the traffic
- Sequencing: measures performance in the sequencing of traffic;
- Vectoring: measures performance in vectoring skills.

The availability of scoring for a category will depend on its applicability. For instance, Maze and Target exercises have no sequencing function, so a score will not be generated for that discipline.

The final score for a category is based on algorithms developed by Visual Vectoring Pty Ltd. As an alternative, it is possible to generate custom algorithms to determine whether student and course training outcomes have been achieved. A facility is available in course modules to output data to a text or csv file for analysis. See course documentation for details

It is important that end-users adopt a moderation process to ensure applicability of the quantitative data generated by the VV Simulator to ensure it correctly reflects qualitative performance assessment conducted by qualified instructors.

12.6.1 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);
- Incorrect phrases, such as wrong direction turns are detected;
- Arriving aircraft are forced to level off;
- Go-arounds occur;
- Aircraft are positioned to operate outside designated airspace.

12.6.2 CompSep Score

Depending on the installation, the CompSep score is included for exercises designed for training in an appropriate response to a CompSep event. The score is reduced when:

- A worse outcome is achieved than that which would have resulted without controller intervention;
- A non-participating aircraft is instructed;
- Where ideal actions for the scenario have been determined, where controller actions do not match these ideal actions.

12.6.3 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;
- CL (CLAM) Alerts are disabled (for radar systems that support this alert);
- An aircraft is subject to a CL (CLAM) Alert (for radar systems that support this alert);
- An aircraft's cleared level does not match the value of the CL. That is, the level that has been issued to the aircraft does not match the level in the label;
- An aircraft's track is assumed;
- An inbound aircraft's track is accepted late (inside airspace boundary);
- An outbound aircraft's track is handed over too early (more than about two minutes from the airspace boundary).

12.6.4 Question Score

Where quizzing is present in an exercise, a score is calculated based on the number of correct responses.

12.6.5 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.

12.6.6 Vectoring Score

Vectoring score is provided in Maze and Target exercises.

In Maze exercises, the score is based on the retention of the aircraft within the airspace boundaries.

In Target exercises, the score is based on the accuracy of the issued headings.

12.6.7 Sequencing score

The *Sequencing* score is designed to measure student performance in sequencing an aircraft to a gate or onto a runway. 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 each sector, a set of distances (in NM or Km depending on the measurement system) is defined to capture the students' performance:

As an aircraft passes a gate (or lands), the distance to the next aircraft is measured. A penalty to the score is applied if the trail distance achieved is not between the Ideal Distance and the High Distance. An extra penalty is applied if the trail is below the Very Low Distance or above the Very High Distance.

A slight penalty 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.

12.6.8 Score Weighting

A weight may be applied to the score in each category according to the importance of that category. The separation score would normally have the highest weighting, though this may vary depending on the course and the type of exercise

12.6.9 Overall score

For a single exercise, results in all of the relevant disciplines are assessed, based on a weighted average, to provide an overall score.

Absolute overall scores should not be compared across exercises. It is easier, for instance, to achieve a 100% score in Maze exercises than in complex TMA sequencing exercises.

13 Troubleshooting

13.1 Speech Recognition

13.1.1 Introduction

Speech Recognition Training is more a process of training yourself than it is one of training the system. Learn to speak clearly and steadily. Be patient and develop discipline in the way you speak into the microphone.

13.1.2 Use of the Phrase Recognition Display

Learn to be aware of the Phrase Recognition Display (top right of Radar screen) in your peripheral vision during simulation. There is no need actually to read what has been recognised. If the aircraft has misunderstood an instruction it should become evident to you when it reads it back incorrectly (this is also very good training in monitoring pilot readbacks for correctness). The appearance of white text in the window is sufficient to tell you that you have been recognised; non-appearance of text indicates that you have not been understood and that you should repeat the instruction.

Once the Speech Recognition function is performing well, the Phrase Recognition Display should be disabled to promote the use of active monitoring of readbacks.

