



## **VATUSA Controller Tip Military Operations and ATC**

Since Military Operations on VATSIM continue to grow by the day, VATUSA thought it might be a good idea to offer some pointers on some of the operations/missions commonly seen in the USA sectors. The ones we have decided to discuss are just a few of the many that the Special Operations are capable of. We'd also like to note that the information we have gathered may not be ARTCC specific. VATUSA recommends that the controller check the SOP of their local facility for specific requirements and phraseology.

### **TIP: Military Operations Areas**

A Military Operations Area or MOA is airspace of defined vertical and lateral limits used for military flight training. These large areas of the country are shown on VFR and low en-route sectionals as enclosed by a line of magenta hash marks with a sharp outer edge. Its purpose is to separate these flight training activities from IFR traffic. Numerous types of flight training occur within a MOA, to include acrobatic maneuvers, spins, formation flying, air combat training (ACT), basic fighter maneuvers (BFM), traffic pattern stalls and instrument training maneuvers. In the real world, anytime these types of training activities are taking place the MOA is considered HOT. Note that for the most part, Victor Airways and Jet Routes do not usually go through a MOA. While many pilots do use Victor Airways or Jet Routes, many do not and try to proceed direct to their destination without proper flight plans. And as long traffic conditions permit and standard IFR traffic separation criteria can be met by the Controller, IFR traffic can be cleared through a MOA. VFR aircraft, on the other hand, can pass through a MOA at anytime but should always remain cautious when the MOA is HOT.

Military aircraft enter and leave a MOA through specific entry/exit points. There are two types of routes a military pilot can file. The first type uses a predetermined route which is usually developed by the owning agency of the MOA (in most cases the nearest base). These standard routes identify various fixes that take the aircraft from takeoff to the MOA entry point. Here's an example: **PACK 402 CONAN BULLDOG MOA**

In this example the aircraft has filed to fly a PACK 402 (most bases have different nomenclature for their routes) to the CONAN entry point of the Bulldog MOA. The second type of route usually begins with a published departure procedure followed by the transition entry point into the MOA, for example **DAVIE2.CONAN BULLDOG MOA**

When issuing clearance, ATC at military installations will clear the aircraft on its route, issue a departure climb, and tell the pilot to contact the departure controller on a particular channel which is a locally assigned channel that corresponds with the departure controller's frequency. Finally ATC will issue a squawk code.

Under most circumstances military aircraft perform their missions inside the MOA under VFR and on a discrete frequency. As the aircraft approaches the MOA entry point he will normally request from ATC to switch to his discrete frequency. When that happens the controller should say something like "*Cleared to switch to discrete frequency, contact me on XXX.XX upon exit.*" For safety reasons, most military aircraft will monitor the guard frequency while inside the MOA in the likelihood that ATC needs to tell them something. As a courtesy to the pilot, the controller might also give the pilot the operating dimensions of the MOA before leaving their frequency. For example, *Felon 01, cleared into MOA Bulldog, surface to FL400, cleared to switch discrete frequency, contact me on 377.1 upon your exit.*

Some predetermined routes (as in the ones above) do not include a clearance back to base. If it does not, the aircraft, after it has completed its mission inside the MOA will depart from an entry/exit point (just as it entered, but sometimes at a different point) and will contact ATC for either an IFR pickup, which can be the reverse routing they flew in on, or will request VFR back to base. An example of a predetermined route with a clearance back to base would be **DAVIE2.CONAN BULLDOG MOA CONAN.MONTI3**. This tells ATC the aircraft will depart the MOA at the CONAN entry/exit point and fly the MONTI3 arrival back to base.

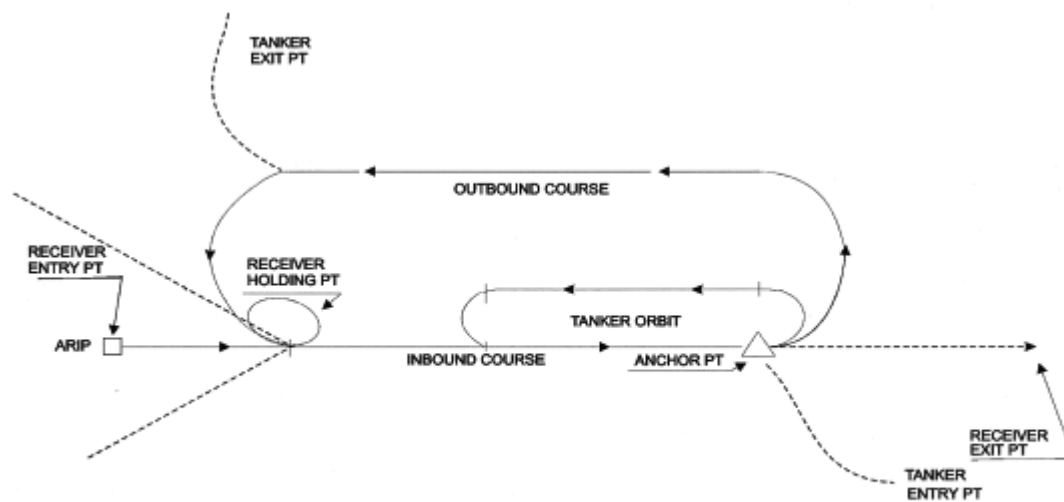
If the pilot is going somewhere else other than back to base after leaving a MOA he might include a delay time to signify that he will delay in the MOA for a certain amount of time (to complete his mission). If the aircraft will delay for 20 minutes for example, the pilot would use the format **/D 0 +20** and include it in his routing usually after the MOA name. Adding the delay time keeps the flight plan active. When the pilot finishes the delay he will contact the controlling agency (Approach or Center) to complete the rest of his route.

