



# Instructor Guide

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## Module 1: Introduction to VV Enroute

### Summary:

Consists of five lesson movies.

- General Information
- ATC Concepts
- VVE Radar display
- Radar Vectoring
- Altitudes and Flight Levels

### Duration:

These should take about 90 minutes to complete in total, the majority of which will be spent on the Radar Vectoring lesson. That lesson teaches the all-important theory of vectoring an aircraft to achieve an ATC purpose.

### Translation Resources (China Only):

Each of these lessons (and all on the course) has an associated PDF document containing Chinese translations of the English text. The student can access them by clicking on a screen icon. If a student needs help with the English, it is suggested they keep the document for the lesson open in the background as they view the movie.

It is emphasised that training cannot be performed from the PDF only, most of a slide's graphics have been removed.

The student should view the movie and pause it to switch to the PDF only to obtain a better understanding of the text. If printing is required, the PDFs can be located by clicking the red **Help** button on the main VVE interface and navigating to

...**Visual Vectoring Pty Ltd\VV Enroute\briefs\**.

### Supervision:

Students should be encouraged to pause the lessons and replay the movies as required, to ensure understanding. They should work at their own speed, ignoring any apparent progress being made by adjacent students.

The instructor should 'floor-walk', casually observing each student in turn without necessarily monitoring audio.

### Scoring:

There is no scoring in this module.

## Module 2: MAZE Vectoring

### Summary:

Consists of these parts.

- Basic MAZE; and
- Complex MAZE
- NEXUS (some installations).

This is where the basic vectoring skills are obtained and practised to a high level of expertise.

Each of these sections contains a lesson, a demonstration and a Simulator Task Trainer. There is then one simulator exercise in Basic and two in Complex.

### Duration:

The time an average student will take to complete this module varies. The primary factor is the student's English reading and speaking skills. Each of the two lessons has an attached PDF giving the Chinese translation of the English text. Demonstrations do not have PDFs because the English is largely in the form of spoken commands to pilots and their responses. Very short English texts appear briefly but their content is a confirmation of what is happening in the movie and their meaning should be easily translated by the student.

### Recommendations: Basic MAZE vectoring.

- The student should view the **Basic Lesson and Demonstration**. Then they should complete the **Simulator Task Trainer** to learn how to operate it.
- Next, complete the **Basic Maze Exercise (1)**, until it terminates (20 minutes after the 10<sup>th</sup> aircraft is added). The student should then re-watch the **Demo: Basic Maze Vectoring** movie to ensure that they are applying techniques correctly. They should then repeat the **Basic Maze Exercise** with the map rotated to any of the following alignments: 040, 140, 220 or 320 until all ten aircraft are managed and kept easily inside the airspace boundaries. They should repeat the exercise with other alignments until fully confident.
- The instructor should observe the student performing the exercise and recommend further practice if needed.

For Chinese versions of VVE, note that all exercises on the course can be performed with metric measurement – altitudes in metres, distances in kilometres and speeds in Km/Hour. Also, the aircraft have China-region callsigns, with relevant airline aircraft types.

Exercises should be done first in non-metric measurement to better apply what was learned in training.

### Supervision:

Students should be encouraged to pause the lessons and replay the movies as required to ensure understanding.

When observing simulation, the following assessments can be made:

- Is the student keeping the aircraft inside the *MAZE*? The majority should be flying headings parallel to the boundaries.
- Is the student moving the labels so that they are not overlying each other?
- Is the student having to repeat instructions? If so have them repeat the Speech Training. Check their pronunciation of instructions to aircraft.
- Is the student working confidently? If that is not the case, they will have difficulty progressing through the course. Time spent at this stage gaining expertise and confidence is beneficial.

### Recommendations: *Complex MAZE (and NEXUS) vectoring.*

- The student should view the **Complex MAZE Vectoring Lesson and Demonstration**.
- They should then do **Exercise MAZE 2**. In this exercise the aircraft have low speeds, to allow the student to become familiar with new ATC techniques covered in the training. Repeat the exercise with the map alignment rotated.
- When full confidence in managing all ten aircraft is attained the student can move to **Exercise MAZE 3**. This exercise contains aircraft at much higher speeds and it may take more than one run to gain the required expertise. Again, repeat the exercise as required with new map alignments;
- For Chinese versions, the student can then undertake some simulation with metric measurement. This should be done later because the training is related to non-metric measurement. For versions with *NEXUS*, the student can complete these exercises.

### Supervision:

In addition to aspects of student performance in Basic MAZE, the following should be observed:

- Are **LVL Alerts** showing? This means that the student is not climbing/descending the aircraft into the *MAZE*.
- Are **CL Alerts** showing? This means the label Cleared Levels are not being updated;
- Are there **White CL's** on display? This means that the student is not listening to level readbacks.
- Have any **Conflict Alerts** appeared? If so, more practice at recognising the possibility of a Loss of Separation is required.

- Is the traffic being managed confidently? Are the majority of the aircraft proceeding in an orderly manner around the *MAZE* – are they flying headings parallel to the *MAZE* boundaries?

