VV Approach™

Product Description and Factsheet

Product description:

VV Approach™ is a self-contained PC-based training program for Air Traffic Controllers. Specifically, it teaches the sequencing of jet and prop-jet aircraft onto a runway with any alignment and in any wind conditions by the use of radar vectoring and speed control techniques. It assumes zero knowledge of Air Traffic Control at commencement, so it is ideal for *ab initio* students. It is equally suitable for controllers in other streams transferring to a Terminal Area Radar environment.

Preamble

Traditionally, Air Traffic Control has been taught using a *heuristic,* or problem-solving approach whereby various air traffic scenarios are presented in a simulator environment and the student is required to manage effectively the scenarios in 'real time'. Strategies for coping with each scenario are learned by exposure to the traffic, rather than through organised instruction.

In contrast, *VV Approach*™ uses an *algorithmic* or step-by-step approach, which provides students with a developmental sequence of proven air traffic management strategies devised by an expert in the field. This structural framework of strategies ensures that students have a solid foundation of skills that can be applied to an extensive range of Air Traffic Control scenarios.

The algorithmic training approach means that students no longer need to devise their own strategies whilst training, only to find that later they may not be as appropriate or effective in a 'real time' environment. Instead, students can now benefit from an expert, step-by-step model in *VV Approach*™, enabling them to develop their own cognitive framework of coping strategies to take to sector-specific training.

The course itself is practical rather than theory-based, such that, while it does have a theoretical foundation, it aims to teach the skills actually required to perform the Terminal Area Radar Function. These techniques are taught primarily through the use of positive visual cues, as it is argued that once these visual cues are learned, Radar Control becomes a subconscious process.

As the *VV Approach* course is computer-based, and therefore portable, it will allow new students to learn at their own pace, and existing controllers to re-familiarize themselves with minimal downtime, and without the need for a system-based simulator.
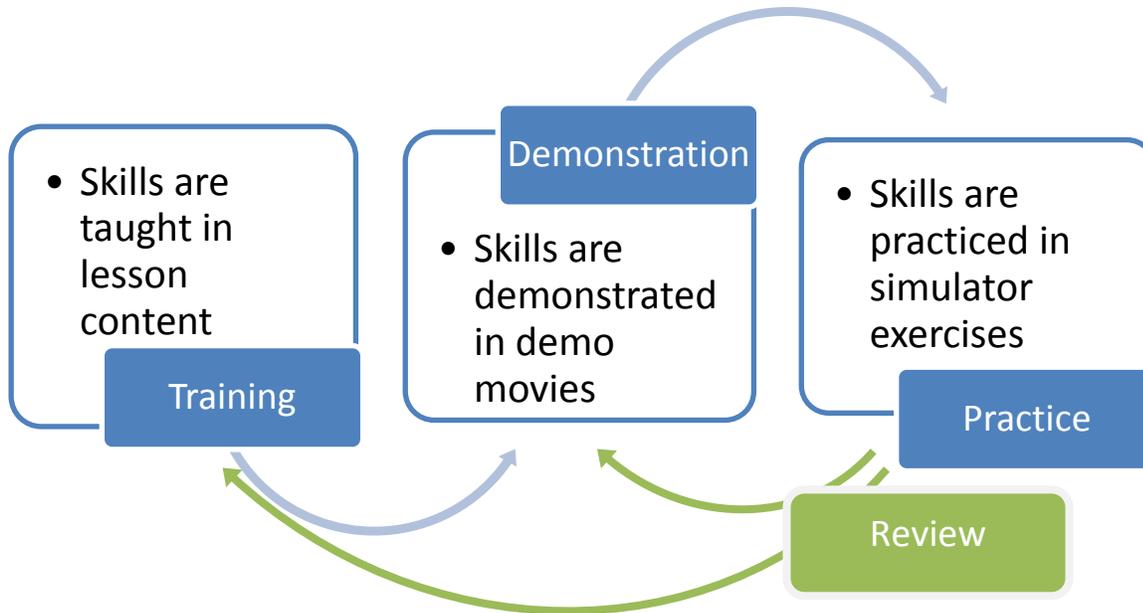
Skills taught by *VV Approach*:

- Aircraft callsign formats and usage
- Aircraft operations in a typical Terminal Area
- Operation of a typical modern Air Traffic Control radar workstation
- Measurement of bearing and distance on a radar screen by eye alone
- Interpretation of radar information and its relation to aircraft movement
- Assessment, implementation, monitoring and correction of aircraft turns
- Basic radar vectoring techniques, with an emphasis on Terminal Area traffic
- Separation of aircraft by their radar position and movement
- Separation of aircraft by application of a vertical buffer between their levels
- Wake turbulence separation
- Vectoring aircraft around typical visual and ILS circuit patterns
- ILS intercept techniques
- Correct spacing between aircraft for landing and its achievement
- Aircraft performance: Speeds, turn rates, climb and descent rates and profiles
- R/T phrases for control of aircraft in Terminal Area operations
- Sequencing of inbound aircraft in all configurations onto a runway by radar vectoring and speed control, to a high level of precision and over lengthy periods of time
- Effects of wind on aircraft operations and techniques for recognising and compensating for drift
- Acceptance and Hand-off procedures
- Transfer-of-aircraft communications procedures
- HMI (Human Machine Interface) skills
- Techniques for assuring aircraft safety in the event of communications failure whilst under Radar Control

Training structure:

VV Approach contains a total of approximately twenty hours of training materials and approximately one hundred hours of structured simulator exercises.

Training is done in five Phases, each of which contains lessons, demonstrations and simulator exercises that form a *Learning Step*. Skills acquisition is cumulative as the Phases progress – each adds to what has been learned earlier. Training is self-paced and done in private or under instructor supervision. Instruction elements can be reviewed at will and unlimited practice simulation is provided at each Learning Step, ensuring positive rates of development.

Learning Step structure:

- Skills are taught in lesson content

  Training

- Skills are demonstrated in demo movies

  Demonstration

- Skills are practiced in simulator exercises

  Practice

Review

1. **Training** lesson(s): Instruction presented as a DVD-style movie. The training platform is a radar display overlaid with graphics and spoken instruction. Full control of the *flow of information* is available by pausing and forward/reverse scanning the movie player.

2. **Demonstration(s):** DVD-style 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 control techniques being used to the lesson content. The movies can be paused and reviewed at will.

3. **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. The exercises are structured to increase in complexity as the student's skill levels rise. At the conclusion of each exercise series a Test Exercise is presented to allow the student to test for readiness to move to the next Learning Step.   Test Exercises must be run at normal clock speed and in real time – the simulator cannot be paused. See Page 10 for a list of simulator features.

4. **Review**. The student is free to revisit the training and demonstration content to review and consolidate.

All lessons, demonstrations and exercise series are preceded by a written *Student Brief* (PDF document), accessed from the main menu.

A written checklist is provided for completion by the student after every exercise series to assist self-assessment of performance and readiness to progress to the next Learning Step.

Training Phases:

1. **Phase 1** contains an introduction to the course and five elements comprising a Learning Step. Each element contains a lesson. Demonstrations and simulator exercises follow the lesson at two critical points (after Lessons 3 and 5). The first exercise presents ten jet aircraft and the second six jets and four prop-jets. Also included is a *Simulator Task Trainer* that teaches the manipulation of the simulator functions ('buttons to press')

Phase 1
Sim Tour
Lesson 1
Lesson 2
Lesson 3
Lesson 3 Demo
Sim Task Trainer
Lesson 3 Exercises
Lesson 4
Lesson 5
Lesson 5 Demo
Lesson 5 Exercises

Learning Outcome: On completion of this phase the student will have acquired the ability to vector numbers of aircraft from takeoff, around a standard circuit pattern and for a visual approach and landing on the same runway. Or, to vector aircraft to any point witiin the Terminal Area and then to join a standard circuit leg for landing, with full understanding and control. Correct separation of aircraft will be maintained at all times.

2. **Phase 2** contains one lesson, one demonstration and two simulator exercises. The first exercise presents ten jet aircraft and the second six jets and four prop-jets. It teaches the theory and practice vectoring aircraft for an intercept of an Instrument Landing System.

Phase 2
Lesson 6
Lesson 6 Demo
Lesson 6 Exercises

Learning Outcome: On completion of this phase the student will be able to vector aircraft around the circuit pattern and for a correct ILS intercept and landing. Or, to vector aircraft from any point within the Terminal Area for a correct ILS intercept and landing.