### **TIP: Aerial Refueling**

Aerial Refueling is the in-flight transfer of fuel between tanker and receiver aircraft. An aircraft's ability to remain airborne is limited by the amount of available fuel. Air refueling increases the range, payload, loiter time, and ultimately the flexibility and versatility of combat, combat support, and mobility aircraft. Aerial refueling tracks are listed with an "AR" prefix followed by numbers and sometimes other letters located on specialty Refueling Tracks/Anchor maps. An example of one of these tracks would be **AR12H**.

The standard aerial refueling anchor pattern consists of a left-hand race track orbit with legs at least 50 NM in length. The legs will normally be separated by at least 20 NM. The orientation of the pattern is determined based on the inbound course to the anchor point. Four turn points are designated to describe the anchor pattern.

The standard anchor area consists of one or more entry points, an ARIP (air refueling initial point), anchor point, anchor pattern turn points, one or more exit points, and the designated refueling altitude block(s).



ANCHOR PATTERN

Tanker aircraft inbound to a refueling track use similar predetermined route structures as military aircraft heading to a MOA. In most cases it is an IFR flight plan and will include the air refueling control point (ARCP), the delay time while in the track, and the name of the track itself. Here's an example of what one might look like. Note that the delay time will usually follow the ARCP in a tanker's route:

**EIL HAWGG BIG BUFLO EIL038020/DELAY 1+30 AR719 BIG BOGIE EIL**

Controlling aircraft engaging in air refueling can be a little intimidating at first so to make it a little easier, here are some points to follow as well as some general phraseology you can use.

Note: normally the tanker aircraft enters the track at the ARCP (air refueling control point), and the receiver aircraft enters at the air refueling initial point (ARIP).

1. Tanker requests delay at the ARCP and advises ATC of the requested aerial refueling block altitudes.

*TANKER: center, (tanker) with Air refueling request*

*CENTER: (tanker), go ahead with request*

*TANKER: center, (tanker) request delay at (ARCP) in the block (flight level) to (flight level) until (Zulu time) for (AR track) to refuel (receiver's callsign)*

2. ATC approves delay and issues clearance, or advises tanker to expect clearance, for the air refueling block.

*CENTER: cleared to delay at (ARCP) in the block (flight level) to (flight level) until (ZULU) on (AR track), report accepting MARSAs with (receiver's callsign)*

3. Tanker enters orbit pattern airspace for delay at ARCP.
4. Receivers are cleared to requested altitude and IFR separation is established prior to ARIP and release to tanker communication rendezvous (C/R) frequency. Note that the receiver will switch to the tanker's discrete frequency during refuel delay.

*Center: (receiver), you are cleared to conduct air refueling operations in (AR Track) with (Tanker), maintain the block (flight level) to (flight level) and cleared to tanker frequency squawk standby 3 NM from the tanker.*

5. Tanker declares MARSAs (Military Assumes Responsibility for Separation). This is a condition whereby the military services involved assume responsibility for separation between participating military aircraft in the ATC system. In other words once the tanker declares this ATC is not responsible for separating the receiving aircraft from the tanker. However ATC is responsible for separating the tanker from other IFR aircraft in the airspace.

*TANKER: center, (tanker) accepts MARSAs with (receiver)*

6. ATC issues clearance to conduct aerial refueling along the track, and issues block altitude clearance, if not previously accomplished.

*CENTER: roger, (tanker), you are cleared to conduct Air Refuel along (AR Track) with (receiver), maintain (block altitude)*

7. Tanker and receiver aircraft complete rendezvous and proceed down track. During aerial refueling, the tanker is responsible for receiver aircraft navigation along the track and for all tanker/receiver communications with ATC.
8. Tanker advises ATC of tanker and receiver end aerial refueling altitude requests at least five (5) minutes prior to exit.

*TANKER: center, (tanker) with end AR request*

*CENTER: (tanker), go ahead with your request*

*TANKER: (center), after AR, (receiver) would like to go direct (navaid) at (altitude) and (tanker) would like to go direct (navaid) at (altitude)*

9. At or prior to the exit point, ATC issues tanker and receiver altitude clearances, transponder codes, and if requested, amended routing.
10. Prior to exit, tanker vertically positions the aircraft in the formation within the air refueling airspace to facilitate breakup at the exit point (normally, tanker at highest altitude of aerial refueling block and receiver at lowest altitude).