13.1.3 General Strategies

- Position the microphone carefully – to the side of your mouth so you are not breathing directly into it;
- Eliminate ambient noise - find a quiet place to work. You will spend many hours using the simulator and the intensity of the training requires a favourable learning environment;
- Eliminate pauses and extraneous sounds such as ‘umm’ and ‘ahh’;
- You cannot correct yourself mid-transmission. If you make a mistake or stumble in delivering an instruction release the Press-to-talk button and start again;
- **Do not run words together**; pronounce each clearly. This is particularly important when a word with a ‘soft’ vowel sound at its end is followed by one that begins with a soft sound. For example: “Singapore two two zero Approach” It is very easy to run the ‘zero’ into ‘Approach’ to make ‘zeroapproach’, which the Speech Recognition will attempt to interpret as one word. Also watch phrases like ‘Descend to four thousand’ - don’t say ‘Descen’tfourthousand’;
- Be very careful to say the aircraft callsign clearly for each transmission; that is what the program is listening for when the Press-to-talk is pressed;
- Some modern laptop computers have sophisticated sound cards for entertainment applications, and this can affect Speech Recognition performance in simulation. The problem causes a small delay between when the system is activated (Press-to-talk pressed) and when it becomes fully operational. Using a **USB microphone** (or a USB adaptor) can assist greatly. Desktop computers rarely display the problem. The simple solution is to be careful to pause very slightly after pressing the Press-to-talk button and beginning to speak.

13.1.4 Computer Lockups

If you are experiencing a computer lockup after a recognition such that the simulator clock does not update for some seconds, this may be caused by the soundcard incompatibilities with the emulation of speech phrases. The emulation function performs a ‘best guess’ at recognising a phrases but for some sound cards, the processing overhead can cause a lockup as described. Emulation can be disabled on the Exercise tab of the Settings Panel.

14 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 Simulator* exercises. It does not understand 'general English'. So, the correct instructions must be always used. Appropriate phrases 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

The allowable phrases are detailed in course lessons and documentation. The following sample phrases are included as a guideline.

14.1 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"

14.2 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”

14.3 Tracking Phrases

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

14.4 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.

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.

15 Appendix B: Pronunciation

15.1 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

15.3 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	One Zero	Ten
11	One One	
12	One Two	
20	Two Zero	
86	Eight Six	
100	One Zero Zero	One Hundred

16 Appendix C: Data Storage and Performance Metrics

16.1 User Information

Data Field	Details
Record Identifier	A code used to uniquely identify the exercise record for storage in a database.
User Ident	The code or number that uniquely identifies a student. By default, this is the Speech User Name, though depending on the installation, another credential may be used.
Family Name	The family name for the student. This may be obtained from login credentials or added later by the performance database.
Given Name	The given name for the student. This may be obtained from login credentials or added later by the performance database.
Organisation	This is the organisation licencing the software.
Course/Group	This is the student's or class identifier. It may be added later by the performance data.
Machine Name	This is the Windows identifier for the machine in use.
Windows Name	This is the user name reported by Windows. It is normally the Windows account name and is also known as the Environment Name.

16.2 Exercise Information

Data Field	Details
Product	The VV product containing the exercise.
Sector	The Sector controlled in the exercise.
Exercise Name	A short code used to uniquely identify the exercise. It is used in tables for reporting purposes.

Exercise Category	This specifies the type of exercise from a number of different categories.
Exercise Grouping	Each course will subdivide exercise into groups for the purposes of collating data. These identify the grouping for the exercise and is used in presenting tabulated performance data.
Start Time	The (real world) time and date at which the simulator exercise was commenced.
End Time	The (real world) time and date at which the simulator exercise was completed.
Minutes in Simulation (total)	The number of minutes in simulation, including repeated time.
Minutes in Simulation (absolute)	The number of minutes completed in the exercise; that is, the latest time in the exercise that was experienced.
Completion	Has the exercise been completed? This is normally achieved when sufficient time was spent in simulation.
Success	Has the exercise been successfully completed? This is normally achieved when a calculated score is above a sufficient level.
Is Metric	Does this exercise use metric measurement?
Is Task Trainer	If true, the exercise is a task trainer.
Termination Reason	The event causing the exercise to complete.