#### Scoring:

Penalties are applied when:

- Aircraft are vectored outside the *MAZE*;
- Aircraft are not climbed/descended into the *MAZE*;
- There is a Loss of Separation (Conflict Alert);
- The Cleared Level (CL) in the label does not match the assigned level to the aircraft;
- The Cleared Level (CL) in the label remains white after an assigned level has been read back by the aircraft;
- ‘Bad Phrases’ are issued:
  - Using ‘right’ instead of ‘left’
  - Using ‘climb’ instead of ‘descend’;
  - Issuing a level outside the *MAZE*.

#### Completion:

In order to complete the *MAZE* (and *NEXUS*) exercises, the student must control all ten aircraft in the exercise for 20 minutes. As the exercise length is 30 minutes, all ten aircraft must be added in the first ten minutes.

## Module 3: GRID Vectoring

### Summary:

The module is aimed at teaching conflict recognition and conflict resolution. It consists of:

- A lesson on Conflict Recognition (duration 24:30);
- A Lesson on Conflict Resolution (duration 34:00);
- Demonstration (Duration 18:30);
- Simulator Task Trainer
- 5 Simulator Exercises (each duration ~25:00)
- 4 Random Simulator Exercises (duration 30:00-40:00).

### Recommendations:

- The students should complete the lessons and demonstration. They should be encouraged to pause and take their time to understand the concepts thoroughly;
- The Simulator Task Trainer should be completed;
- The first Simulator Exercise should be attempted, after which the student should review the demonstration to ensure that concepts are understood;
- The Random Exercises are intended as extension. They do not need to be completed. Subject to course requirements it is suggested that the students try each exercise on a rotated airspace.

### Supervision:

- Are **CL Alerts** showing? This means the label Cleared Levels are not being updated;
- Are there **White CL's** on display? This means that the student is not listening to level readbacks or not updating the display when they are heard.
- Have any **Conflict Alerts** appeared? If so, more practice at recognising the possibility of a Loss of Separation is required;
- Are aircraft being handed off prior to the boundary?
- Are aircraft being accepted before they cross the boundary?
- Are x-prompts being used correctly?
- Are aircraft on vectors for no reason?

### Scoring:

Penalties are applied when:

- Aircraft are accepted late (inside airspace);
- Aircraft are transferred to the next frequency too late (outside airspace);
- Aircraft are transferred to the next frequency too early (more than three minutes prior to exit);
- Aircraft are handed off on a vector;
- Aircraft are handed off to the wrong unit;

- Aircraft are transferred to an incorrect frequency;
- There is a Loss of Separation (Conflict Alert);
- The Cleared Level (CL) in the label does not match the assigned level to the aircraft;
- The Cleared Level (CL) in the label remains white after an assigned level has been read back by the aircraft;
- 'Bad Phrases' are issued
  - Using 'right' instead of 'left'; ○ Using 'climb' instead of 'descend';
  - Clearing an aircraft direct to a position not on its route;
  - Clearing an aircraft to position it is already tracking to.

### Completion:

In order to complete the GRID exercises, the student must run the simulator for at least 80% of the design length of the exercise. The non-random GRID exercises are ~25 minutes in length. Random exercises are 30-40 minutes in length.



## Module 4: Same Track Sequencing

### Summary:

The module is aimed at teaching formative sequencing skills with aircraft on the same track. It is divided into two sections:

- 2 Aircraft: In which only pairs of aircraft are required to be sequenced; and
- Multiple Aircraft: In which groups of four aircraft are required to be sequenced.

Each section contains a Lesson, a Demonstration and four simulator exercises.

### Recommendations:

- The students should complete the lessons and demonstration. They should be encouraged to pause and take their time to understand the concepts;
- The Simulator Task Trainer should be completed;
- The first Simulator Exercise should be attempted. The student should then review the demonstration to ensure that concepts are understood;

### Supervision:

- Are **CL Alerts** showing? This means the label Cleared Levels are not being updated;
- Are there **White CL's** on display? This means that the student is not listening to level readbacks.
- Have any **Conflict Alerts** appeared? If so, more practice at recognising the possibility of a Loss of Separation is required;
- Are aircraft being handed off prior to the boundary?
- Are aircraft on vectors for no reason?
- Does the sequencing look organised and accurate?

### Scoring:

Penalties are applied when:

- Aircraft are accepted late (inside airspace);
- Aircraft are transferred to the next frequency too late (outside airspace);
- Aircraft are transferred to the next frequency too early (more than three minutes prior to exit);
- Aircraft are handed off on a vector;
- Aircraft are handed off to the wrong unit;
- Aircraft are transferred to an incorrect frequency;
- There is a Loss of Separation (Conflict Alert);
- The Cleared Level (CL) in the label does not match the assigned level to the aircraft;
- The Cleared Level (CL) in the label remains white after an assigned level has been read back by the aircraft;
- 'Bad Phrases' are issued
  - Using 'right' instead of 'left';

- Using 'climb' instead of 'descend';
- Clearing an aircraft direct to a position not on its route;
- Clearing an aircraft to a position it is already tracking to.
- Aircraft trails are too large or too small. The ideal trail distance is 20-22 NM or 40-45 Km.

