



Course Manual

Product Version: 8.12

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Preamble

VVD Departures™ (VVD) is a Windows-based Air Traffic Control trainer that provides basic skills development in the processing of Terminal Area (TMA) departing traffic. It is designed to be a natural continuation of the *VVD Approach™* course, though much of it may be completed without having completed any ATC training. That is, VVD may be undertaken by ab initio students without any prior experience.

Nomenclature

In many places around the world, the use of the term ‘Departures’ as it pertains to an ATC operational position is understood to refer to a Tower-based role. In other locations, this term is understood to be referring to a surveillance role performed by a Terminal Area controller.

VVD is targeted at the latter role and is a course that teaches processing of departing aircraft using surveillance in a busy terminal area of a single-runway airport.

Learning Outcomes

VVD Departures™ is focused at teaching the efficient processing of departing traffic with consideration for differing aircraft performance, airspace constraints and separation with inbound and overflying traffic.

Skills taught include:

- Vectoring
- Conflict recognition and resolution
- Application of radar/surveillance separation
- Interface usage
- Task management
- Prioritisation
- Communications and phraseology
- Scanning.



Versions

VV Departures™ is deployed in two versions.

On-site version

The On-site version is delivered on-site and uses the *VV Management* tool for administration and monitoring of student performance. It is intended for users who require delivery locally at a College, Training Centre or Academy.

LMS Version

The LMS version is delivered through a cloud-based Learning Management System (LMS). Content delivery, course administration, student performance management are provided by the LMS. This version is intended for end users who prefer remote or distributed delivery.

Installation

On-site version

The program installation is supplied for the On-Site version as a msi executable installer. The application is code-signed, and the msi installer and setup.exe are digitally signed.

Firewall

In order to run the networking function to communicate performance data with the *VV Management* program, it may be necessary to approve access of the program through the Windows firewall.

The executable file to be allowed through the firewall is **vvdepartures.exe**. See the *VV Management Operating Manual* for more information on this.

LMS Version

The LMS version requires installation of the **VVSIM** program, which manages simulation and reporting to the performance database. Full details are available as part of the courseware.

Features

The *VV Simulator* as implemented in *VV Departures™* has been designed to support the acquisition of traffic management skills in a radar (or surveillance) environment. For this reason, a range of learning tools not normally present in operational systems is included. These include:

- Task Trainer Functionality
- Primer functionality
- Task Completion Prompts
- Scoring Functionality

- Feedback of Sequencing and Separation Performance.

Full description on the operation of the simulator is available in the *VV Simulator* Operating Manual.

Training structure

All VV training follows a sequence widely recognized as an optimum method of transferring practical skills from one person to another:

Training Lessons

Instruction presented as slideshows but run as MP4 movies. Full control of the flow of information is available by pausing and forward/reverse scanning the movie player.

Demonstrations

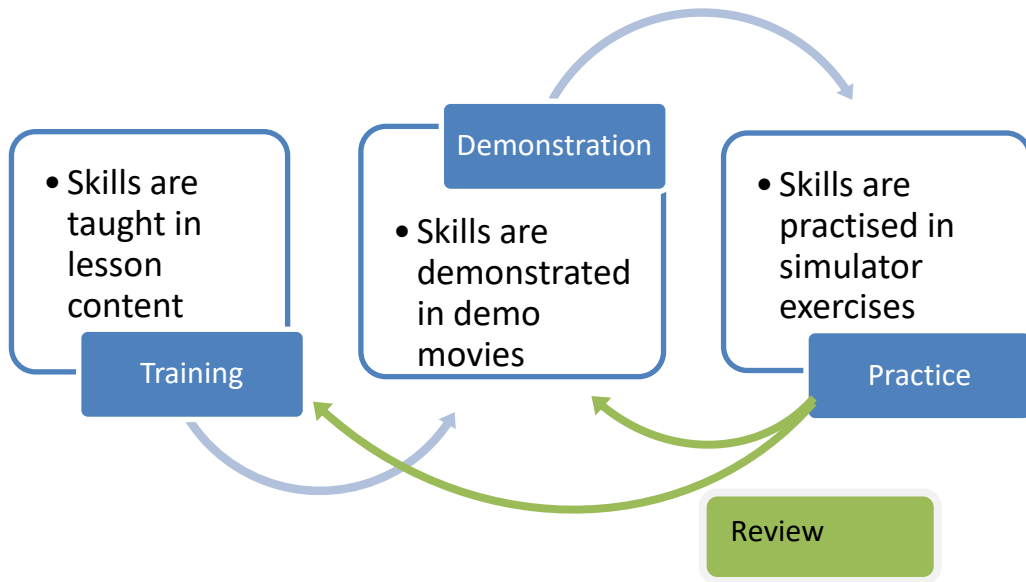
Screen-capture MP4 movies of actual simulator performance of a selection of traffic scenarios from the upcoming exercise series, with audio. Graphic overlays of the radar relate the techniques being used to the lesson content. The movies can be paused and reviewed at will. The controller voice is replaced with a synthesised one. Aircraft responses are generated by the simulator.

Practice Simulation

A series of exercises to be performed on the incorporated simulator provides unlimited practice opportunity to establish control techniques to the level required to progress to the next Learning Step. A performance assessment (score) is provided at the end of each exercise to allow the student to self-assess his/her readiness to progress to the next.

Review

Following self-assessment, the trainee is free to revisit the lesson and demonstration content to review and consolidate.



Main interface



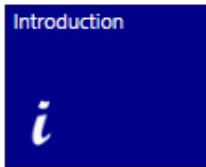
On-site version

The software installation for the on-site version will place a *VV Departures™* icon on the computer desktop (below). This will provide access to the Main Interface, shown above.

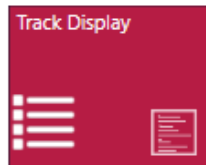


Course Tiles

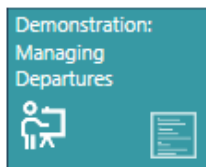
The Main Interface contains various tiles that allow course content to be displayed or executed. These Course Tiles fall into the following categories:



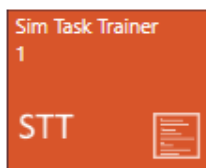
Module Tiles: Clicking will display or hide the course tiles contained in this module.