16.3 Extra Data

Data Field	Details
Database Storage Date	The date/time when the record was stored in the database.
Airspace Rotated	Was the airspace rotated?
Marked as Completed	Has the exercise been manually marked as completed? This is used to display an exercise tile as completed in the main course interface.
Version	The exercise version.

16.4 Speech Data

This set of data fields records the usage and performance of the speech recognition function.

Data Field	Details
PTT Press	Number of times the PTT (transmit) button was pressed.
Recognitions	Number of standard recognitions reported by the speech recognition engine.
Emulated	Number of emulated recognitions reported by the speech recognition engine.
Average Recognition Time	The average time (in seconds) taken for the speech recognition engine to make a recognition.
Average Lag Time	The average lag time (in milliseconds) for the speech recognition engine to respond.
Maximum Lag Time	The maximum lag time (in milliseconds) for the speech recognition engine to respond.
Number Lags	Number of lag time measurements made.
Mouse Click Control Events	The number of times a Mouse Click Control command was issued.

16.5 General Data

Data Field	Details
Number Pauses	The number of times the exercise was paused.
Number Vectors	The number of vectors issued in the exercise.
Number Level Changes	The number of level changes issued in the exercise.
Number Killed	The number of aircraft removal actions.
Requests	Number of requests, such as descent or climb requests that have been made.
Bad Phrases	Number of incorrect phrases detected; for example incorrect use of left/right.
Number APCA	The number of times in which the APCA tool was displayed.

Paints	The number of individual aircraft paints in the exercise.
Paints Jurisdiction	The number of individual aircraft paints for (jurisdiction) controlled aircraft.
Paints RAM	The number of individual aircraft paints for which the route adherence alert has been activated for that aircraft.
Paints CLAM	The number of individual aircraft paints for which the cleared level adherence alert has been activated for that aircraft.
Paints RAM Inhibited	The number of individual aircraft paints for which the route adherence alert (RTE or RAM) has been inhibited.
Paints CLAM Inhibited	The number of individual aircraft paints for which the cleared level adherence alert (CL or CLAM) has been inhibited.
Paints CFL	The number of individual aircraft paints for which the cleared level value in the label does not match the cleared level that has been issued to the aircraft.
Paints LVL	In Maze exercises, the number of individual aircraft paints for which the level alert (LVL) has been activated for that aircraft.
Paints ALT	The number of individual aircraft paints for which the altitude is below the required level.
Paints off Frequency Inside Sector	The number of individual paints for aircraft that are not on the control frequency but are inside the sector. This is a measure for late acceptances.
Paints on Frequency Outside Sector	The number of individual paints for aircraft that are on the control frequency but outside the sector. This is a measure for late handoffs.
Paints Low Exercise Speed	The number of individual aircraft paints for which the simulator clock has been slowed (<1.0 speed).
Paints High Exercise Speed	The number of individual aircraft paints for which the simulator clock has been sped up (>1.0 speed).

16.6 Separation Data

Data Field	Details
Paints with Conflict Alert	The number of individual aircraft paints for which a conflict alert is activated. This includes situations when a predictive conflict alerts is activated and a loss of separation may not necessarily ensue.

Paints with Conflict	The number of individual aircraft paints for which a loss of separation is occurring.
Sweeps No Conflict	The number of radar/surveillance sweeps for which there is no loss of separation
Sweeps with Conflict	The number of radar/surveillance sweeps for which there is a loss of separation
Number Conflicts	The number of individual conflict pairs detected in the exercise.

