Virtual Air Traffic Simulation
Caribbean Division

VATCAR

APPROACH/DEPARTURE
STUDY GUIDE

Issue No. 001

October 22, 2004

Bill Raymond, VATCAR Director

Mike Nowinski, VATCAR Training Director

Note: This is not for real-world training

TABLE OF CONTENTS

INTRODUCTION

This VATCAR Approach Control Study Guide is designed to build on knowledge you have already gained in the Basic, Ground Control, and Tower Study Guides. Approach/Departure Control is perhaps the most complex of all the control positions in ASRC. It is the first one dealing primarily with the control and separation of IFR aircraft. In Ground Control and Tower, your primary

responsibility was to set an orderly sequence of arrivals and departures; most of the responsibility for avoiding collisions with other aircraft and navigation was on the pilot. Now in addition to setting the sequence, you are responsible for separating the aircraft from each other and the terrain. You must select the routes and altitudes the pilots will fly. You must take the aircraft from the runway up into the enroute system and bring others down to a safe approach and landing. What you learn here will form the basis for much of what you do while working Center.

CHAPTER 1 - AIRSPACE AND OPERATING POSITIONS

1-1. In real-life, all the airspace belongs to the FIR/ARTCC. TheFIR/ARTCCin-turn delegates the airspace around major airports to the Approach Control. The lateral and vertical limits of each Approach Control's airspace are individually tailored. Some Approach Controls are quite large serving several busy airports while others are relatively small with only the primary airport and perhaps one or two small secondary airports. When an airport doesn't lie within an Approach Control's airspace theFIR/ARTCCprovides limited approach/departure service.

1-2. In ASRC very few Approach Controls have any airspace boundaries depicted. Therefore, the standard Approach Control airspace has been set at 40 NM from the primary airport, from the surface to 10,000 AGL. If additional airspace is needed to contain operations at a secondary airport, these dimensions may be expanded if coordinated and agreed to by APP and CTR.

1-3. Approach Control is the generic name given to the radar facility responsible for controlling IFR and, in Class B and C Airspace VFR aircraft in the vicinity of the primary airport. Other names you may have heard are CERAP, TRACON, RAPCON, RATCF, or ARAC.

1-3-1. Approach Control is also the name given to the main operating position or sector within the facility. The other main sector is Departure. Depending on how busy or complex the operation is, there may be other sectors as well. Their names will vary from one facility to another. Some common sector names are Arrival, Pattern, Feeder, and Final. Additionally, sectors may be designated by the portion of the airspace they control, e.g. High Approach, Pattern East, West Feeder, or the name of a secondary airport, Sitac Arrival, Vermo Four Departure.

1-3-2. Regardless of the sector name, each sector is given a portion of the Approach Control's overall airspace to control. Anything going on in that airspace is the responsibility of the sector controller. The sector name may be Departure but if there is a secondary airport completely within his airspace, that controller performs the approach control function as well.

1-4. This idea of only one controller responsible for each block of airspace is a cornerstone of the ATC system. That one controller knows where all his airplanes are and what he plans to do with them. He doesn't have to worry about any conflicts created by another controller working aircraft in the same airspace.

1-5. In ASRC, the need to sectorize doesn't come up often, but if it does you must coordinate with adjacent controllers and agree to the sector boundaries. Try to keep them as simple as possible to eliminate the need for excessive coordination. Each controller must keep all his aircraft within his own sector until he has completed coordination and obtained approval from the adjacent controller to enter the other controller's airspace.

CHAPTER 2 - PROCEDURAL PREFERENCE

2-1. There are two main methods to control IFR traffic: Radar and Non-Radar.

2-1-1. Radar is used to accurately determine each aircraft's position in order to separate and sequence traffic.

2-1-2. Non-radar uses time and distance to create blocks of protected airspace for each aircraft along its route.

2-2. In real-life, both methods are normally used together according to the situation and equipment limitations. Radar coverage is not always 100%.

2-3. ASRC is a 100% radar environment. It's not possible for an aircraft to be connected to the VATNET system and not show up on radar. It may only show a partial data block but it's still there. Therefore, non-radar procedures will not be covered in this study guide.

CHAPTER 3 - COORDINATION

3-1. By this time, you should have a pretty good idea of what needs to be coordinated and what doesn't.

3-2. You already know what needs to be coordinated with Tower. Some of the things you should coordinate with Center are routings for arrivals and departures, altitude restrictions, and handoff points and altitudes. If you coordinate and agree to standard procedures for these things, it will eliminate the need to coordinate for each aircraft individually.