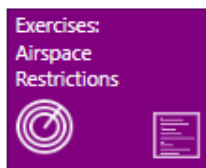
Lesson Tiles. Clicking on this tile will run a lesson movie.



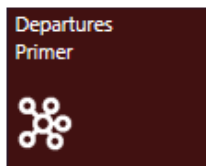
Demonstration Tile: Clicking will run a demonstration movie.



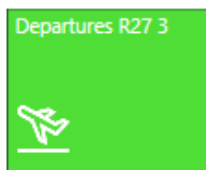
Sim Task Trainer Tiles: Clicking will launch a Sim Task Trainer exercise.



Exercise Module Tiles: Clicking will display or hide a set of related exercises.



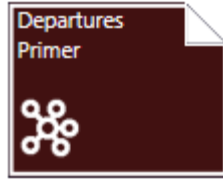
Primer Tile: Clicking will launch a primer exercise.



Exercise Tile: Clicking will launch a simulator exercise.

Completion Display

When a simulator exercise or lesson/demonstration movie has been completed, it is marked completed with a white dog-ear on the top right corner:



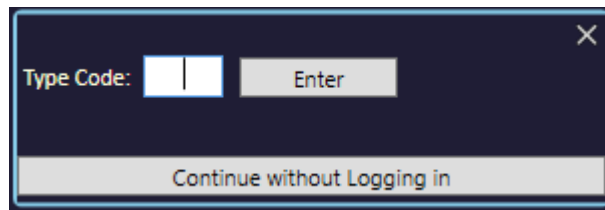
Provided the feature is enabled in the Tools Panel, an exercise or lesson/demonstration can be marked as completed by centre-clicking on the tile.

A module tile is shown as completed when all course elements beneath have been completed.

Student Credentials

Before running a simulator exercise or a lesson movie, opening the User Summary, the Last Exercise window or the Speech Trainer App, a user will be required to enter in a four-digit code to verify that they are the correct user.

The code is generated on the VV Management machine and will be provided by the Course Administrator.



Once the code is typed in, it will be remembered for the current session for the current Speech User.

Each student computer retains a recent copy of the passwords so that VVA can be used offline when the Management computer is not available.

For Exercises and Lessons, the user may proceed without logging in by clicking the **Continue Without Logging in** button. Performance records will be saved and transmitted to the Management machine, but this will need to be approved by the course administrator before inclusion in the Performance Database.

Utility Tiles

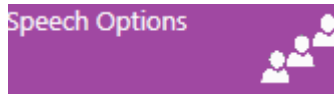
There are up to seven utility tiles to the left of the main display.

Help Utility Tile



Clicking the red Help Utility Tile will open a folder containing electronic copies of this document as well as simulator and licencing documentation.

Speech Options Utility Tile

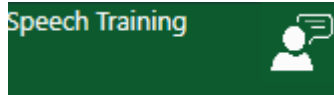


Clicking the Speech Options Utility Tile will open the Advanced Speech Options applet. This interface allows the following functions to be performed:

- Change of microphone input for speech recognition
- Change of audio output for speech synthesis
- Adjustment of microphone volume levels
- Change of speech recognition engine in use
- Selection of the active Speech User and
- Training of the speech recognition engine using a generic script.

Full details on the use and applicability of the above functions are contained in the VV Simulator Operating Manual.

Speech Training Utility Tile



Clicking the green Speech Training tile will allow training of the speech recognition engine using a script that is targeted for ATC phraseology. This is delivered using the **VV SpeechTrainer** App. Further information is provided on this loate in this document.

Tools Utility Tile



Clicking the Tools Utility Tile will open the Tools Panel (below). This panel contains information and settings about the operation of the *VV Approach™* course. See the Tools section below for details.

VocabularyTile



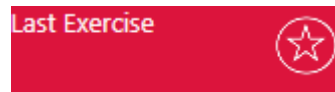
Where present, this tile provides access to a dictionary containing a list of aviation terms with their Chinese translation.

Progress Utility Tile



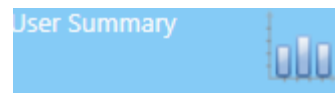
Clicking the Tools Utility Tile will open the Progress Report Window This provides the student with a graphic display of his/her progress through the VVA course.

Last Exercise Utility Tile



Clicking the Last Exercise Utility Tile will display a multi-page summary of the events and performance in the last simulator exercise that was run.

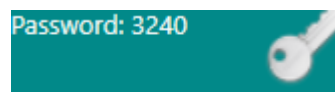
User Summary Utility Tile



Clicking the User Summary Tile will open a panel containing performance and completion data. This is intended as a reference only for the student. Primary data collection is performed by the *VV Management* tool.

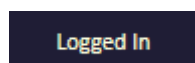
Password Utility Tile

The Password Utility Tile will appear when the Administrator has sent the password from the Management computer.



When the correct password has been entered, or a course module is commenced, the Password Utility tile will fade from view.

Once the correct password is entered, the text "Logged In" will appear at the bottom of the main course interface.