3. **Phase 3** contains four lessons, two demonstrations and two simulator exercises. The first exercise presents ten jet aircraft and the second six jets and four prop-jets. It teaches the theory of setting the landing spacing between two aircraft and allows the student to apply that theory to the sequencing of the circuit pattern aircraft onto the runway via an ILS approach.
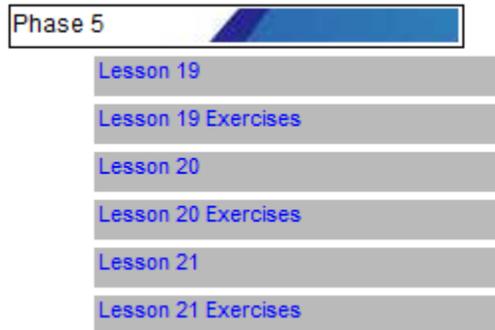

Learning Outcome: On completion of this phase of the course the student will be competent at departing aircraft from a runway, vectoring them around standard circuit patterns of various dimensions, containing their flight within the limits of controlled airspace, and sequencing them accurately back onto the runway via ILS approaches. Correct separation between all aircraft is maintained at all times.

4. **Phase 4:** This phase contains eight lessons, five demonstrations and sixty-five simulator exercises, each of an average sixty minutes' duration. In a series of Learning Steps it teaches the sequencing of aircraft inbound to the Terminal Area on Standard Terminal Arrival Routes. The steps are structured to build the complexity of traffic configurations, each adding to the ones that preceded it. Initially only aircraft inbound on STARs between square downwind and square base directions require sequencing action. Directions are added in stages, culminating in aircraft inbound on the runway extended centreline. *Simulator Test Exercises* are provided to check student progress at each step.

Phase 4

Lesson 11

Lesson 12

Lesson 13

Lesson 13 Demo

Lesson 13 Exercises

Lesson 14

Lesson 14 Demo

Lesson 14 Exercises

Lesson 15

Lesson 15 Demo

Lesson 15 Exercises

Lesson 16

Lesson 16 Demo

Lesson 16 Exercises

Lesson 17

Lesson 17 Demo

Lesson 17 Exercises

Lesson 18

Lesson 18 Exercises

Learning Outcome: On completion of this phase the student will be capable of accepting control of aircraft inbound to the Terminal Area from all directions and sequencing them in all configurations onto the runway with full control and understanding. Correct separation will be maintained at all times, and sound procedures to guard against possible communications failure will be established.

5. **Phase 5:** This phase consists of three lessons and twenty-five simulator exercises. It teaches a range of ancillary skills including the control of aircraft experiencing wind effects, Speed Control as a sequencing tool, and the application of standard sequencing techniques to operations on runways of any magnetic alignment.

Learning Outcome: On completion of this phase students will have acquired high-level skills at managing Terminal Area jet and prop-jet aircraft. They will be capable of sequencing high-density traffic inbound from all directions and in all configurations onto a runway with any magnetic alignment and any wind conditions with any prescribed landing spacing.

Aviation English aspects:

The lessons and demonstrations in *VV Approach* contain a total of approximately 140,000 words of spoken English in an Air Traffic Control context. The *VV* simulator speech recognition program requires the user to speak in correct Aviation English. These two factors present ideal tuition for students to whom English is not the native language. The spoken English instruction can be replayed at will to assist understanding. The course can be supplied with printed script of all the spoken content to assist further. The script is arranged in paragraphs with an on-screen numbering system that facilitates the correlation of spoken and written words.

VV Student Tracking:

This program is incorporated into the ANSP version of *VV Approach.* A wide range of parameters of student usage and performance is recorded on the security USB device for later collation and analysis.

For more information, or to arrange for a trial, contact us at info@visualvectoring.com or telephone +61738991173.

The *VV Simulator*.

The *VV Simulator* emulates a modern Radar Workstation and provides a very realistic teaching and practice platform. Its principal features include:

- PC-based. Laptop machines are ideal and low-cost machines are adequate
- Speech Recognition operation with synthesised aircraft replies
- Realistic pilot prompts: Illogical control instructions are queried
- Variable clock speed from x0.5 to x2
- Instant clock speed change between x1 and x2 (F keys) to minimise 'dead' time
- Clock may be paused and back-stepped to afford re-processing and correction of situations not ideally handled
- Electronic measurement of bearing and range
- Conflict alerts
- Conflict prediction tools
- Graphic route function
- Aircraft callsign text display
- Route alerts
- J-Rings
- Electronic flight progress strips
- On-screen texting
- Label display of aircraft callsign, type, Mode C Level, Cleared Level and groundspeed. Other data can be manually entered
- Coordination prompts
- Customisable interface (HMI)
- Aircraft speed performance prompts
- Performance evaluation: The distance spacing achieved between pairs of landing aircraft is displayed and recorded for later analysis
- Display of an aircraft's current Indicated Airspeed and the maximum and minimum speeds it can accept at its present distance from touchdown
- Full mouse control for use when speech is not convenient