3-3. In the Basic Study Guide, you learned about Handoffs. A Handoff is simply the transfer of responsibility for control of an aircraft from one controller to another. It included changing the aircraft to the next controller's frequency.

3-4. Another term used between two radar controllers is "POINTOUT." A pointout is a request from one controller to enter the airspace of another controller without transferring control or communications.

3-4-1. A pointout is similar to a non-automated handoff in that you state the word "POINTOUT" the aircraft's position, callsign, and your request, e.g. "POINTOUT 35 NORTHEAST OF ABQ UAL535 REQUEST EXTENDED DOWNWIND."

3-4-2. The other controller has three options:

3-4-2-1. "POINTOUT APPROVED" which means you may enter his airspace as requested and retain control of the aircraft. He may also issue restrictions which you must obey.

3-4-2-2. "RADAR CONTACT" which means in order to enter his airspace you must handoff the aircraft to him.

3-4-2-3. "UNABLE" which means you may not enter his airspace at all.

3-4-3. There are three other terms associated with pointouts you need to know:

3-4-3-1. "TRAFFIC" along with an aircraft's position used by the controller approving a pointout means "Separate your pointout aircraft from this aircraft of mine while you're in my airspace."

3-4-3-2. "TRAFFIC OBSERVED" Used by the controller requesting the pointout means "I see your aircraft and will separate my pointout aircraft from it."

3-4-3-3. "YOUR CONTROL" when used by the controller approving the pointout means "Anything you want to do with that aircraft in my airspace is approved."

CHAPTER 4 - RADAR IDENTIFICATION AND SERVICE TERMINATION

4-1. Real-life air traffic control consists of a mix of radar, non-radar, and visual procedures. You must inform the aircraft when it is in "radar contact" and when it isn't. In ASRC, the aircraft is always in radar contact. In real-life, there is always the possibility of misidentifying an aircraft. In ASRC, this is impossible. Therefore, anything you do to radar identify an aircraft or inform it of "radar contact" serves no real purpose and is only to add to the feeling of realism.

4-2. In order to satisfy the requirement of a "radar contact", the preferred method is to confirm that the pilot has turned his transponder "on" and is transmitting (squawking) the assigned code.

4-2-1. To tell an aircraft to turn its transponder on, use the term "SQUAWK NORMAL."

4-2-2. To tell an aircraft to turn its transponder off, use the term "SQUAWK STANDBY."

4-2-3. If an aircraft is on the wrong code, tell it to "RESET TRANSPONDER, SQUAWK (correct code)."

4-2-4. If all you see is a partial data block (code and altitude) the aircraft must resend its flight plan.

4-3. The two most common places you tell aircraft they are in "Radar Contact" are on initial contact after departure and on initial contact if the aircraft is a pop-up arrival.

4-3-1. On initial contact after departure, use the phrase “radar contact” followed by any other instructions or clearances.

4-3-1-1. Verify the aircraft’s altitude readout on initial contact with APP or DEP. An altitude is valid if it is less than 300 feet off the pilot reported altitude.

4-3-1-2. If the altitude readout and pilot report don’t match tell the pilot to check his altimeter setting, e.g. "VERIFY ALTITUDE AND ALTIMETER SETTING. ORD ALTIMETER 2987."

4-3-1-3. If the aircraft is a departure, you may compare the altitude readout to the airport elevation instead of asking the pilot.

4-3-2. You should inform a pop-up arrival of its position when you state "radar contact", e.g. "RADAR CONTACT 35 MILES NORTHEAST OF TIST.”

4-4. It is not necessary to tell the aircraft "radar contact" if it was handed off to you by another controller. The aircraft was told "radar contact" when it initially entered the ATC system and hasn’t been out of radar contact since.

4-5. It isn’t possible to loose radar contact in ASRC so you should never have occasion to say ‘RADAR CONTACT LOST." If the target or data block disappears the aircraft has either dropped out of the VATNET system or you need to check your altitude filters in DC>FILTER information box.

4-6. When an aircraft is leaving your airspace and there are no adjacent ATC facilities to handoff to, or when you will no longer provide ATC service, use the term "RADAR SERVICE TERMINATED."

CHAPTER 5 - SAFETY ALERTS AND TRAFFIC ADVISORIES

5-1. Safety Alerts are a first priority duty. They are just as important as separating aircraft. If you see an unsafe situation developing you must issue a safety alert. Once you have done so, it is up to the pilot to decide what to do. When he tells you he is taking action, you may stop issuing the alert.