Speech User Name

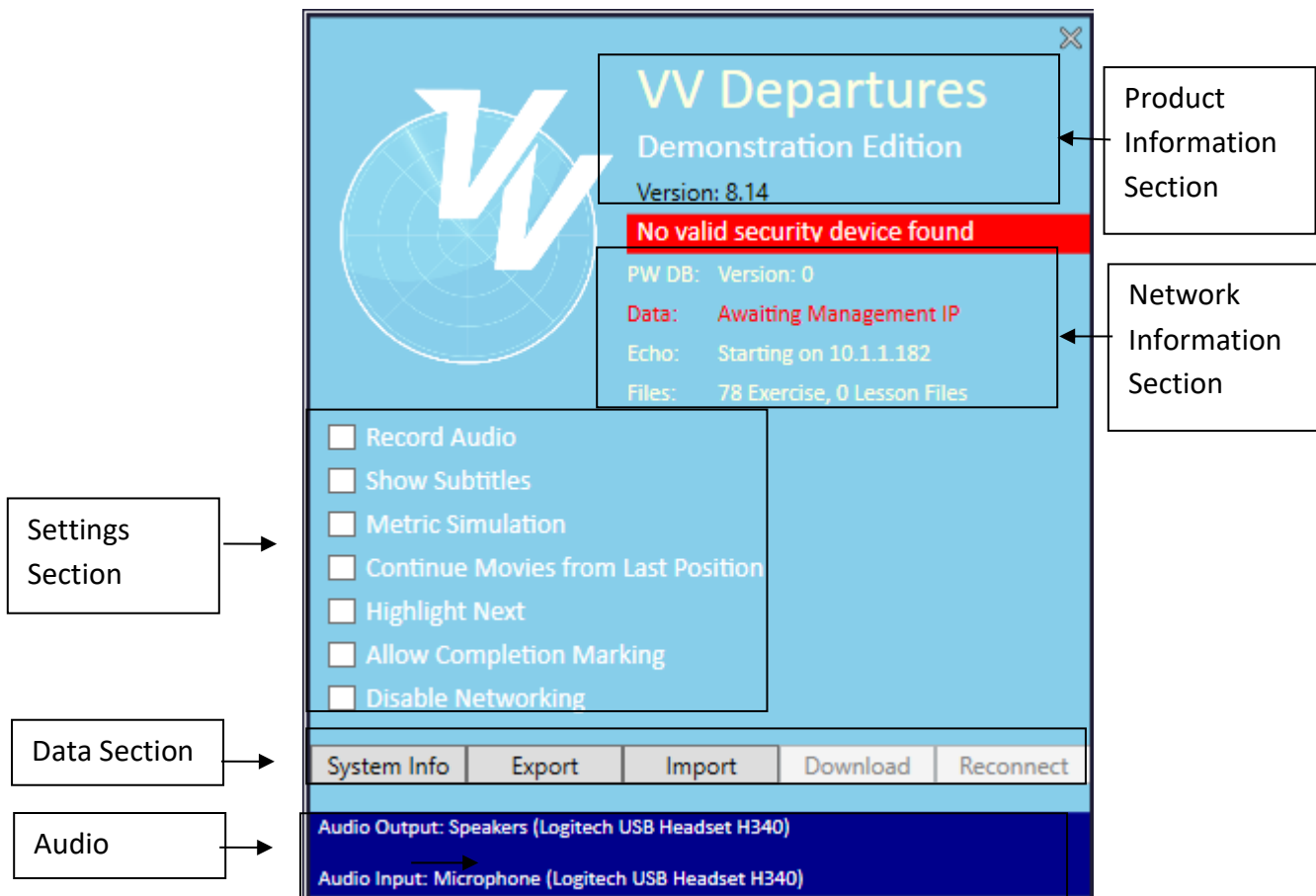
The User Name is displayed at the bottom left of the Main Display. It is important that this text matches the student’s name or identifier as this name is coded into exercise records.

To change the Speech User Name, click the purple Speech Options Utility Tile. The Speech Properties panel will open. Click the Speech Recognition Tab and ensure that the correct name is selected from those available. Click New to make a new Speech user.

Full details on management and training of Speech Users is available in the *VV Simulator Operating Manual*.

Note that when the Speech User is changed the appropriate password will be required to be entered.

Tools Panel



Product Information Section

This section contains details about the product name, versioning and licensing information. Where used, the status of the security dongle is displayed in red.



Network Information Section

This section contains information about the network communication with the *VV Management* application. Where the networking function has been disabled, or the functionality is not included in the installation, this section will show the networking as disabled.

PW DB

The password database allowing access to VV Approach is regularly updated by the VV Management Computer. This label shows the current version of the database held on the local machine.

Data

The Data Network is used for sending performance data to the Management computer. This is the main network used to communicate information so that it may be stored and analysed. This field is colour-coded red when the network is disconnected and green when it is connected.

Echo

The Echo Network is used to locate and verify the *VV Management* computer at load-up, and when the **Reconnect** button is pressed. When a connection has not been found, periodic attempts at reconnection are made.

Settings Section

This section contains settings for the general functioning of the VV Approach program. Once set, a setting will be retained for the current user.

Record Audio

If set, audio transmissions from the controller will be recorded to file in .wav format. These are stored in the Personal Data Area which is normally located here:

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

The audio files are further sorted into a folder named for the Speech User name.

Metric Simulation

All deployed versions of *VV Departures* will be delivered in a standard system of measurement. The lesson content uses imperial (or non-metric) units for which distances are measured in nautical miles and altitudes are measured in feet, thousands of feet. Simulation may be presented in metric measurement.

Some installations provide the options to simulate in an both metric and imperial systems of measurement. Clicking this textbox will result in all simulator exercises using the metric system. Lessons and demonstration movies are delivered in the imperial system.

Continue Movies from Last Position

If selected, this setting will result in movies that have been previously watched to commence at the point at which they were closed.

Highlight Next

The Highlight Next setting will provide a flashing yellow frame around the module, lesson, demonstration or simulator exercise that is the first uncompleted course element.

Allow Completion Marking

Selecting this setting will allow course elements to be marked as completed. They will display the graphical indications of being completed. This feature may be disabled in some installations.

Disable Networking

If this setting is selected, the use of network connections to transfer performance and screen-capture information is disabled. This may be selected if the network option is not available with the installation, or network exceptions cause performance to be affected in simulation.

Data Section

System info

Clicking this button will result in the Windows System Information panel to be displayed. This application allows a detailed summary of the system attributes to be saved to a text file. This is normally used for debugging and troubleshooting purposes.

Export

The Export function allows the performance data stored on the local machine to be saved to a flash drive or network disk for use by the *VV Management* app.

Import

The Import function allows performance data from another machine to be saved on the local machine so that individual student metrics and performance graphs are available. This function would normally be used in lieu of a networked *VV Management* solution.

Download

This function allows all performance records to be downloaded from the *VV Management* computer to the local machine. This allows individual student metrics and performance graphs to be available for display.

Reconnect

This button will become active when the Data network disconnects or fails to connect. When clicked, the Echo network is used to locate the server and make a reconnection. While disconnected from the network, all data is retained and will be sent to the Management computer the next time a connection is made.



Audio Section

This section displayed a read-only text description of the audio output used for the speech synthesis system and the audio input used for the speech synthesis system.

