

## SECTION ENGAGED MANEUVERING (2v1)



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## SECTION ENGAGED MANEUVERING

### INTRODUCTION

Advanced weapons technology and a deeper understanding of threat capabilities have evolved fighter employment. The fact remains that despite or maybe because of these advancements you will find yourself going to the merge. Circumstances leading to this include an electronic attack (EA) environment, a visual identification requirement, an unobserved entry to delouse another fighter, or Beyond Visual Range (BVR) weapons that do not guide and fuse on the target. In any case, if fighters find themselves turning at the merge they are executing engaged maneuvering. The fighters' ability to gain tallies, maneuver to achieve a timely kill and then continue to execute their primary mission is driven by their ability to employ engaged maneuvering fundamentals.

As the name implies, Section Engaged Maneuvering (SEM) employs from the basic fighting element – the section. The most basic Section Engaged Maneuvering environment is two fighters against one adversary or 2v1. However, Section Engaged Maneuvering is not limited to 2v1. In the Fleet 2v2 engagements or 2v unknown engagements in the visual arena will be encountered. Understanding the basic principles behind 2v1 will allow you to develop your capabilities in more complex situations.

Section Engaged Maneuvering is one of the most challenging missions for aircrew. It requires you to track multiple aircraft and make timely decisions while employing your aircraft to the edge of its capabilities. To be successful you must be able to apply your 1v1 Air Combat training. Your Training Command experience will be a building block approach giving you the foundation to be successful in future FRS and Fleet experiences. **Focus your studies on the Safety and Contingencies, SEM Fundamentals and the canned/advanced sets; then use the other conceptual chapters to better round out your studies for Tap-the-Cap.**

This FTI will spend a considerable amount of time discussing Section Engaged Maneuvering. However, while you prepare for your Section Engaged Maneuvering events do not take the Admin and Tac Admin for granted. Sound Admin and Tac Admin demonstrates professionalism, good judgment and forethought. Additionally, over the course of your Naval Aviation career you will find the smoother the Admin and Tac Admin goes the better your overall tactical performance will be!

## **CHAPTER 8 ADMIN**

### **800. PRE-FLIGHT PLANNING**

The bandit is the division lead and maintains overall responsibility for the event. In the FRS and Fleet you will see many adversary callsigns – Viper, Snake, Mutt, Dog, etc. TRACOM SEM events will standardize the bandit's callsign to Viper 1 (adversaries do not typically use two digit callsigns). The kneeboard card should list the bandit as the division lead, the Tac Lead as -2, and the Tac Wing as -3. Air-to-Air TACAN ranging will be setup so that the fighters range to each other.

### **801. GROUND OPS**

Standard. Consider the ground ops portion a division tactical formation sortie.

### **802. DEPARTURE**

The division will join as briefed – typically into the fingertip formation. The bandit will lead the division to and from the area and will pass the tactical lead as briefed. The Tactical Lead (Tac Lead) will push the Tactical Wingman (Tac Wing) to spread when appropriate. Regardless of the change in tactical lead, the bandit will maintain and initiate all Admin related items for the duration of the event.

### **803. FINAL RENDEZVOUS / RTB**

The final rendezvous will be initiated per the TACSOP following the final KIO. If the join-up is a running rendezvous the fighters should deconflict the left/right side of the bandit and slightly stagger the join-ups. During a running rendezvous, to maintain deconfliction, no one should cross the area directly behind the flight lead. Maintain your side if an overrun situation develops. If the rendezvous becomes a CV rendezvous then deconflict who will join first on bearing line.

The RTB portion will be conducted per the brief and previous stage guidance. Wingmen not in parade are expected to set the proper formation for the field entry.

### **904. DEBRIEF EXPECTATIONS**

The bandit is the overall event lead and will run the debrief. The bandit will re-construct each set calling upon the fighters to fill in the gaps. Fighters will speak in order once called upon by the bandit to expedite the flow of the debrief. Debrief items will focus on the training objectives/fundamentals.