5-1-1. Issue a safety alert anytime you see an aircraft in unsafe proximity to terrain or other aircraft.

"LOW ALTITUDE ALERT, CHECK YOUR ALTITUDE IMMEDIATELY. THE MINIMUM SAFE ALTITUDE IN YOUR AREA IS 3,000."

"TRAFFIC ALERT, ADVISE YOU TURN LEFT/RIGHT/CLIMB/DESCEND IMMEDIATELY."

5-2. Traffic advisories can serve as a useful tool to organize your traffic flow and help the pilots help you. They were briefly covered in the Tower Study Guide but are just as important to Approach Control, so a review is in order.

5-2-1. Issue traffic advisories to all IFR and VFR aircraft unless the aircraft is in Class A airspace or the pilot tells you he doesn't want them.

5-2-2. Issue traffic advisories any time it looks like the separation may decrease below the minimum required. This does not mean you may substitute traffic advisories for positive separation. If no separation is required (e.g. two VFR aircraft in class D or E airspace) issue traffic advisories when you deem necessary.

5-2-3. You must provide traffic advisories to all aircraft at or above 10,000 feet and to turbojet and Presidential aircraft at any altitude if the targets look like they will touch, unless they are separated by more than 1000 feet vertically.

5-3. A radar traffic advisory consists of:

- Direction in terms of the 12-hour clock or cardinal compass points (N, S, E, W, etc.)
- Distance in miles.
- Direction of movement (north, south, crossing, converging, etc.).
- Type aircraft and altitude, if known.

"TRAFFIC, 12 O'CLOCK, 15 MILES, OPPOSITE DIRECTION, ALTITUDE UNKNOWN."

"TRAFFIC, 10 O'CLOCK, 12 MILES, CROSSING LEFT TO RIGHT, 1,000 BELOW YOU."

"TRAFFIC, NORTHEAST OF YOU, 10 MILES, SOUTHBOUND, DC-8, 17,000."

5-4. If the pilot requests and your workload permits, provide vectors away from conflicting traffic. If you are unable, inform the pilot.

5-5. You may also use non-radar traffic advisories if more appropriate. These consist if:

- Distance and direction from a fix.
- Direction the traffic is moving.
- Type aircraft and altitude, if known.
- ETA over the fix, if appropriate.

"TRAFFIC, 10 MILES EAST OF ZQA, SOUTHBOUND, MD-80, DESCENDING TO 16,000."

"TRAFFIC, 10 MILES WEST OF MLY, NORTHBOUND, ALTITUDE UNKNOWN."

"TRAFFIC, 8 WEST OF PJG, WESTBOUND, 747 AT 8,000, ESTIMATING PRG 2035."

"TRAFFIC, NUMEROUS AIRCRAFT, VICINITY OF TNCS AIRPORT."

CHAPTER 6 - VERTICAL SEPARATION AND ALTITUDE ASSIGNMENT

6-1. The minimum vertical separation used by Approach Control is 1,000 feet. Other standards are used at higher altitudes and will be covered in the Center Study Guide.

6-2. The NEODD-SWEVEN rule you learned in the Basic Study Guide are used in assigning Arrival and Departure altitudes within Approach Control airspace.

6-3. Altitudes assigned to arrivals and departures by Approach Control are based on traffic and terrain. Many DPs and STARs have minimum altitudes in them. Airways also have Minimum Enroute Altitudes and Minimum Obstruction Clearance Altitudes. Any other altitude you assign must be at or above the Minimum Vectoring Altitude.

6-4. The Minimum Vectoring Altitude is an altitude which is 1000 feet above the highest terrain or obstacle in a given area. Unfortunately, MVAs are not readily available for most airports in ASRC. You must use your best judgment based on information derived from real-world charts and FS experience.

CHAPTER 7 - RADAR SEPARATION

7-1. The minimum radar separations between non-heavy aircraft of the same weight class are:

- When less than 40 NM from the center of the ASRC display - 3 NM
- When 40 NM or more from the center of the ASRC display - 5 NM

7-2. When Heavy or dissimilar weight classes are involved:

- Heavy behind Heavy - 4 NM.
- Large or Heavy behind B757 - 4 NM.
- Small behind a B757 - 5 NM.

- Small or Large behind a Heavy - 5 NM.

7-3. When an aircraft will land behind another aircraft on the same runway:

- Small behind Large - 4 NM.
- Small behind a B757 - 5 NM.
- Small behind Heavy - 6 NM.

7-4. Between aircraft departing from the same airport when initial headings differ by 15 degrees or more - 1 NM.