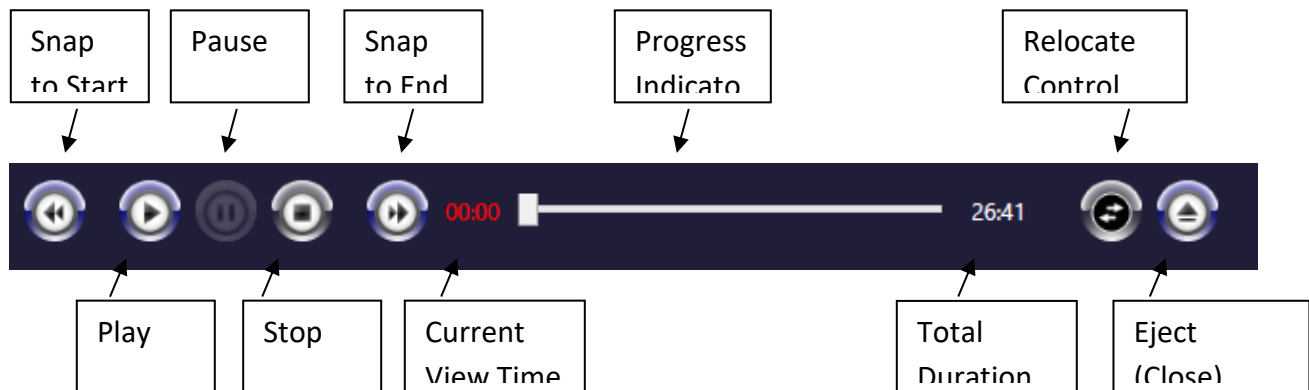
Movie Player

Lessons and Demonstrations are presented as MP4 movies. Depending on the installation, the movies may play in the embedded VV movie player, or on the default media player that has been installed.

When loaded, a lesson or demonstration will always revert to the beginning of the movie unless the Continue Movies from Last Position checkbox in the Tools Panel is selected. In this case, movies will be primed to the last part of the movie that was watched.

Control Bar

The VV Movie player contains a modal Control Bar (below) that is used to control the movie playback. The Control Bar will fade out of view when the exercise is started. It will fade into view when the exercise is paused or when the mouse is moved over its position.



Key Commands

The VV Movie Player will respond to the following keyboard commands:

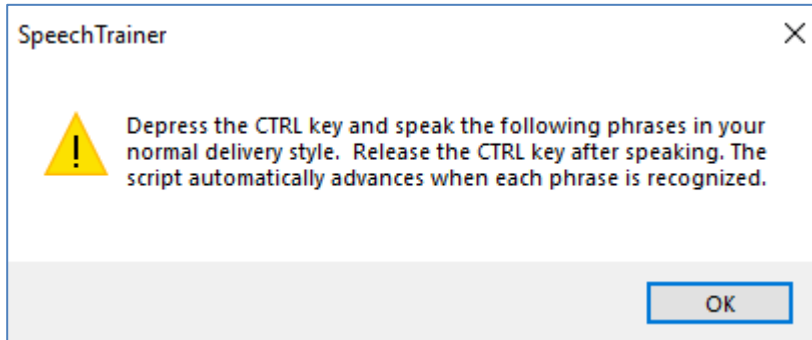
Key	Action
Space	Start/Pause
Page Up	Rewind by one second (when paused)
Page Down	Move forward by one second (when paused)
Esc	Eject (close) the movie
Left-Arrow	Rewind by three seconds

Right-Arrow	Move forward by three seconds
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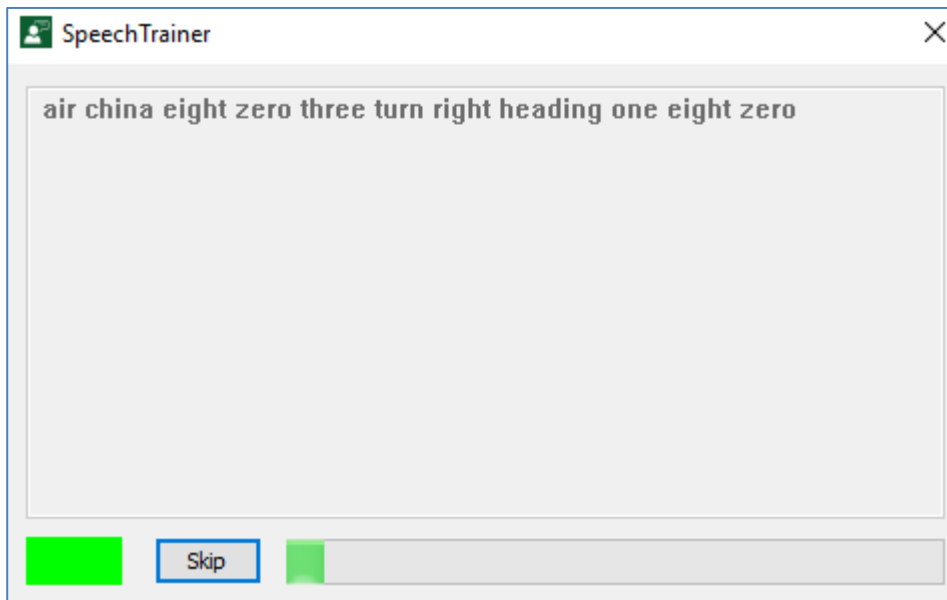
VV SpeechTrainer App

The VVSpeechTrainer app allows the speech recognition engine to be trained using relevant terminology. For the On-site version, it is launched either through the Speech Training Utility tile. For the LMS version, it is launched through a course link, or from the Setup panel during a simulator session. Full information on this is provided in course documentation.

When launched, initially a set of instructions is displayed:

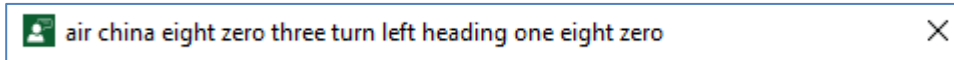


On clicking OK, the display below will appear:



With the CTRL key depressed, the user should speak the displayed phrase. Once the phrase is recognised, one of three events will occur:

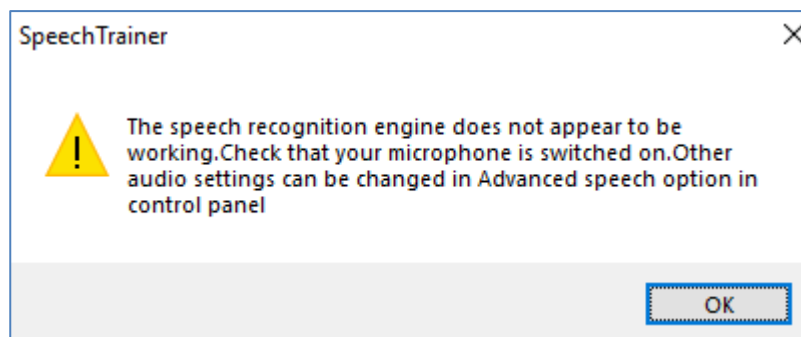
1. The phrase recognised correctly matches the displayed phrase. The speech recognition engine will be updated, and the next phrase will be displayed or
2. A different phrase is recognised. This phrase will be displayed in the task bar as below. The correct phrase should be re-spoken until it is correctly recognised.