## **805. COMMON ADMIN ERRORS**

- Join-ups
- Briefed Formation Adherence
- Final Rendezvous
- Rejoins from ATC Spread

## CHAPTER 9 TAC ADMIN

### 900. DIVISION FORMATION MANAGEMENT

While in the area, the bandit will maintain and initiate all Tac Admin requirements IAW the TACSOP. The fighters must focus on good basic airwork, disciplined formation keeping and following proper procedures. The bandit will use directive comm to prepare the division for the next set. The fighters can make appropriate recommendations at any time. The bandit will agree with the recommendation and call the fighters to execute or override. In general, allowing the flight lead's experience to be a crutch will result in excessive maneuvering and less gas to fight. Execute all formation maneuvers as in the Tactical Formation and BFM Stages.

### 901. SET TAC ADMIN

The division will climb at 300 KIAS to the next set's altitude. When the fighters are at altitude the bandit will direct the division to accelerate for the next set. The Tac Lead will acknowledge with the sections callsign (e.g. "Mace"), select military power and accelerate level to 330 KIAS.

	Position	Altitude	Distance	Speed	Initiated From
<b>All SEM Sets</b>	Abeam	Deck + 5/6k	0.9 nm	330 kts	300 kts
*All decks referred to for PADS will be the Hard Deck **Allowable Deviations = Altitude +-200ft, Distance +-.1nm, Speed +- 10kts					

When ready the bandit will call "set". The fighters will complete standard "speed and angels" comm, indicating they are tally/visual and ready to fight. The bandit will call "in" and maneuver as required to set the presentation. The bandit will call "fight's on" as outlined for the different setups; a "fight's on" echo is not required this is replaced with the tally comm. At this point the engagement has begun and the fighters should execute SEM.

### 902. KIO MECHANICS

The bandit will typically evaluate and hold the KIO hammer for Training Objectives. KIO comm and mechanics are important and are outlined in the TACSOP. Once you hear the KIO call, all aircraft should stand the throttle up and clear their flight path and lift vector maneuvering as required for safety of flight. When low SA roll wings level, maintain your altitude and listen for the flow heading. When high SA, initially maneuver to maintain SA. Low and high SA decisions and mechanics are discussed in the following paragraphs. Hold all formation management comm until after all aircraft are maneuvering to the flow heading.

As the low SA fighter, maintain your altitude and make a hard turn to the flow heading while clearing your flight path and lift vector. Next, continue to maintain your altitude and, in the proper order, communicate your status – tally/no joy, visual/blind, one or two in sight. If another aircraft has two in sight, they own deconfliction and you may climb or descend, remaining predictable.

If you have high SA, you are not required to stay at any altitude or immediately pull to the flow heading. How you maneuver is situational dependent. Apply sound judgment and tactical formation maneuvering to arrive in combat spread on the flow heading. If at any time you have to turn belly up to another aircraft you may do so with proper deconfliction. Deconfliction can be solved vertically or laterally, but must be maintained before, during, and after a belly up turn. When making such a turn you cannot float the turn, you must be in a hard turn while clearing your flight path and lift vector. Follow Tactical Formation Stage procedures for adequate deconfliction standards. Finally, use descriptive comm or make recommendations to expedite the Tac Admin. Your priority is fixing the fighter's formation. The bandit will generally take care of himself so hold any comm for the bandit till the end. Above all else, use good headwork, make sure you have the whole picture and remember safety-of-flight trumps all. If you see a bad situation developing then get that SA out immediately without regard to any recommendations or comm flow.

### **903. DIVISION REJOINS**

The division can typically get back together with tactical formation maneuvers, cooperative TAC Form is required to redress the formation. Examples are listed below. However, if all players are low SA a TACAN rendezvous may be used to rejoin the division. Any time altitudes are used to deconflict you may not cross an occupied altitude without deconfliction. Update any changes in a timely fashion. If your SA improves use descriptive comm or make recommendations to expedite a rejoin. A tool you can use to differentiate aircraft is a wing-rock. If you have one or two in sight, ask someone for a wing-rock to improve your SA to visual, tally, or tally/visual.