Frequently Asked Questions:

Who will benefit from *VV Approach* training?	*VV Approach* is intended for delivery to abinitio and cross-stream conversion trainees in the Terminal Radar stream.
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.
What does it teach?	*VV Approach* teaches complex Approach Radar Control, including vectoring, vertical and lateral separation and jet and propjet sequencing onto runways of any alignment and in any wind conditions. See Page 2 for a full list of skills that are covered.
What doesn't it teach?	The processing of departing and very slow inbound aircraft are not currently included in the course. However, these are planned for future versions.
Can extra content be added?	The training is generic in nature; the skills taught are pertinent to operations at any airport. As such it is not practical or necessary to inject local content. A student graduating from the course will be well prepared for the necessary local training to follow.
Does the training content support regional variations in procedures and phraseology?	Yes. The instruction content in *VV Approach™* is designed to be generic in nature, but may be customised to local phrasings and procedures. Similarly, the *VV* Simulator can be programmed with specific speech and data parameters to support any local requirements.
How is *VV Approach* supplied?	The *VV Approach* training program is installed from a USB stick. File size is approximately 1.8Gb. The use of the program is controlled by a USB security device (dongle) that limits access to one computer at a time. Licensing is per dongle per year.
How much does it cost?	*VV Approach* is licensed to training organisations for use on an annual basis. Fees depend on the number of trainees that will be using the program and whether they are abinitio or cross-stream. Customised features that may be required are extra. The overall cost of the use of *VV Approach* will be a small fraction of the cost of delivering the same training by traditional methods. Contact us on sales@visualvectoring.com for more information.
Can I trial the program?	Yes, a trial version is available for testing by ANSPs and ATC Training providers.

Appendix 1: Computer specifications for using Visual Vectoring products:

- Windows 7 operating system (English version)
- Minimum (and recommended) screen resolution: 1366x768 pixels
- Minimum screen size: 15.6"
- PDF reader
- No LAN connections
- 2Gb available disc space
- Headset: 2 earphones + microphone.   Common types are suitable.

In Academy training it is highly recommended that computers dedicated to *VV* training be used. Monitors with 22"-24" screen and 1366x768 pixel resolution are ideal.