3. The speech is not recognised or there is insufficient acceptable audio. In this case, the task bar will show the (FALSERECO) indicator below. The correct phrase should be re-spoken until it is correctly recognised.



If the speech recognition engine is repeatedly receiving poor audio or unexpected phrasing the following dialog may appear. If so, consult the Appendices of the VV Simulator Operating Manual for advice on improving recognition performance.



Note that the VV Speech Starter Application (VVSS) is available for all users of VV Technology. For users with heavy accents, this application is preferable for initial speech training as it provides the capability of training very simple phrases.

Procedures

The procedures used in instructional content and during simulation are designed to be generic and to provide training value to a wide range of users. It is acknowledged that local procedures are likely to differ greatly from those used on this course. The simulator provides many customisations for aircraft behaviour and performance, and more specific variations to procedures may be implemented by Visual Vectoring on request.

In particular, where the use of release approvals is not required, traffic may be set to depart automatically by enabling Auto-releases in the simulator settings. See the Simulator Operating Manual for more information.

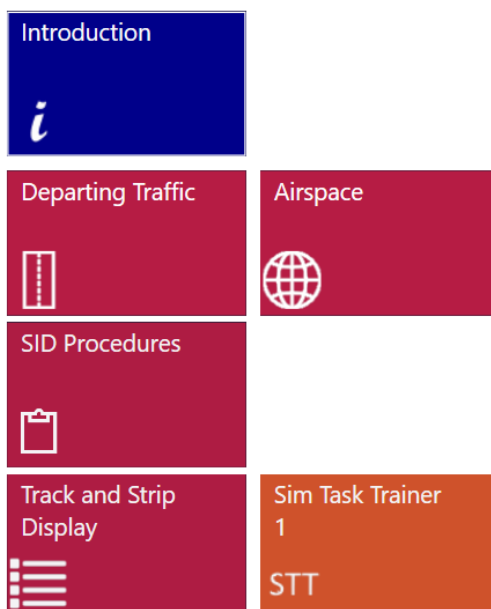
Course Content

There are four training modules in the *VV Approach* course. Content with each module is accessed by clicking on a module tile at the top of the Main Interface. Below is the visualisation of this for the On-site version:



Module 1: Introduction.

The Introduction module contains four lessons and a task trainer simulator exercise.



Lesson: Departing Traffic

This lesson contains a summary of the course, and an overview of the information transfer between the ATC system and the pilot/airline system, including flight plan information, weather advice, clearances and other communications. **Duration: 05:35.**

Lesson: Airspace

This lesson provides an introduction to the airspace and procedures used during this course, such as service provision, airspace classification and dimensions, and terrain considerations. **Duration: 11:25.**

Lesson: SID Procedures

This lesson details the utilization of Standard (Instrument) Departures procedures and how they are used to implement a smooth flow of departing aircraft from an airport, as well as providing terrain separation, deconfliction from arrivals and noise abatement. **Duration: 11:27.**

Lesson: Track and Strip Display

This lesson explains how relevant information is provided to the controller through strips (primarily for taxiing aircraft) and track labels (primarily for airborne aircraft). **Duration: 15:09.**

Exercise: Sim Task Trainer

This short simulator exercise introduces key simulator functionality. **Duration: 05:00 (approx).**

Module 2: Processing.

This module provides more detail into the procedures and techniques used during simulation on this course. It concludes with four simulator exercises containing jet aircraft only.



Lesson: Release Approvals

This lesson details the coordination exchange between Tower and Approach/Departures for approval of the issuance of a takeoff clearance. **Duration: 14:09.**

Lesson: Procedures

This lesson provides instructions on the use of a surveillance service in processing departing traffic, including separation, level issuance, handover of control, and required spacing of consecutive aircraft. **Duration: 26:03.**

Lesson: Managing Departures

This lesson provides instruction on the use of a surveillance service in processing departing traffic, including separation, level issuance, handover of control, and required spacing of consecutive aircraft. **Duration: 26:03.**

Primer Demonstration

This is a screen capture demonstration of the upcoming primer exercise, which provides a script containing required interface actions, transmissions and control actions **Duration: 15:47.**

Exercise: Departures Primer

This exercise allows the student to practice performing interface and control actions promptly and in the correct sequence. A script provides guidance for these actions, and feedback on correct completion. **Duration: 15:00**

Lesson: Jet Departures

This lesson explains the processing of successive jet departures from the runway to the departure gate. **Duration: 34:18.**

Demonstration: Jet Departures

This lesson explains the processing of successive jet departures from the runway to the departure gate. **Duration: 13:58.**

Exercises: Jet Departures

This set of four exercises contain jet departures only:

- Exercise JD01: Runway 09: **Duration: 25:00**
- Exercise JD02: Runway 27: **Duration: 25:00**
- Exercise JD01: Runway 09: **Duration: 25:00**
- Exercise JD01: Runway 27: **Duration: 25:00**

Module 3: Mixed Departures

This module covers the processing of departing aircraft with different performance profiles.



Lesson: Managing Mixed Departures

This lesson explains the thought processes that inform a control plan for the processing of successive departures, of differing performance profiles, from the runway to the departure gate.

Duration: 27:47.

Exercises: Mixed Departures

This set of four exercises contain mixed departures:

- Exercise MD01: Runway 09: **Duration: 25:00**
- Exercise MD02: Runway 27: **Duration: 25:00**
- Exercise MD01: Runway 09: **Duration: 30:00**
- Exercise MD01: Runway 27: **Duration: 30:00**

Module 4: Combined Traffic.