#### Completion:

In order to complete the *DIAMOND* exercises, the student must run the simulator for at least 80% of the design length of the exercise. The exercises are ~50 minutes in length, so must be run for at least 40 minutes.

## Module 5: Multi-Track Sequencing

### Summary:

The module is aimed at teaching formative sequencing skills with aircraft on different tracks to the same Gate. It is divided into two sections:

- 2 Aircraft: In which only pairs of aircraft are required to be sequenced; and
- Multiple Aircraft: In which groups of four aircraft are required to be sequenced.

Each section contains a lesson and a demonstration and four exercises.

### Recommendations:

- The students should complete the lessons and demonstration. They should be encouraged to pause and take their time to understand the concepts;
- first Simulator Exercise should be completed. The student should then review the demonstration to ensure that concepts are understood.

### Supervision:

- Are **CL Alerts** showing? This means the label Cleared Levels are not being updated;
- Are there **White CL's** on display? This means that the student is not listening to level readbacks.
- Have any **Conflict Alerts** appeared? If so, more practice at recognising the possibility of a Loss of Separation is required;
- Are aircraft being handed off prior to the boundary?
- Are aircraft on vectors for no reason?

### Scoring:

Penalties are applied when:

- Aircraft are accepted late (inside airspace);
- Aircraft are transferred to the next frequency too late (outside airspace);
- Aircraft are transferred to the next frequency too early (more than three minutes prior to exit);
- Aircraft are handed off on a vector;
- Aircraft are handed off to the wrong unit;
- Aircraft are transferred to an incorrect frequency;
- There is a Loss of Separation (Conflict Alert);
- The Cleared Level (CL) in the label does not match the assigned level to the aircraft;
- The Cleared Level (CL) in the label remains white after an assigned level has been read back by the aircraft;
- 'Bad Phrases' are issued
  - Using 'right' instead of 'left';
  - Using 'climb' instead of 'descend';

- Clearing an aircraft direct to a position not on its route;
- Clearing an aircraft to a position it is already tracking to.
- Aircraft trails are too high or too low. The ideal trail distance is 20-22 NM or 40-45 Km.

#### Completion:

In order to complete the *DIAMOND* exercises, the student must run the simulator for at least 80% of the design length of the exercise. The exercises are ~50 minutes in length, so must be run for at least 40 minutes.

## Module 6: Diamond Traffic:

### Summary

The module combines all the skills learned on the course. It teaches the overall traffic management in a busy Enroute/Area Control sector. The traffic flow is highly realistic, and its mastery is a good indication that the student has learned sound techniques and has aptitude for ATC work.

The **Diamond Traffic Lesson** is an examination of the traffic in one of the forthcoming simulator exercises. It details the way in which a controller accepts control of aircraft from an adjoining sector, processes them through crossing traffic to arrive at their exit gate at a specified level and correctly sequenced with other aircraft through that gate. This teaching format is called a *Storyboard*.

The **Diamond Traffic Demonstration** shows the real-time processing of a different exercise, with audio of Controller/Pilot communications. It should be viewed by the student in detail, which will require regular movie pauses to absorb the content.

Then follows four structured simulator exercises which the student should perform and repeat until full control of the traffic, correct interface with adjoining sectors, and the maintenance of a correct display are achieved.

Finally, four exercises of randomly generated traffic conclude the module. There is no necessity for the student to complete these, they are provided only as an option for additional practice simulation.

### Recommendations:

- The students should complete the lessons and demonstration. They should be encouraged to pause and take their time to understand the concepts;
- The first Simulator Exercise should be completed. The student should then review the demonstration to ensure that concepts are understood;

### Supervision:

- Are **CL Alerts** showing? This means the label Cleared Levels are not being updated;
- Are there **White CL's** on display? This means that the student is not listening to level readbacks.
- Have any **Conflict Alerts** appeared? If so, more practice at recognising the possibility of a Loss of Separation is required;
- Are aircraft being handed off prior to the boundary?
- Are aircraft on vectors for no reason?

## Scoring:

Penalties are applied when:

- Aircraft are accepted late (inside airspace);
- Aircraft are transferred to the next frequency too late (outside airspace);
- Aircraft are transferred to the next frequency too early (more than three minutes prior to exit);
- Aircraft are handed off on a vector;
- Aircraft are handed off to the wrong unit;
- Aircraft are transferred to an incorrect frequency;
- There is a Loss of Separation (Conflict Alert);
- The Cleared Level (CL) in the label does not match the assigned level to the aircraft;
- The Cleared Level (CL) in the label remains white after an assigned level has been read back by the aircraft;
- 'Bad Phrases' are issued
  - Using 'right' instead of 'left';
  - Using 'climb' instead of 'descend';
  - Clearing an aircraft direct to a position not on its route;
  - Clearing an aircraft to a position it is already tracking to.
- Aircraft trails are too high or too low. The ideal trail distance is 20-22 NM or 40-45 Km.

## Completion:

In order to complete the DIAMOND Traffic exercises, the student must run the simulator for at least 80% of the design length of the exercise. The exercises are ~50 minutes in length, so must be run for at least 40 minutes.