7-4-1. Between a departure and an arrival - 2 NM if the separation will increase to 3 NM (5 NM if 40 NM or more from the center of the ASRC display) within 1 minute.

7-5. Under some conditions you may conduct simultaneous operations between arrivals, departures, and arrivals and departures. These conditions are very complex and require specific distances between runways and landing thresholds..

7-6. Visual separation is another option but in ASRC/SB this can be a bit of a problem. Unless the aircraft are all connected using SquawkBox's Multi-Player feature and have their multi-player visibility set high enough the aircraft can't actually see each other. The next best thing is to use the TCAS function of the SB FMS, although not all pilots are proficient at reading the display.

7-6-1. If one aircraft reports the other in sight tell it to "MAINTAIN VISUAL SEPARATION FROM THAT TRAFFIC."

7-6-2. If the two aircraft are on crossing courses tell the other aircraft visual separation is being used, e.g. "TRAFFIC HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION."

7-7. Besides separating aircraft, you must also separate your aircraft from the boundary of adjacent airspace.

- When less than 40 NM from the center of the ASRC display - 1.5 NM
- When 40 NM or more from the center of the ASRC display - 2.5 NM

Since each controller must apply the separation, this ensures aircraft are always separated by the required minimum: half on each side of the boundary.

CHAPTER 8 - CONTROLLING FORMATION FLIGHTS

8-1. Control formation flights as a single aircraft. All instructions should be issued to the flight leader.

8-2. When separating a flight from other aircraft, add 1 NM to the appropriate radar separation. If separating one flight from another flight, add a total of 2 NM. Responsibility for separation within the flight rests with the leader.

8-3. When aircraft are flying in formation, all aircraft but the leader should squawk standby. This will eliminate any data block overlap. To keep ASRC's conflict alert function from going off, you must go to the "Options" menu and set the DSR Alt and/or the ARTS Alt. Settings to zero (0).

8-4. If flight split-up is requested, issue instructions as necessary to establish standard separation between the aircraft. These instructions are advisory only and separation responsibility remains with the pilots until standard separation is established.

CHAPTER 9 - VECTORING

9-1. Vectoring aircraft is a skill that only gets better with practice. Practice will help you pick good headings, teach you to anticipate the delay caused by the pilot response, and show you the effect of winds aloft.

9-1-1. To help you determine a good heading, use ASRC's "Heading/Distance" line feature. Place the cursor over the aircraft and double-click the left mouse button holding it down on the second click. Then drag the cursor to the point you want to vector the aircraft to. You will then see two lines in the RA display box.

- H: 300 120 - 300 is the heading to your point, 120 is the heading from your point
- D: 150 - 150 is the distance To/From the final cursor location to your original cursor location.

9-1-2. Headings should be rounded off to the nearest 10 degrees. They are easier to figure, easier for the pilot to fly, and close enough for most purposes.

9-2. IFR aircraft may only be vectored if they are at or climbing to an altitude at or above the MVA. VFR and Special VFR aircraft may be vectored at any altitude.

9-3. There are three main ways to vector aircraft:

- Issue the direction to turn and heading, e.g. "TURN LEFT HEADING 360." If you say "FLY HEADING" the pilot will turn in the shortest direction. The term "TURN HEADING" is incorrect and should not be used.
- Issue a direction and number of degrees to turn, e.g. "TURN THIRTY DEGREES RIGHT."

- Issue a NO-GYRO turn. Tell the aircraft "THIS WILL BE A NO-GYRO VECTOR" when to "TURN LEFT/RIGHT" and when to "STOP TURN." The pilot will make standard rate turns (3 degrees/second).

9-4. You must tell the aircraft why you're vectoring him (except the initial vector for departures) and, if appropriate, what he is expected to do at the end of the vector, e.g. "VECTOR FOR DESCENT" or "JOIN V-198 AND RESUME OWN NAVIGATION" or "WHEN ABLE, PROCEED DIRECT." When issuing multiple vectors to the final approach course, you only need to tell the aircraft on the first vector (e.g. "VECTORS TO THE ILS FINAL APPROACH COURSE").

9-5. Issue a new altitude if you vector an aircraft off a published procedure (DP, STAR, instrument approach) which has its own altitudes, e.g. "TURN LEFT HEADING 270 MAINTAIN 3,000."

9-5-1. If the aircraft will re-join the procedure you must tell it to use the published altitudes, e.g. "RESUME JAAWS NINE DEPARTURE, COMPLY WITH RESTRICTIONS."