Example comm flow for formation management:

Bandit: "Rage check left 150"  
Tac Lead: "Rage 150"

Bandit: "Showtime Tac Right"  
Tac Lead: "Showtime"

Example comm flow for small formation redress or other recommendations from the fighters:

Tac Wing: "Rage 12 recommend check right 210"  
Bandit: "Rage check right 210"  
Tac Lead: "Rage 210"

Tac Lead: "Rage 11 recommend flow 060"  
Bandit: "Rage flow 060"  
Tac Lead: "Rage 060"

Tac Wing: "Rage 12 recommend In Place Left"  
Bandit: "Rage In Place Left"  
Tac Lead: "Rage"

Example descriptive comm flow:

Tac Lead: "Rage 31 blind/no joy"  
Tac Wing: "Rage 31, I'm at your right 4 o'clock, 10 low"  
"Recommend check right 090"  
Bandit: "Rage check right 090."  
Tac Lead: "Rage 090"

#### **904. COMMON TAC ADMIN ERRORS**

- Tactical Formation Keeping
- Setup Adherence
- KIO Mechanics
- KIO Communications
- KIO Headwork
- TACSOP Adherence

## **CHAPTER 10 SAFETY AND CONTINGENCIES**

### **1000. SAFETY**

Section Engaged Maneuvering is a highly dynamic and challenging mission. Each fighter must adhere to their responsibilities outlined to mitigate risk and allow for proper tactical execution within the bounds of training and safety. Training Rules dictate how this mission is flown and you must understand how to apply them to this scenario. Easing your pull is not on its own a risk mitigation tool. Proper comm and a thorough understanding of the FTI is crucial.

There is a considerable amount of comm that happens in very short timeframes during Section Engaged Maneuvering. This underlines the need for clear and concise transmissions and the need to LISTEN. There may be times when you are unable to call the pass as you are familiar with from 1v1 BFM. Here you must clearly show your intentions by exaggerating your aircraft movements (e.g. exaggerate your nose to the right to show you intend a left-to-left). During these times it is prudent to aim for a slightly wider pass (e.g. 1,000 feet vice 500 feet) then when the pass is set tighten down.

OPNAV 3710 ACM Training Rules states all aircraft must be in sight of each other in the visual arena. A good dialogue of blind, no joy, visual and/or tally is required. If the engaged fighter and bandit have lost sight of each other utilize Training Rules as in 1v1 BFM. Other instances are outline below.

Per OPNAV 3710 element deconfliction, “blind aircraft within an element shall immediately transmit “blind,” and wingman shall respond visual with his position. If the wingman is simultaneously blind, he shall transmit “blind” with his altitude and maintain a level flight path. It is the responsibility of the first aircraft in the element that calls “blind” to establish altitude deconfliction. If communications are prohibited, each aircraft that remains blind shall maintain a level and predictable flight path, and his priority shall be to clear his flight path.” As a good technique if you ever become blind transmit your altitude. If unable to communicate your blind status due to lack of radio time prioritize deconfliction.

Per OPNAV 3710 engagement deconfliction, “without a tally/visual on all fighters and bandits, aircraft shall conduct belly checks at a minimum of every 90 deg of turn.” To conduct a belly check, roll out to approximately wings level. Spend two to three seconds scanning the area masked by your belly. Be sure to look level, slightly above and below the horizon, and then continue fighting.

Discuss these training rules with your instructors to determine how to apply them in the SEM environment!

Section Engaged Maneuvering guidance allows a fight to continue with one blind/no joy aircraft. If SA degrades below this deconfliction becomes primary. Use the radio to establish deconfliction, if deconfliction cannot be resolved in a timely manner a KIO shall be initiated. The need for a sound scan of wingman, bandit and aircraft performance in Section Engaged Maneuvering cannot be overstated! This isn't to say that you will always be visual. The dynamic nature of the mission makes tracking multiple aircraft very challenging. Use good headwork, if you should be able to find your wingman and cannot call "blind" **with an altitude**.

It would be extremely complicated to explain every possible contingency and outcome when low SA. The following general guidelines apply. If you are high SA (tally/visual or two in sight) then an aggressive mindset is expected, general safety and common sense always applies (e.g. avoid three aircraft merges). Having high SA is more than just what you see right now. You have to determine if you will be able to maintain that SA while you maneuver. If you are not high SA or determine you won't be able to maintain high SA while maneuvering then adopt a conservative mindset increasing separation (stiff arm the fight). If after a few seconds your SA is still low then adopt a cautious mindset prioritizing flight path deconfliction updating your tallies again if required (e.g. "tally/blind altitude").