16.7 Exit Information

Data Field	Details
Frequency Changes	The number of frequency changes issued.
Correct Frequency Changes	The number of correct frequency changes issued.
Incorrect Frequency Changes	The number of incorrect frequency changes issued.
Handovers	The number of handovers completed.
Correct Handovers	The number of correct handovers completed.
Incorrect Handovers	The number of incorrect handovers completed.
Acceptances	Number of aircraft tracks accepted.
Late Acceptances	Number of aircraft tracks accepted late (inside sector).
Correct Exit Level	Number of aircraft exiting the sector that have been issued the correct level.
Incorrect Exit Level	Number of aircraft exiting the sector that have been issued an incorrect level.
Assumptions	Number of aircraft tracks assumed, that is, accepted without a handoff proposal being made.
Number Landing Strip Order Checks	Number of landing aircraft that have had the strip order checked.
Number Incorrect Landing Strip Order Checks	Number of landing aircraft for which the strip order was incorrect.

Gate Strip Order Checks	Number of aircraft through a gate for which the strip order has been checked.
Number Incorrect Gate Strip Order Checks	Number of aircraft through a gate for which the strip order is incorrect.

16.8 Task Trainer Data

Task Trainer data is recorded for Task Trainer exercises only.

Data Field	Details
Task Trainer Tasks	Number of individual tasks in the exercise.
Task Trainer Tasks Completed	Number of tasks completed at least once.
Task Trainer Tasks Performed	Number of tasks completed including repeats.
Task Trainer Tasks Reset	Number of times the task pane was reset.

16.9 CompSep Data

CompSep data is recorded for compromised separation exercises only.

Data Field	Details
Do Score CompSep	Set to True if the exercise scores the CompSep performance
Score Weight CompSep	The weight applied to the CompSep score.
CompSep Overall Score	The overall score for the CompSep performance in the exercise.
CompSep Number Scenarios	Number of unique CompSep scenarios completed.
CompSep Number Scenarios Including Repeats	Number of CompSep scenarios completed, including repeats.
Number Traffic Statements	Number of traffic statements issued.
Number Effective Traffic Statements	Number of effective traffic statements issued.
CompSep Non-Participating Aircraft Instructed	Number of times an aircraft not participating in a CompSep event was given an instruction.
CompSep Repeats	Number of times CompSep scenarios were repeated.

CompSep Worse Outcomes	Number of times the controller action led to a worse separation outcome than had no intervention been made.
-------------------------------	---

16.10 Maze Data

Maze data is only stored for Maze exercises.

Data Field	Details
Maze Paints Outside Lateral	The number of individual aircraft paints for that occur laterally outside the Maze.
Maze Paints Outside Vertical	The number of individual aircraft paints for that occur vertically outside the Maze.
Maze Paints Inside Lateral	The number of individual aircraft paints for that occur laterally inside the Maze.
Maze Number Added	The number of aircraft added to the Maze.

16.11 Target Data

Target data is recorded for Target exercises only.

Data Field	Details
Target Number Attempted	Number of Target events initiated.
Target Number Completed	Total number of Target scenarios completed.
Target Excellent	Number of reports of an excellent outcome.
Target Very Good	Number of reports of a very good outcome.
Target Good	Number of reports of a good outcome.
Target Keep Trying	Number of reports of a poor outcome.
Target Repeats	Number of repeats on a Target scenario.

16.12 Question Data

Question data is recorded for exercises that contain quizzing.

Data Field	Details
Questions Proposed	Number of questions proposed.
Questions Completed	Number of questions completed.
Questions Correct	Number of questions answered correctly.
Questions Total Time	The cumulative time taken to answer all questions.
Questions Total Correct Time	The cumulative time taken to answer the questions that were answered correctly.
Questions Fastest Answer	The fastest answer time.
Questions Average Correct Time	The average time to answer a question correctly.
Questions Average Time	The average time to answer a question.

16.13 Sequencing Data

These data fields record the performance in performing a sequencing function.

Data Field	Details
Number Departures	Number of aircraft departing.
Number Landers	Number of aircraft landing.
Go Arounds	Number of aircraft conducting a go-around (missed approach).
Very Low Distance	The Trail Distance Parameter (in NM or Km) that indicates an unacceptably low trail distance.
Ideal Distance	The Trail Distance Parameter (in NM or Km) that indicates an ideal trail distance.
High Distance	The Trail Distance Parameter (in NM or Km) that indicates the upper end of the ideal trail distance.
Very High Distance	The Trail Distance Parameter (in NM or Km) that indicates the upper end of the an acceptably high trail distance.