9-6. If your vector will take the aircraft across the route the pilot is expecting to join, tell him why, e.g. "EXPECT VECTOR ACROSS FINAL FOR SPACING." Even if you don't, the pilot still isn't supposed to turn inbound on approach unless you issue approach clearance.

CHAPTER 10 - IFR DEPARTURE PROCEDURES

10-1. An IFR departure clearance is not valid until the aircraft is released by Departure Control.

10-1-1. Departure releases, restrictions, and void times are all used to separate successive departures or regulate the departure flow.

10-1-2. In real-life and in many VATCAR FIR/ARTCCs, departure releases are covered in a local SOP. Without an SOP, you must inform the Tower if they must obtain a release for each departure, or grant them "automatic" releases. If "automatics", you must specify the separation you desire between successive departures.

10-2. Departures may either be vectored, fly a DP if it's in their filed route, or a combination of the two. Your decision should be based on traffic and the pilot's desires.

10-3. Under normal conditions, all departures should be established on, or on a vector, which will intercept their filed route before you handoff to center. Exceptions caused by traffic or other factors need to be individually coordinated.

CHAPTER 11 - HOLDING

11-1. Holding of airborne aircraft may be necessary due to traffic, weather, or airport conditions.

11-2. Detailed holding instructions consist of:

- Holding Fix and cardinal direction (N, S, E, W, etc.).
- Holding course.
- Leg length in miles or minutes.
- Direction of turns.
- Expect Further Clearance time.

"CLEARED TO BSR, HOLD SOUTH ON V-27, 10 MILE LEGS, LEFT TURNS, EXPECT FURTHER CLEARANCE 1920."

11-2-1. Standard turns in all holding patterns are right-hand turns.

11-3. If the holding pattern is published and the pilot has the chart you only need to include the direction, the term "AS PUBLISHED" and an EFC.

"CLEARED TO WALLY, HOLD NORTH AS PUBLISHED, EXPECT FURTHER CLEARANCE 1315."

11-4. You must use your best judgment when computing EFCs. They should be as accurate and realistic as possible. Consider these factors:

- The number of aircraft in the approach sequence ahead of the holding aircraft.
- The distance from the holding fix to the destination.
- Each complete holding pattern takes a minimum of 4 minutes.

11-5. You may also use a visual fix if the pilot can see it and is familiar with it.

"HOLD AT THE SEARS TOWER UNTIL FURTHER ADVISED"

CHAPTER 12 - ARRIVAL PROCEDURES

12-1. Arriving aircraft were cleared to their destination airport when they were issued their IFR clearance prior to departure.

12-2. You may assign a STAR if you desire and the pilot accepts, e.g. "CLEARED TO SVMI, CRSTL ONE DEP. ARMUR TRANSITION." If the pilot has

filed for a STAR, you don’t need to issue it again. Do not assign a STAR to military aircraft unless the pilot has filed for it.

12-2-1. If you want the aircraft to descend using the published altitudes along the STAR tell the pilot to "DESCEND VIA THE (name) ARRIVAL." If no altitudes are published on the STAR or a different one is necessary for separation you must assign one. If the altitude on the STAR reads " Expect Clearance to cross XYZ at 12,000", then we must issue that crossing restriction in our descent clearance. The keyword here is “expect”. If the arrival procedure states, “Cross XYZ at 12,000”, then the pilot can descend at his discretion unless otherwise instructed. A lot of ATC's miss this in their descent clearance's

12-2-2. Many pilots spend considerable time entering the data necessary for STARs into the FMS. If possible, you should let them fly it. However, your job is to separate aircraft and organize the traffic flow. Do not let your desire to comply with one pilot’s request adversely affect your service to other aircraft.

12-3. Issue arrival information to all arriving aircraft as soon as possible after initial contact, unless the pilot states the ATIS code. Arrival information consists of:

- Runway in use.
- Wind.
- Altimeter setting.
- Ceiling and visibility if below VFR.
- Type approach to expect.
- Low level windshear advisories when available.
- Braking action reports if available and the braking action is reported as "POOR" or "NIL."

12-4. The pilot decides if the weather is adequate for approach and landing. If he reports it is below his requirements, issue holding instructions or clearance to his alternate airport, as requested.

12-5. When you vector aircraft to the instrument final approach course:

12-5-1. The aircraft must intercept final at least 3 miles from the Final Approach Fix (OM) at an angle of no more than 30 degrees for fixed-wing, or 45 degrees for helicopters.

12-5-2. If the ceiling is 500 feet above the MVA and visibility at least 3 SM, you may vector to intercept no closer than 1 NM from the FAF/OM, at an angle of no more than 20 degrees.