This module brings together the concepts covered in the VV Approach course, and the skills acquired on this course to provide realistic training on a combined Approach+Departures position.



Lesson: Combined Traffic Part 1

This lesson covers the processing of jet and non-jet departures from runway 27 to the north, with considerations for the deconfliction of arrivals inbound via LIMBO and BILLO. **Duration: 35:29.**

Lesson: Combined Traffic Part 2

This lesson covers the processing of jet and non-jet departures from runway 27 to the south, with considerations for the deconfliction of arrivals inbound via the BULLY LITOF AND MAXIM gates. **Duration: 42:06.**

Lesson: Combined Traffic Part 3

This lesson covers the processing of jet and non-jet departures from runway 09 in all directions. **Duration: 24:24.**

Demonstration: Combined Traffic

This demonstration is a screen-capture of exercise CT05. **Duration: 38:42.**

Exercises: Combined Traffic

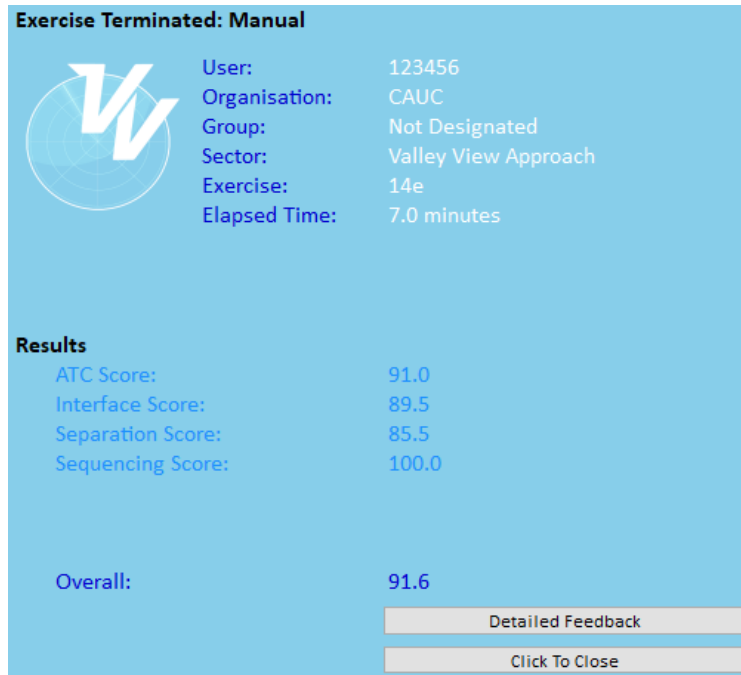
This set of six exercises provide a realistic simulation of an Approach+Departures position at a busy single runway airport:

- Exercise CT01: Runway 09 Light Traffic: **Duration: 45:00**
- Exercise CT02: Runway 27 Light Traffic: **Duration: 45:00**
- Exercise CT03: Runway 09 Moderate Traffic: **Duration: 45:00**
- Exercise CT04: Runway 27 Moderate Traffic: **Duration: 45:00**
- Exercise CT05: Runway 09 Busy Traffic: **Duration: 45:00**
- Exercise CT06: Runway 27 Busy Traffic: **Duration: 45:00**

Scoring

Competencies

After the simulator exercise has been completed the Termination Panel will display some feedback on performance, provided the exercise has been run for at least one minute.



Exercise Terminated: Manual

 User: 123456
Organisation: CAUC
Group: Not Designated
Sector: Valley View Approach
Exercise: 14e
Elapsed Time: 7.0 minutes

Results

ATC Score:	91.0
Interface Score:	89.5
Separation Score:	85.5
Sequencing Score:	100.0

Overall: 91.6

Detailed Feedback

Click To Close

For task trainer and primer exercises, specific completion information is provided. For other exercises on this course, a score will be reported in three competencies. These are:

- ATC
- Interface and
- Separation

Where used, the score for each competency is weighted and combined to produce an overall score. Algorithms for calculating the score in each of these competencies are outlined below.

For exercises that have been run for a minimum period (normally one minute), a **Detailed Feedback** panel is available by clicking the top button in the Feedback Panel. This panel will provide a detailed summary of metrics captured during the exercise.

Where the course is delivered using an online LMS this detailed information is also available to students and instructors by clicking on course links.

Completion

For an exercise to be completed, the following criteria must apply:

- For Task Trainer and Primer exercises, at least 80% of the tasks must be completed
- For other exercises the simulator must be run for 80% of the design length of the exercise. This does not include repeated time from backstepping the simulator.

Success

For an exercise to be marked as successful, the following criteria must apply:

- Score in each individual competency (ATC, Interface, and Separation) must not be less than 70% and
- Overall score must not be less than 80%.

Passing

For a student to be deemed as having passed the exercise, the following criteria must apply:

- The exercise must be Completed and
- The exercise must be Successful.

Weights

Sim Task Trainers and Primer Exercises:

For Sim Task Trainers, there are no individual competencies scored only an overall score. The overall score is the percentage of tasks that have been completed. This score is used to determine Completion, Success and Passing.

Other Exercises

The weights in the table below are applied for all other exercises.

Competency	Scoring Weight
ATC	1.0
Interface	1.0
Separation	0.8
Sequencing	0.6

ATC Competency:

Description

The ATC Competency is designed to capture the student's performance in performing general ATC tasks, other than separation and sequencing. This is generally related to the service provided to the aircraft. The ATC Competency not scored in Task Trainer or Primer exercises. It is scored in all other exercises.

Metrics

The following Metrics are used in scoring the ATC competency:

Metric	Details
Pauses	The number of times the exercise was paused.
Aircraft 'Killed'	The number of aircraft removed from the exercise.
Requests	The number of aircraft requests made. This is normally when descent is needed because the aircraft is too high when close to the airport.
Bad Phrases	The number of bad phrases that were issued in the exercise. Examples: <ul style="list-style-type: none"> • An aircraft is given descent to a level above • An aircraft is given climb to a level below • An aircraft is issued a right turn to a heading that is to the left • An aircraft is issued a left turn to a heading that is to the right • An aircraft is issued a visual approach when not visual • An aircraft is issued an ILS approach when not established and not issued an intercept heading.
Frequency Changes Incorrect	The number of frequency changes (transfers) incorrectly issued in the exercise.
Exit Level Incorrect	The number of times an aircraft was handed to the next sector and assigned the incorrect level.
Updates ALT	The number of individual radar/surveillance updates for which the aircraft was outside controlled airspace.
Updates MSAW	The number of individual radar/surveillance updates for which the aircraft was below the lowest safe altitude (where implemented).
Updates Slow	The number of individual radar/surveillance updates for which the simulator clock speed has been slowed.
Go-Arounds	The number of aircraft which execute a go-around (missed approach) in the exercise.