Appendix 2: *VV Approach*™ in the Academy environment

All *VV* training differs from traditional delivery methods in that it is done independently by the student at his/her own pace and without the constant need for the physical presence of an instructor. For that reason no attempt need be made to structure it into a schedule to which all students are committed. There should be no pressure on students to reach perceived performance milestones, removing probably the largest impediment to success in current training.   Visual Vectoring recommends the following method of introduction:
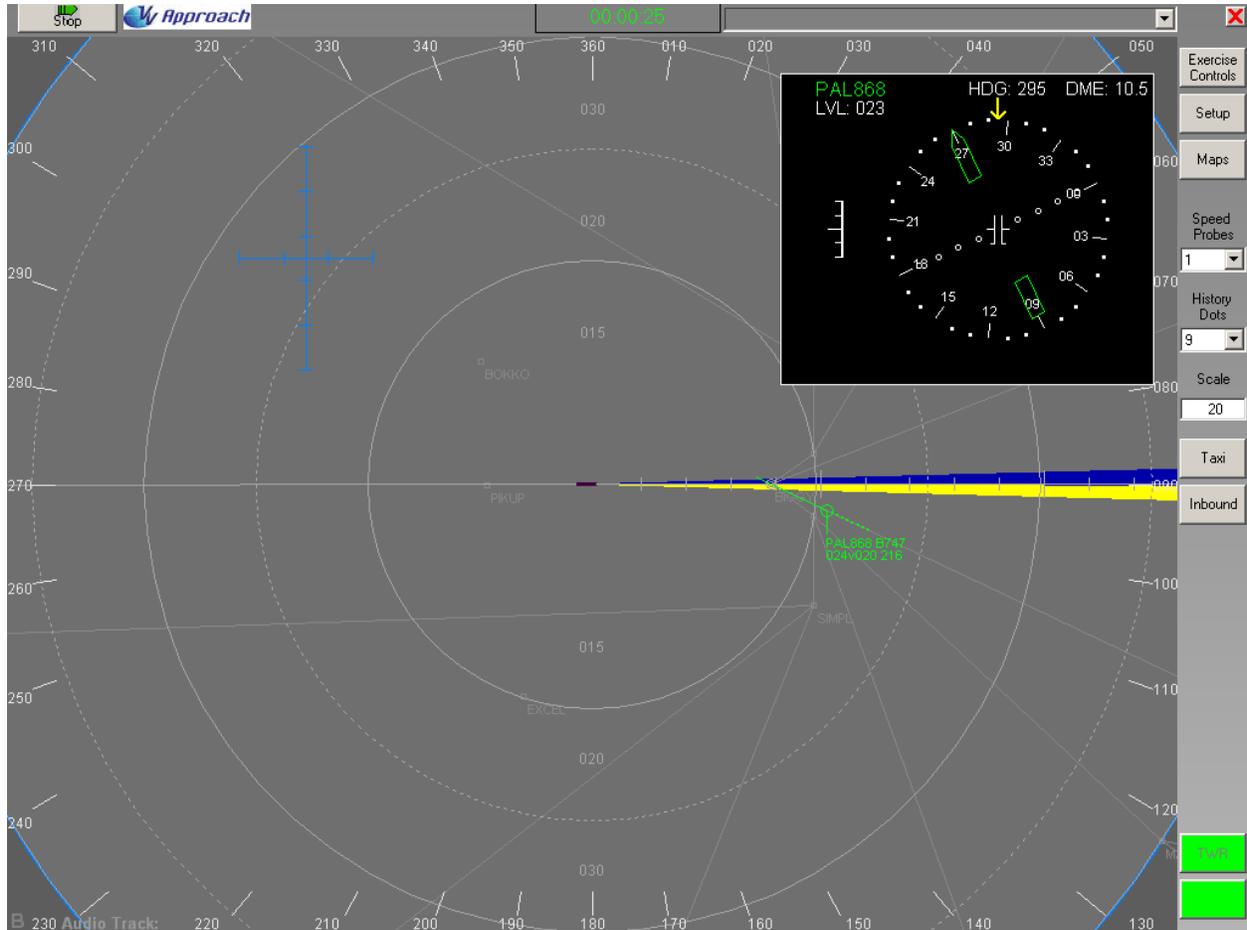
Abinitio students for the Terminal Control stream:

1. The students should be introduced to *VV Approach*™ very early – ideally at the beginning of the second week of their time at the Academy. By that time the induction process should have been completed and theory classes commenced – but simulator training would probably be a few weeks away. *VV Approach*™ has sufficient theory content to allow the student to learn practical skills. Detailed classroom delivery of theory then runs parallel with practical *VV* training and the two in combination will develop sound understanding of what is being taught.

2. Ideally, the students' day should be divided into two segments, with theory content delivered in the morning and *VV* training conducted in the afternoon. This schedule minimises the effects of learning inertia, which is more pronounced in the afternoons and during passive theory sessions. Practical training in afternoon sessions will be far more productive than theory.

3. The students should be allowed to work their way through *VV Approach*™ their own pace. An instructor should be present as a 'floorwalker' to assist as required. Students should be allowed to confer with others, subject to class disruption factors; comparing experiences is invaluable to people learning new skills. They should be allowed to extend their *VV* training beyond rostered times if they wish. This would be no different to spending time studying theory at home, other than that it is practical skills that are being studied and practised.

4. Students should have access to the *VV* computers whenever they have spare or unutilised time at the Academy (even lunch breaks) to afford them as much practice time as possible.

5. The computers should be numbered to correspond to the dongle numbers. Each student should work on only one computer, because changing machines requires re-training of the Speech Recognition program.

6. During observation of students' performance instructors should assess skills acquired and cover any deficiencies in the live simulator sessions that will follow *VV* training.