12-5-3. If the pilot requests, you may vector to intercept at the FAF/OM at no more than 20 degrees.

12-6. When you are ready to clear the aircraft for approach after vectoring it to final you must issue four things:

- Position from the airport or FAF.
- Turn to the intercept heading.
- Altitude to maintain. The altitude must provide terrain clearance until the aircraft is established on the approach.
- Clearance for the approach. See Chapter 14 for specific approach clearance procedures.

12-6-1. As you can see, this results in the easy to remember mnemonic of PTAC. Position-Turn-Altitude-Clearance.

"FOUR MILES FROM LIMA. TURN RIGHT HEADING 340. MAINTAIN 2,000 UNTIL ESTABLISHED ON THE LOCALIZER, CLEARED ILS RUNWAY 36 APPROACH."

12-7. Once you have cleared the aircraft for approach, handoff to TWR. Do not ask for unnecessary reports such as "Established on the localizer" or "Intercepting the glideslope."

CHAPTER 13 - OPERATION AT UNCONTROLLED AIRPORTS

13-1. Uncontrolled Airports are those that do not have an operating Control Tower.

13-1-1. An airport is considered as not having an “operating” Control Tower under the following conditions:

- It has a Control Tower, but it is not currently staffed by an ATC due to lack of available personnel, or
- It has a Control Tower, but it is considered a “non-primary” airport within the control area and does not have an assigned ATC position, or
- It does not have a Control Tower at all.

13-2. Radar service must be provided to all aircraft arriving or departing from uncontrolled airports within Class B, C airspace or special Terminal Control Areas (TCA).

13-3. IFR departures can be handled in one of two ways:

- The pilot can depart VFR (weather conditions permitting) and request an IFR clearance when airborne and on initial course heading, or
- The pilot can request IFR clearance while on the ground.

13-4. After issuing an IFR Flightplan clearance to an aircraft prior to departure and readback has been confirmed, controllers must issue either a “Hold for Release” or “Released For Departure” clearance. There are several options available to the controller.

13-4-1. Option 1. Release the aircraft when you issue its IFR clearance. This way the aircraft may depart any time it is ready. Example:

> "CLEARED TO MDSD AIRPORT AS FILED MAINTAIN 13,000, SQUAWK 4301. RELEASED FOR DEPARTURE."

13-4-2. Option 2. Include the phrase "HOLD FOR RELEASE." This way the aircraft has its clearance but may not depart until you call it back and issue a departure release. Example:

> "CLEARED TO TNCM AIRPORT AS FILED, MAINTAIN 14,000, SQUAWK 4301, HOLD FOR RELEASE."
>
> "RELEASED FOR DEPARTURE."

13-4-3. Option 3. Include a release time and time check with the clearance. This way the aircraft may not depart until the release time. Example:

> "CLEARED TO MKJP AIRPORT AS FILED. MAINTAIN FL190, SQUAWK 4301, RELEASED FOR DEPARTURE AT 1700. TIME NOW 1632."

13-4-4. Option 4. Issue a clearance void time and a time check. This way the aircraft may depart anytime up until the void time but not after it. Example:

> "CLEARED TO MYNN AIRPORT AS FILED, MAINTAIN 8,000, SQUAWK 4301. RELEASED FOR DEPARTURE, CLEARANCE VOID IF NOT OFF BY 1345 TIME NOW 1315."

13-5. VFR departures in controlled airspace are considered the same as IFR departures. Clearances are the same as IFR, except, they do not need a Flightplan routing clearance. They must be assigned an IFR squawk code and a Departure Release clearance.

13-5-1. After leaving a controlled airspace, radar service for VFR departures may be cancelled only by the pilot. Pilots may be instructed to change radio frequency to either Center or Advisory frequency, or they may remain on Departure’s frequency. Example:

> “N1523R is canceling radar service.”

“Radar service is terminated, frequency change approved (if necessary), maintain VFR altitudes and squawk 1200.”

CHAPTER 14 - SPEED ADJUSTMENT

14-1. Use speed adjustments only when absolutely necessary. Do not use them as a substitute for good vectoring. Keep the number of speed adjustments per aircraft to a minimum.

14-2. When assigning a speed, remember these things:

14-2-1. Approach clearance cancels any assigned speed adjustment unless you reissue it.

14-2-2. Groundspeed shown in the aircraft’s data block will often be higher than the indicated airspeed the pilot reports.

14-2-3. Speed adjustments don’t happen immediately. Different factors all combine to affect the time needed to change an aircraft’s speed.