Ignore Distance	The Trail Distance Parameter (in NM or Km) representing a distance above which trails can be ignored for reporting purposes.
Number Trails	Number of trails recorded.
Trails No Trail	Number of aircraft through a gate or landing for which no trail is recorded.
Trails Very Low	Number of aircraft through a gate or landing for which the trail distance is unacceptably low.
Trails Low	Number of aircraft through a gate or landing for which the trail distance is low.
Trail Ideal	Number of aircraft through a gate or landing for which the trail distance is ideal.
Trails High	Number of aircraft through a gate or landing for which the trail distance is high.
Trails Very High	Number of aircraft through a gate or landing for which the trail distance unacceptably high.
Trails Too Close but Under A Vector	Number of aircraft through a gate for which the trail distance is low, but the following aircraft is on a vector.
Trails Ideal but Under A Vector	Number of aircraft through a gate for which the trail distance is ideal, but the following aircraft is on a vector.
Trails High and Under A Vector	Number of aircraft through a gate for which the trail distance is high, and the following aircraft is on a vector.

16.14 Time Arrival Data

Where exercises have been designed for simulating Time Arrivals using an arrival management system, the follow data is recorded:

Data Field	Details
Time Arrivals	Number of time arrivals through a gate that have been detected.
Time Arrivals (<20s)	Number of time arrivals through a gate within 20 seconds of the required time at the gate.
Time Arrivals (20s-1min)	Number of time arrivals through a gate within one minute of the required time at the gate.
Time Arrivals (1-2min early)	Number of time arrivals through a gate that arrive more than minute and less than two minutes before the required time at the gate.

Time Arrivals (1-2min late)	Number of time arrivals through a gate that arrive more than minute and less than two minutes after the required time at the gate.
Time Arrivals (>2min early)	Number of time arrivals through a gate that arrive more than two minutes before the required time at the gate.
Time Arrivals (>2min late)	Number of time arrivals through a gate that arrive more than two minutes after the required time at the gate.
Time Arrivals Total Time Difference	The total absolute time differences for all time arrivals through their gates.
Time Arrivals Average Time Difference	The average absolute time differences for all time arrivals through their gates.

16.15 Primer Data

Primer data is recorded when the user is participating in Primer exercises, in which individual interface tasks and control actions are recorded.

Data Field	Details
Number of Task Completions	The number of individual tasks that were completed
Number of Sequence Completions	The number of sequential task groups that were completed.
Number of Correct Sequence Completions	The number of sequential task groups that were completed correctly.
Number Incorrect Sequence Actions	The number of sequential task groups that were completed incorrectly.
Number Prohibited Actions	The number of times that a task that has been marked as prohibited was completed.

16.16 Scoring Data

The data fields below contain information about the scoring regime for the exercise. In particular which they specify the aspect of performance that was measured and what score was achieved.

This section contains the five categories that are most commonly used in VV courseware. Other scoring information, such as for questions, primer and CompSep exercises are detailed above.

Data Field	Details
Do Score ATC	Is a score to be recorded in the ATC competency? This will almost always be true.
Do Score Interface	Is a score to be recorded in the Interface competency? This will be true for most exercises.
Do Score Questions	Is a score recorded for questions? This will only be used for exercises containing quiz questions.
Do Score Separation	Is a score to be recorded in the Separation competency? This will be true for all exercises except Target exercises, Task Trainers and some Maze exercises.
Do Score Sequencing	Is a score to be recorded in the Sequencing competency? This will only be used for sectors and exercises for which sequencing must be performed.
Do Score Vectoring	Is a score to be recorded in the Sequencing competency? This will be true for Target and Maze exercises only.
Do Use Weights	Should a weight be required in calculation of the overall score.
Score Weight Atc	If weights are used, this is the weight applied to the ATC score.
Score Weight Interface	If weights are used, this is the weight applied to the Interface category.
Score Weight Questions	If weights are used, this is the weight applied to the question score.
Score Weight Separation	If weights are used, this is the weight applied to the separation score.
Score Weight Sequencing	If weights are used, this is the weight applied to the sequencing score.
Score Weight Vectoring	If weights are used, this is the weight applied to the vectoring score.
Score ATC	The score for ATC.
Score Interface	The score for Interface.
Score Questions	The score for Questions.
Score Separation	The score for Separation.
Score Sequencing	The score for Sequencing.
Score Vectoring	The score for Vectoring.
Score Overall	The overall score calculated by combining the weighted scores for each of the categories assessed in the exercise.