Updates DAIW	The number of individual radar/surveillance updates for which an aircraft is detected inside a Danger/Restricted area (where implemented).
Number Repeated Coordination	The number of times that a coordination request had to be repeated.
Handovers on Vector	The number of handovers with aircraft still on a vector.
Not Airborne	The number of aircraft that did not become airborne in the exercise.
Late Departures	The number of times an aircraft was delayed in departing.
Late Identifications	The number of times an aircraft was identified late (above 1,250 M).
Services not Terminated	The number of times an aircraft's services were not terminated on exiting controlled airspace.
Excessive Delays	The number of times an aircraft is subjected to an excessive delay in processing to the exit gate.
QNH Issuance (scored in non-metric versions).	The number of times: <ul style="list-style-type: none"> • An aircraft is issued an incorrect QNH • An aircraft is not issued a QNH prior to landing • An aircraft lands without having an incorrect QNH corrected.

Algorithm

The following table describes how the ATC score is calculated:

Metric	Deduction	Note
Pauses	0.25% for each Pause during the exercise.	One Pause is allowed without penalty.
Aircraft 'Killed'	7.5% is deducted for each aircraft 'Killed' (removed from the exercise).	Maximum deduction: 40%
Requests	1.5% is deducted for each request (such as a climb, descent or intercept request).	
Bad Phrases	1.5% is deducted for each Bad Phrase detected.	
Frequency Changes Incorrect	1.5% is deducted for each incorrect frequency change.	
Exit Levels Incorrect	1.5% is deducted for each incorrect exit level.	
Updates ALT	0.1% is deducted for each individual aircraft surveillance update detected outside controlled airspace.	Maximum deduction: 15%

Updates Slow	15% is deducted if more that 25% of the exercise time was conducted at a reduced clock speed.	
Go-Arounds	2.5% deducted for each Go-Around.	Not in Circuit Exercises Also scored in Sequencing
Updates DAIW	0.2% is deducted for each individual aircraft surveillance update detected inside a Danger/Restricted Area.	Maximum deduction: 15%
Number Repeated Coordination	0.5% deduction for each repeated coord.	Maximum deduction: 15%
Handovers on Vector	2.5% is deducted for each time an aircraft was handed over while still being vectored.	
Updates MSAW	0.1% is deducted for each individual aircraft surveillance update detected below the lowest safe altitude	Maximum deduction: 15%
Not Airborne	5% deduction for each aircraft that was not airborne when the exercise was finished or terminated.	
Late Departures	2.5% is deducted for each late departure.	Maximum deduction: 15%
Late Identifications	1.5% is deducted for each late identification.	Maximum deduction: 15%
Services not Terminated	2.5% is deducted for each failure to terminated services.	Maximum deduction: 15%
Excessive Delays	2.5% is deducted for each aircraft subjected to an excessive delay.	Maximum deduction: 25%
Incorrect QNH	1.5% deducted for each incorrect QNH issued.	Maximum deduction: 15%
No QNH Issued	1% deducted for time an aircraft lands without having a QNH issued.	Maximum deduction: 10%
Incorrect QNH uncorrected	1% deducted for time an aircraft lands having an incorrect QNH issued.	Maximum deduction: 15%

Interface Competency:

The Interface Competency is designed to capture the correct interaction with the label interface, such as keeping label contents up to date, and handing off and accepting aircraft in a timely fashion. The Interface Competency is not scored in Task Trainer or Primer exercises. It is scored in all other exercises.

Metrics

The following Metrics are used in scoring the Interface Competency:

Metric	Description
Updates CL Incorrect	The number of individual radar/surveillance updates for which Cleared level in the label did not match the assigned level.
Updates CL Highlight	The number of individual radar/surveillance updates for which Cleared level highlight in the label was on. This is an indication that level readbacks and initial calls are not being monitored.
Acceptances Late	The number of inbound aircraft tracks that were accepted too late (after crossing the airspace boundary).
Updates off Frequency Inside Sector	The number of individual radar/surveillance updates for which the aircraft was inside the sector but not on the user's frequency. This is an indication of a late acceptance.
Assumptions	The number of aircraft tracks that were assumed (forced acceptances without a handover).
Updates on Frequency Outside Sector	Individual radar/surveillance updates for which the aircraft was outside the sector but on the user's frequency. This is an indication of a late handoff/transfer.
Incorrect Strip Order	The number of times the aircraft landing sequence was incorrect based on the strip order.

Algorithm

The following table describes how the Interface score is calculated:

Metric	Deduction	Note
Updates CL Incorrect	0.1% is deducted for each individual aircraft surveillance update detected when the assigned level does not match the level in the label.	Two updates are allowed for each level change Maximum deduction: 15%
Updates CL Highlight	0.05% is deducted for each individual aircraft surveillance update detected when the CL is highlighted.	Allowance is applied of 2 updates per level change, 5 updates per acceptance and 15 updates for each departure Maximum deduction: 15%
Acceptances Late	1% is deducted for each late acceptance.	Maximum deduction: 15%
Updates off Frequency Inside Sector	0.1% is deducted for each individual aircraft surveillance update detected inside sector and off frequency.	Maximum deduction: 20%
Assumptions	1% is deducted for each Assumption.	Maximum deduction: 10%
Updates on Frequency Outside Sector	0.1% is deducted for each individual aircraft surveillance update detected outside sector and on frequency.	Maximum deduction: 15%
Incorrect Strip Order	1.5% for each landing for which the strip order was incorrect.	

Separation Competency:

The Separation Competency is designed to measure the ability to detect conflicts and apply (or regain) separation. The Separation Competency not scored in Task Trainer or Primer exercises. It is scored in all other exercises.