14-2-4. The pilot may refuse any speed adjustment in the interest of safety.

14-2-5. Aircraft assigned a speed greater than 250 knots above 10,000 MSL will automatically reduce to at or below 250 knots when descending through 10,000 MSL.

14-3. You may not assign speed adjustments to the following aircraft:

14-3-1. On a High Altitude Instrument Approach Procedure. These are approaches with names like HI-ILS RWY 12 or HI-TACAN RWY 33L. They are used primarily by military aircraft and normally begin at or above 10,000 MSL.

14-3-2. In a holding pattern.

14-3-3. Inside the final approach fix.

14-4. There are four ways to adjust an aircraft’s speed:

14-4-1. Have it maintain a specific speed, e.g. "MAINTAIN 250 KNOTS."

14-4-2. Have it maintain higher or lower than a specified speed, e.g. "MAINTAIN 180 KNOTS OR GREATER" or "DO NOT EXCEED 210 KNOTS."

14-4-3. Have it maintain the highest or lowest practical speed, e.g. "MAINTAIN MAXIMUM FORWARD SPEED" or "MAINTAIN SLOWEST PRACTICAL SPEED."

14-4-4. Have it increase or decrease by a specified number of knots, e.g. "REDUCE SPEED 50 KNOTS."

14-5. If you want an aircraft to descend and make a speed adjustment you must tell it which one to do first, e.g. "REDUCE SPEED to 210 KNOTS THEN DESCEND AND MAINTAIN 7,000."

14-6. As soon as speed adjustments are no longer needed inform the pilot, "RESUME NORMAL SPEED."

14-7. Arriving jet aircraft below 10,000 MSL may not be reduced below 210 knots except when within 20 flying miles of the runway where they may be reduced to 170 knots.

14-8. Departing jet aircraft may not be assigned a speed less than 230 knots.

14-9. Arriving propeller aircraft below 10,000 MSL may not be reduced below 200 knots except when within 20 flying miles of the runway where they may be reduced to 150 knots.

14-10. Departing propeller aircraft may not be assigned a speed less than 150 knots.

14-11. Helicopters may not be assigned a speed of less than 60 knots at any time.

CHAPTER 15 - APPROACH CLEARANCE PROCEDURES

15-1. To require an aircraft to fly a particular instrument approach, use the name of the approach in the approach clearance, e.g. "CLEARED VOR RUNWAY 36 APPROACH."

15-2. You don’t need to include the runway number if there is only one approach of that type available, e.g. "CLEARED ILS APPROACH."

15-3. To authorize a pilot to execute his choice of instrument approach use the term "CLEARED APPROACH."

15-4. Aircraft which begin an instrument approach at an Initial Approach Fix (IAF) do not require vectors to final, or the PTAC procedure. Aircraft navigating to an IAF via a published route containing an altitude (airway, STAR, or feeder route) only require an approach clearance. If the aircraft is on a non-published route (direct) to the IAF you must assign an altitude to maintain until reaching the fix which is at or above the minimum IFR altitude e.g. "CROSS OSCAR AT OR ABOVE 5000 CLEARED V-O-R APPROACH."

15-5. A circling approach is where the approach is made to one runway and once the pilot has the airport in sight, the aircraft circles to land on another runway.

15-5-1. If an aircraft will fly a circling approach at an airport with a tower, include circling approach instructions in the approach clearance, e.g. "CLEARED VOR RUNWAY 36 APPROACH, CIRCLE TO RUNWAY 27."

15-6. Some instrument approaches include a procedure known as a "Side-Step" for an approach to one runway with landing on a “parallel” runway, e.g. "CLEARED ILS RUNWAY 27L APPROACH. SIDE-STEP TO RUNWAY 27R."

15-7. Approach clearance automatically authorizes IFR aircraft to fly the missed approach procedure; VFR aircraft flying practice approaches require specific approval.

15-8. If the weather is VFR, you may clear aircraft for a Visual Approach under these conditions, e.g. "CLEARED VISUAL APPROACH RUNWAY 27":

15-8-1. If it is first in the approach sequence and the aircraft reports the airport in sight. When the aircraft can see the airport often depends more on the scenery settings in FS than on the reported visibility. When two or more airports are close together make sure the pilot sees the proper one before issuing clearance.

15-8-2. If it isn’t first, the aircraft reports the traffic to follow in sight (see Chapter 7 for more information on visual separation and SB’s multi-player feature) or it reports the airport, but not the traffic to follow, provided you maintain radar separation between the two aircraft.