*TANKER: (center), (tanker) is at (altitude) and (receiver) is at (altitude), we are finished with refueling.*

*CENTER: roger, you are cleared direct to (wherever), maintain (altitude) and for (receiver), he is cleared direct (wherever) at (altitude), have (receiver) come up to my frequency squawking (code)*

*TANKER: (readback clearance)*

11. MARSAs is terminated when standard ATC separation is established and ATC advises MARSAs is terminated.

*CENTER: (tanker), MARSAs is terminated*

*TANKER: roger, MARSAs terminated*

## **TIP: Military Training Routes**

Military Training Routes (MTR) are mutually developed for use by the military for the purpose of conducting low-altitude, high-speed training. Generally, MTRs are established below 10,000 feet MSL for operations at speeds in excess of 250 knots. However, route segments may be defined at higher altitudes for purposes of route continuity. For example, route segments may be defined for descent, climb out, and mountainous terrain. There are IFR and VFR routes as follows:

1. IFR Military Training Routes- (IR): Operations on these routes are conducted in accordance with IFR regardless of weather conditions.
2. VFR Military Training Routes- (VR): Operations on these routes are conducted in accordance with VFR except flight visibility shall be 5 miles or more, and flights shall not be conducted below a ceiling of less than 3,000 feet AGL.

Four number characters (e.g., IR1206, VR1207, etc) shall identify MTRs with no segment above 1,500 feet AGL. MTRs that include one or more segments above 1,500 AGL shall be identified by three number characters (e.g. IR206, VR207, etc.). VFR Sectional charts depict all IRs and VRs. Please note that depicted routes only indicate route centerline. As with a MOA, each MTR has an entry and exit point that ATC should be ready to vector the aircraft to should he request it.

## **TIP: Formation Flights**

If you've done much controlling on the network you've probably noticed some of the VATSIM military organizations flying together really closely in what is known as a formation. But are you familiar with the reason that the Military does this? Did you know that there actually two (2) types of formations they use and that each has special requirements? Furthermore, do you know how to approve a request by military aircraft to join a formation, using the correct phraseology? What about how to approve a formation departure using the correct phraseology? Well let's take a look.

The Military's purpose of flying formation is to provide the mutual support required to accomplish a given mission. A formation is defined as more than one aircraft which, by prior arrangement between the pilots, operate as a single aircraft with regard to navigation and position reporting. Separation between aircraft within the formation is the responsibility of the flight leader and the pilots of the other aircraft in the flight. This includes transition periods when aircraft within the formation are maneuvering to attain separation from each other to effect individual control and during join up

or breakaway. The smallest formation unit is a section that consists of two aircraft; a lead and one wingman. Next in size is a division, which is composed of two sections. Adding sections or divisions as required makes larger formations. It should be noted that the basic unit of any formation, no matter how large, is the section. Here's a look at the two types of formations, and their requirements.

**Standard Formation** - A formation in which a proximity of no more than 1 mile laterally or longitudinally and within 100 feet vertically from the flight leader is maintained by each wingman.

**Nonstandard Formation** - A formation operating under any of the following conditions:

- When the flight leader has requested and air traffic control has approved other than standard formation dimensions.
- When operating within an authorized ALTRV (Altitude Reservation) or under the provisions of a letter of agreement.
- When the operations are conducted in airspace specifically designed for a special activity.

When you are controlling a formation, whether it is a 2 ship (2 aircraft in formation) or even a 4 ship (4 aircraft in formation) you as the controller will only be in contact with the flight lead, and furthermore the flight lead will be the only aircraft in the formation squawking; each wingman will be squawking standby.

Formation usually starts on the ground and continues on until the pilot's mission is completed. But sometimes aircraft that are in a formation will depart separately, and when this happens they'll request to "rejoin" into the formation from ATC, which happens quite a bit on VATSIM. When this happens ATC should ask the flight lead if he will accept MARSAs with the wingman. If the flight lead accepts, ATC should approve the request and then have the wingman squawk standby. If the aircraft will be outside a standard formation ATC should normally have the trailing aircraft squawk subset (example: Lead squawks 4321, Wingman squawks 4300).

*FELON2: center, Felon 2 with request*

*CENTER: Felon2 go ahead with your request*

*FELON2: would like to join with FELON1*

*CENTER: FELON1, will you accept MARSAs with FELON2?*

*FELON1: rgr, will accept MARSAs*

*CENTER: FELON2, cleared to join with FELON1, strangle squawk when able.*

*FELON2: rgr, cleared to join, will strangle squawk.*

Sometimes an aircraft in formation will have to depart, or break away. This is known as a formation departure. A formation departure consists of more than one aircraft at intervals of 1 minute or less which, by prior arrangement between the pilots, operate as a single aircraft with regard to navigation and position reporting. Usually when this happens, the flight lead will advise ATC that (call sign) will be departing. ATC should issue a squawk code for the departing aircraft and once the departing aircraft is squawking correctly and identifies ATC can issue vectors to wherever the aircraft is headed.

For more information on military operations, please check the Special Operations website on the VATSIM homepage. VATUSA would like to thank Stephen Fedor, Brian Doan, and Glenn Blanco of the vUSAF division for their help with our research.