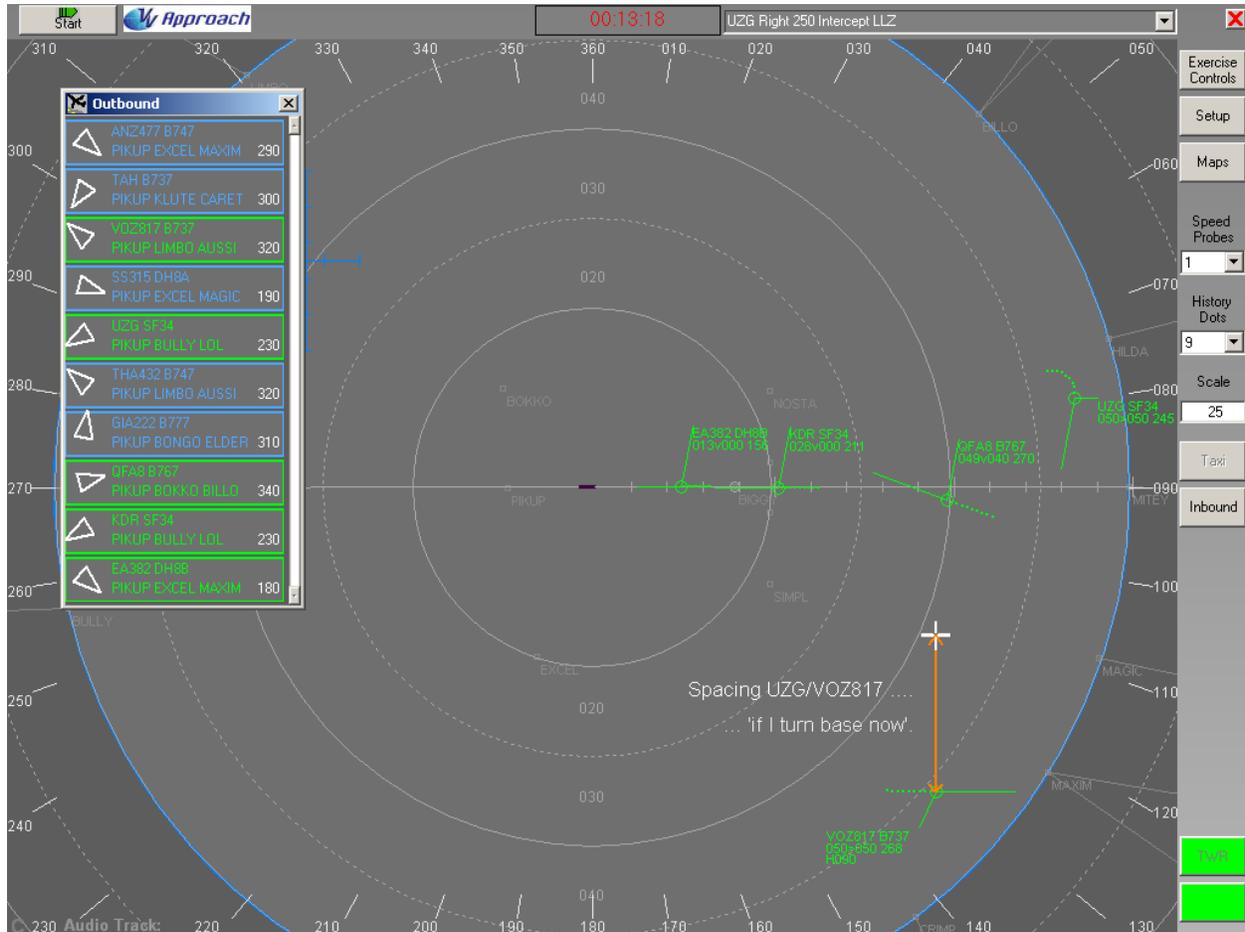**Controllers experienced in other streams (Tower, Enroute/Area) transferring to Terminal Radar Control:**

1   The students should be introduced to *VV Approach*™ very early – ideally at the beginning of their time at the Academy. *VV Approach*™ has sufficient theory content to allow the student to learn practical Approach skills. Detailed classroom delivery of theory then runs parallel with practical *VV* training and the two in combination will develop sound understanding of what is being taught.

2   Ideally, the students' day should be divided into two segments: theory in the morning and *VV* in the afternoon. This allows both theory and practical training to proceed independently, with the real advantage that theory is not done during the less-than-ideal afternoon sessions (the 'doze off' factor).   Practical training in afternoon sessions will be far more productive than classroom/theory.

3   The students should be allowed to work their way through *VV Approach*™ their own pace. An instructor should be present as a 'floorwalker' to assist as required.