15-8-3. You may vector the aircraft to the airport for a Visual Approach if the ceiling is 500 feet above the MVA and the visibility at least 3 SM, e.g. "FLY HEADING 040 VECTOR FOR VISUAL APPROACH TO MYNN." It is usually better to vector the aircraft for a standard instrument approach and ask it to report the airport or traffic in sight. Once it does so then issue clearance for a visual approach. That way even if the aircraft never sees the airport or traffic your sequence isn’t disrupted.

15-9. One last type of approach is a Contact Approach. It is similar to a Visual Approach but the weather requirement is only 1 SM visibility. The pilot navigates visually to where the airport should be while he remains clear of clouds.

15-9-1. You must separate the Contact Approach from all other IFR traffic even though you can’t control its flight path or altitude. The most you can do is assign an "AT OR BELOW" altitude and keep everything else above it. You must also provide a back-up instructions in case the aircraft can’t find the airport, e.g.

"CLEARED CONTACT APPROACH AT OR BELOW 5,000, IF NOT POSSIBLE, FLY HEADING 360 MAINTAIN 5,000 AND ADVISE."

15-9-2. You won’t see Contact Approaches very often (if ever) because the pilot has to specifically request it, controllers can’t suggest it even if they wanted to (which they don’t. It ties up a bunch of airspace and can cause delays for other traffic), and most people don’t consider it particularly safe.

15-10. If you know the aircraft will make multiple instrument approaches issue climbout instructions before the aircraft begins its final descent on the first approach, e.g. "AFTER COMPLETING LOW APPROACH, CLIMB AND MAINTAIN 6,000 FLY RUNWAY HEADING."

CHAPTER 16 - VFR AND SPECIAL VFR OPERATIONS IN CLASS B AND CLASS C AIRSPACE

16-1. As you learned in the Basic ATC Study Guide, Class B and C Airspace is the airspace around busier airports.

16-1-1. For all practical purposes VFR aircraft in Class B and C Airspace are handled the same as IFR arrivals and departures. Any altitudes you assign must be at or above the MVA. The pilot is required to remain in VFR conditions at all times so he may refuse your headings or altitudes.

16-1-2. In Class B Airspace, VFR aircraft require a clearance, e.g. "CLEARED TO ENTER/OUT OF/THROUGH BRAVO AIRSPACE."

16-1-3. You must also tell the aircraft when it is leaving Class B Airspace, e.g. "LEAVING BRAVO AIRSPACE RESUME OWN NAVIGATION, RESUME APPROPRIATE VFR ALTITUDES, RADAR SERVICE TERMINATED, SQUAWK 1200, FREQUENCY CHANGE APPROVED."

16-1-4. Separation standards in Class B Airspace are:

16-1-4-1. Between two IFR aircraft - Standard IFR separation.

16-1-4-2. Between a VFR aircraft and an IFR or VFR aircraft weighing more than 19,000 lb or any turbojet - 1.5 NM laterally or 500 feet vertically or visual.

16-1-4-3. Between a VFR aircraft and an IFR or VFR aircraft weighing 19,000 lb. or less - Radar targets may not touch or 500 feet vertically.

16-2. In Class C Airspace, VFR aircraft must establish radio communications before entering. If you respond to a radio call with "(CALLSIGN) STANDBY" communications have been established and the pilot may enter the Class C. If you want the aircraft to remain outside the Class C you must say so e.g. "(CALLSIGN) REMAIN OUTSIDE CHARLIE AIRSPACE AND STANDBY."

16-3. Separation standards in Class C Airspace are:

16-3-1. Between an IFR and a VFR aircraft - The radar targets may not touch or 500 feet vertically.

16-3-2. VFR aircraft are not separated from other VFR aircraft.

16-4. Special VFR is a procedure to let VFR pilots who aren’t IFR qualified to arrive and depart at an airport in a Class B, C, D, or E Surface Area when the weather is below basic VFR minimums.

16-4-1. Since there aren’t many "VFR Only" pilots in ASRC/SB (if any) Special VFR isn’t likely to come up very often.

16-4-2. The weather minimums for Special VFR are 1 SM visibility for fixed-wing and no minimums for helicopters.

16-4-3. You must separate IFR aircraft from the Special VFR while it is in the Surface Area. Any type of separation may be applied. However, the Special VFR aircraft must stay clear of clouds so it may or may not accept a heading or altitude you issue.

16-4-4. "CLEARED TO ENTER/OUT OF/THROUGH, BRAVO/CHARLIE/DELTA/ECHO SURFACE AREA MAINTAIN SPECIAL V-F-R CONDITIONS"