Metrics

The following Metrics are used in scoring the Separation Competency:

Metric	Description
Updates Loss of Separation	The number of individual radar/surveillance updates for tracks subject to a CA (loss of separation).
Losses of Separation	The number of conflicts (losses of separation) during the exercise.
Updates Loss of Separation Assurance	The number of individual radar/surveillance updates for tracks subject to a loss of separation assurance, that is, when aircraft are predicted to be in lateral conflict within a defined timeframe (90 seconds) without vertical separation being applied.
Losses of Separation Assurance	The number of losses of separation assurance during the exercise.
Wake Turbulence Violations	The number of wake turbulence violations during the exercise.

Algorithm

The following table describes how the Separation score is calculated:

Metric	Deduction	Note
Updates Loss of Separation	0.5% is deducted for each individual aircraft surveillance update subject to a CA (loss of separation).	
Losses of Separation	10% is deducted for each individual CA (loss of separation).	
Updates Loss of Separation Assurance	0.1% is deducted for each individual aircraft surveillance update subject to a loss of separation assurance.	
Losses of Separation Assurance	4% is deducted for each individual loss of separation assurance.	
Wake Turbulence Violations	5% is deducted for each individual wake turbulence violation.	

Sequencing Competency:

The Sequencing Competency is designed to measure the ability to correctly space arrivals onto a runway. The Separation Competency only scored in exercises that have arriving traffic, that is, the Combine Traffic set of exercises..

Metrics

The following metrics are used in scoring the Sequencing Competency: In the table below, the reference distances make use of the default target sequencing trail distances. If the trail distance is changed from default, then the reference distances will change proportionally. These reference distances are saved in the performance record.

Metric	Description	Reference Distance (Km)	Reference Distance (NM)
Go-Arounds	The number of aircraft which execute a go-around (missed approach) in the exercise.	-	-
Trails Very Low	The number of sequencing trails to the runway that were measured as 'Very Low'.	<9.0	<4.5
Trails Low	The number of sequencing trails to the runway that were measured as 'Low'.	9.0-10.0	4.5-5.0
Trails Ideal	The number of sequencing trails to the runway that were measured as 'Ideal'.	10.0-11.0	5.0-5.4
Trails High	The number of sequencing trails to the runway that were measured as 'High'.	11.0-13.0	5.4-6.0
Trails Very High	The number of sequencing trails to the runway that were measured as 'Very High'.	13.0-18.5	6.0-10.0
Trails Low and Vector	The number of sequencing trails to the runway that were below 'Ideal' and the following aircraft was under a vector.	<10.0	<5.0
Trails Ideal and Vector	The number of sequencing trails to the runway that were 'Ideal' and the following aircraft was under a vector.	10.0-11.0	5.0-5.4
Trails High and Vector	The number of sequencing trails to the runway that were above 'Ideal' and the following aircraft was under a vector.	>11.0	>5,4

Algorithm

The following table describes how the Sequencing score is calculated:

Metric	Deduction	Note
Go-Arounds	2.5% deducted for each Go-Around.	Also scored in ATC.
Trails Very Low	4% is deducted for each 'Very Low' trail	
Trails Low	2% is deducted for each 'Low' trail	
Trails Ideal	1% bonus is applied for each 'Ideal' trail	Maximum score limited to 100%
Trails High	1.5% is deducted for each 'High' trail	
Trails Very High	3% is deducted for each 'Very High' trail	
Trails Low and Vector	1% is deducted when the following aircraft is below 'Ideal' distance in trail and still under a vector.	
Trails Ideal and Vector	0.5% is deducted when the following aircraft is at an 'Ideal' distance and still under a vector.	
Trails High and Vector	4% is deducted when the following aircraft is above 'Ideal' trail distance and still under a vector.	

Course Improvement

Aviation is a dynamic industry. Airlines grow - and sometimes go out of business. Aircraft types are introduced and withdrawn from service. Visual Vectoring is committed to providing quality services for the delivery of ATC training. We prioritise the regular updating of our courseware to ensure an efficient training outcome.

Lesson Updates

Lessons will be updated when the content contradicts current working procedures and on request from the end user with the agreed support and upgrade conditions.

Exercise Updates

Exercises are constantly updated to reflect airline fleets and airlines that fly in certain regions.

The metric exercises will contain airlines and types customised for the end user. This will enable students to learn the callsign and radio telephony for local airlines that they will experience later in their training.

Appendix 1: Frequently Asked Questions:

Who will benefit from VV Departures™ training?	The first three modules of the <i>VV Departures™</i> is intended for delivery to <i>abinitio</i> and to <i>cross-stream</i> conversion trainees with limited or no Radar Approach experience. The final Combined Traffic module is best undertaken after completion of the <i>VV Approach™</i> course.
How is the training delivered?	The program may be delivered in an instructor-led classroom environment or distributed on desktop or laptop computers for self-paced learning. It may even be deployed to prospective recruits as part of an aptitude-testing process. An overview of a student's progress by a qualified instructor should be maintained.
What does it teach?	<i>VV Approach™</i> teaches practical processing of departing aircraft through the terminal area. It emphasised visualisation of traffic configurations, identifying and implementing deconfliction strategies, and organised information delivery.
What doesn't it teach?	Airspace-specific services, including clearance requirements, aeronautical information services such as meteorological advice and Inflight Emergencies are not covered.
Can extra content be added?	Yes. With the collaboration with local training experts, extra theory content may be added by the construction of PowerPoint-style lessons (run as movies) which are added to the main interface. Contact Visual Vectoring for more details.
Does the training content support regional variations in procedures and phraseology?	Yes. The instruction content in <i>VV Departures™</i> is designed to be generic in nature but may be customised to local phrasings and procedures. Similarly, the <i>VV Simulator</i> can be programmed with specific speech and data parameters to support any local requirements.

Appendix 2: Computer specifications

- Windows 7 (Ultimate), 8, 8.1, 10 or 11 operating system (English version of Speech Recognition essential)
- Minimum (and recommended) screen resolution: 1366x768 pixels
- Minimum screen size: 15.6"
- PDF reader
- Headset: 2 earphones + microphone. Common types are usually suitable, but USB devices are recommended.

In Academy or University training it is highly recommended that computers dedicated to VV training be used, and that they be made accessible to students for practice during otherwise unutilized hours. Monitors with 22"-24" screen and 1366x768 pixel resolution are ideal.