4   Students should have access to the *VV* computers whenever they have spare or unutilised time at the Academy (even lunch breaks) to afford them as much practice time as possible.

5   The computers should be numbered to correspond to the dongle numbers. Each student should work on only one computer, because changing machines requires re-training of the Speech Recognition program.

6   During observation of students' performance, instructors should assess the generic skills acquired and structure post-*VV* simulator training to apply them to local airspace and traffic scenarios. After a few courses an ideal live simulation program will be established.
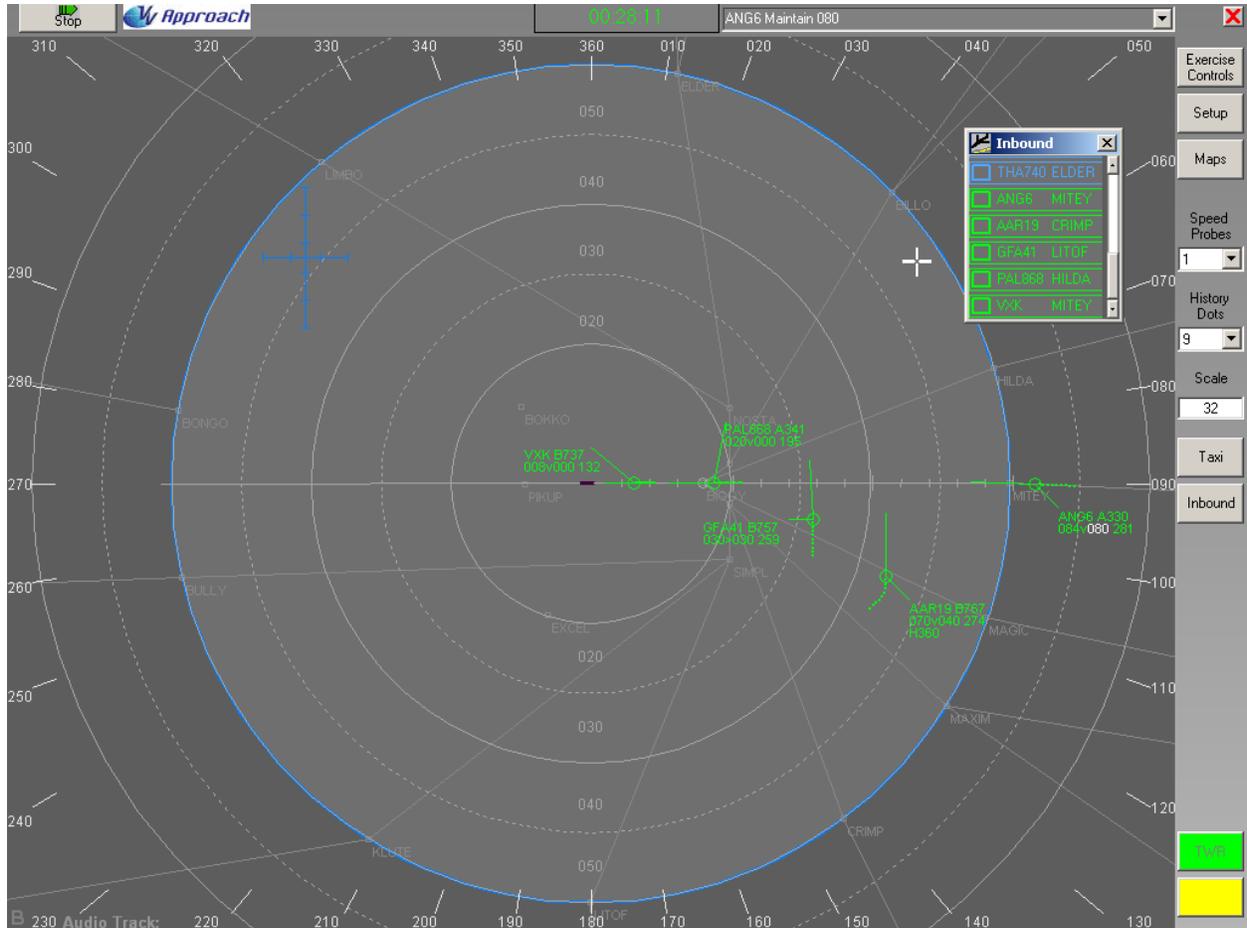
Appendix 3: Simulator screen captures

Phase 1:

*From **Lesson 5 Demonstration**: Vectoring aircraft around a standard circuit pattern*

Phase 2:

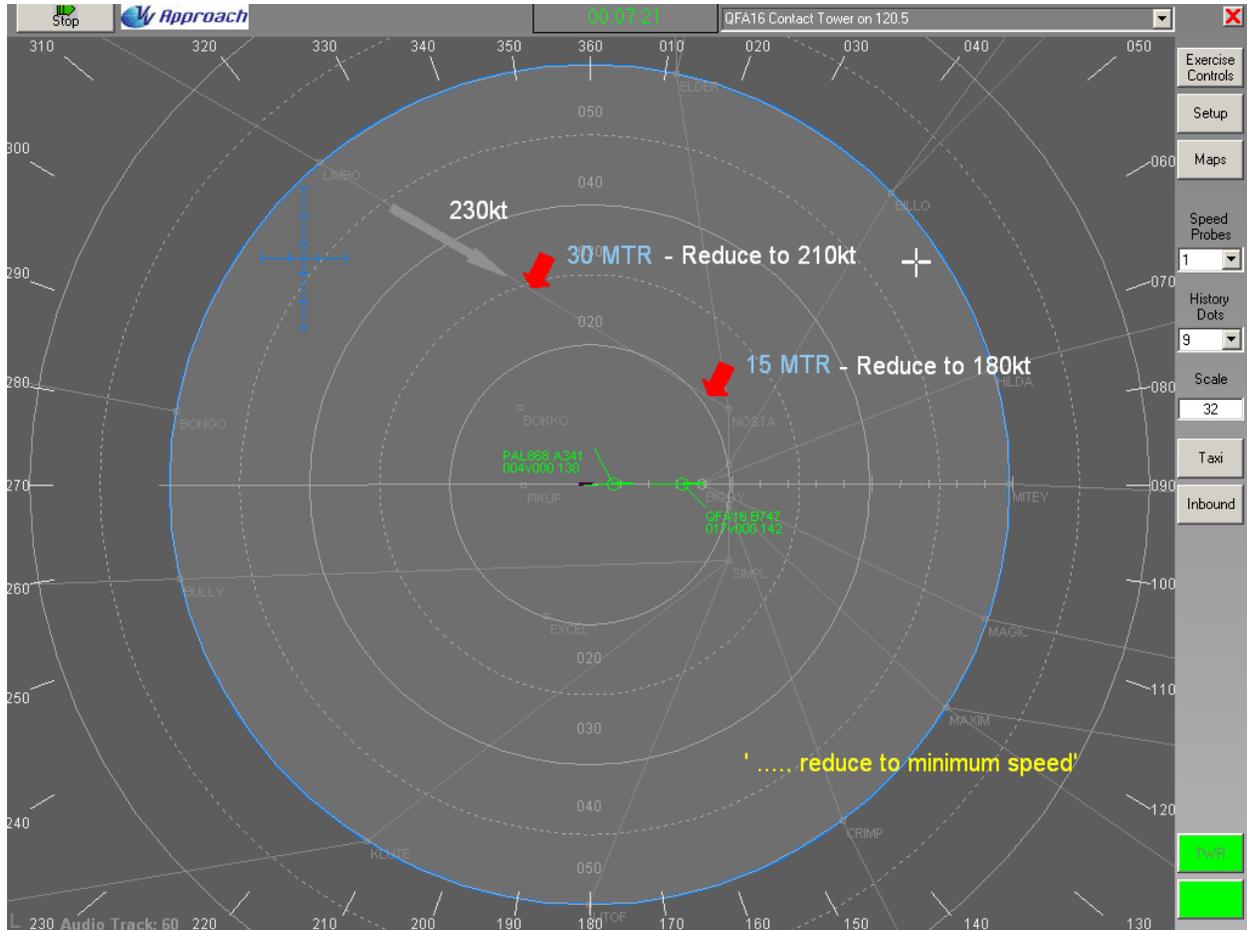*From **Lesson 6**: Intercepting the ILS*

Phase 3:

*From **Lesson 10 Demonstration**: Sequencing circuit pattern aircraft*

Phase 4:

*From **Lesson 17 Demonstration**: Sequencing straight-in aircraft*

Phase 5:

*From **Lesson 20**: Speed Control as a sequencing tool.*

Subtitled versions:

*From **Lesson 16 Demonstration**: Chinese subtitles*