17 Figures

Figure 1.	Launching the Simulator from the VV Enroute™ main screen.....	15
Figure 2.	Launching the Simulator from a Simulator Activity Page.....	15
Figure 3.	Keyboard layout.....	17
Figure 4.	Speech profiles on a shared Windows account.....	21
Figure 5.	Speech Properties Window.....	22
Figure 6.	Adding a new Speech User.....	23
Figure 7.	Audio Input Settings.....	24
Figure 8.	Microphone Setup Wizard 1.....	24
Figure 9.	Microphone Setup Wizard 2.....	25
Figure 10.	Microphone Setup Wizard 3.....	25
Figure 11.	SpeechTrainer Instructions.....	26
Figure 12.	SpeechTrainer interface.....	27
Figure 13.	The Top Menu (VV System).....	28
Figure 14.	Side Menu of VV Simulator.....	29
Figure 15.	Basic Maze Display.....	31
Figure 16.	The label data block: VV radar system.....	35
Figure 17.	Clickable areas of the Radar Track (VV Radar System).....	35
Figure 18.	Cleared Level Selection Window.....	38
Figure 19.	Speed Info Display.....	39
Figure 20.	J-Ring presentation.....	39
Figure 21.	Graphic Route Presentation.....	40
Figure 22.	Mouse Click Control Interface.....	42
Figure 23.	Quick Popup Menu.....	42
Figure 24.	Reroute Direct Window.....	43
Figure 25.	Position Sectors Window for handover.....	43
Figure 26.	Track Assumption Confirmation.....	44
Figure 27.	Cockpit Data Display.....	44
Figure 28.	Aircraft Data Display.....	45
Figure 29.	APCA Tool Display.....	46

Figure 30.	Exercise speed selection	47
Figure 31.	Rewind slide-bar	47
Figure 32.	Sequencing Outcomes from Trail Distance Parameters	49
Figure 33.	The Second Radar Window	51
Figure 34.	Filtering the Second Radar Window	52
Figure 35.	Range-ring configuration	53
Figure 36.	Centreline Marker	54
Figure 37.	Simulator Task Trainer presentation	54
Figure 38.	Test Exercise Dialog	55
Figure 39.	Primer presentation	56
Figure 40.	Clock Presentation for Sub-Scenario Exercises	57
Figure 41.	About Tab	60
Figure 42.	Exercise Tab	61
Figure 43.	Colours Tab	63
Figure 44.	Colour selection	64
Figure 45.	Display Tab	66
Figure 46.	Speech Tab	70
Figure 47.	Airspace Tab	73
Figure 48.	Aircraft Tab	74
Figure 49.	Airline Management	76
Figure 50.	Configuration Tab	77
Figure 51.	Communications Tab	79
Figure 52.	The Inbound Strip Window presentation	80
Figure 53.	The Taxi Strip Window presentation	80
Figure 54.	The Eurocat Jurisdiction Strip Window	81
Figure 55.	Maps Panel presentation	81
Figure 56.	Arrival Management System	82
Figure 57.	The Voice Switch presentation	83
Figure 58.	Sample of a Popup Panel in a CompSep Scenario	83

Figure 59.	The Termination Panel.....	83
Figure 60.	Sample of a Question Panel	85
Figure 61.	Question Outcome Panel	85