An example of this is a switch. If the engaged fighter is tally/visual then an aggressive mindset may be used. If the engaged fighter is tally/blind then increase separation from the bandit (e.g. lag maneuver) and focus your attention on gaining visual. The proper radio call would be "Anvil 31 tally/blind." Once visual is regained update this with, "Anvil 31 tally/visual" and adopt an aggressive mindset, again general safety always applies. If, in this scenario, after a few seconds you did not gain tally/visual prioritize clearing your flight path further increasing separation from the bandit. You should maneuver as described in the following sections however your aggressiveness continues to be relaxed until your SA increases enough to warrant pulling into the area where the other aircraft are or might be.

Another example would have the engaged fighter tally/blind in a two-circle fight at twenty thousand feet. The engaged fighter shall update his tallies with "Smack 12 tally/blind 20 thousand". The engaged fighter would like to maneuver nose-low out-of-plane in accordance with 1v1 HA BFM however since he is tally/blind he cannot unless the free fighter drives the engaged fighter using directive comm.

It is the responsibility of the fighters to establish and maintain deconfliction, the bandit is "the keeper of the training rules" and acts as a safety back-up. Therefore, the bandit shall not assume that his tally two will maintain safety of flight. Sufficient altitude separation shall be established if both the free and engaged fighter are blind. Additionally, if the free fighter has only one aircraft in sight or is no joy sufficient altitude separation must exist between the free fighter and bandit. If this does not occur a KIO shall be initiated and deconfliction primarily via altitude will be established. With sufficient altitude deconfliction the focus will be on regaining tally/visual.

These guidelines provide a framework for each fighter to aggressively maneuver their aircraft since there is always a tally/visual fighter or an established altitude deconfliction gameplan. *The need for the fighters to update their tallies and altitude regularly cannot be overstated.* Discuss these overall concepts with your instructor to better understand the intent.

## **1001. CONTINGENCIES**

Weather is the main contingency that must be dealt with during Section Engaged Maneuvering. Adjusting the fighters setup altitudes may be done to execute the event as long as the intent of the training is not significantly impacted.

## **CHAPTER 11**

### **FORM – SENSOR – COMM**

#### **1100. INTRODUCTION**

Any tactical sortie can be summarized with three key ideas: Formation, Sensors and Communication. A breakdown in any one of these usually results in a less than optimal situation. The following section will describe each portion as it pertains to SEM. Realize the T-45 is extremely limited in sensors, eliminating this discussion. The FRS and Fleet will introduce a multitude of sensors and systems to enhance aircrew SA, but a sound visual lookout cannot be sacrificed. Although not truly a sensor the A/A TACAN is a tool that can be used to improve your SA. Remember, ranging will be to the bandit. Account for this in your decision making.

#### **1101. FORMATION**

The fighters have two primary formations to choose from: Defensive Combat Spread (DCS) and Offensive Combat Spread (OCS). OCS provides better isolation of each aircraft however it reduces the ability and effectiveness of the fighters to visually clear the airspace around each other. The fighters will employ out of DCS because it allows maximum visual mutual support. DCS is the best formation to use when “defensive” in nature and expecting to react to threats visually. The wingman must fly a disciplined formation striving to be directly abeam lead to maximize visual mutual support!

In the TRACOM your ability to detect the adversary is limited to visual lookout. Certain tactics are designed to obtain an unobserved entry on fighters. Therefore the visual lookout doctrine used in the TRACOM will directly carry over to your FRS and Fleet experiences.

An understanding of the environment and how it affects your event is important. On a hazy day a tally may be hard to achieve until the bandit is inside of three nautical miles. This may result in the closest fighter being tally but the furthest fighter being no joy simply because of the environmentals. Evaluating the environment and compensating for it is an important factor.

There are four quarters a bandit can be acquired: forward quarter, beam quarter (left/right), and rear quarter. In addition, a rear quarter visual pick-up can be from between the section or outside. The four quarters are illustrated below and are discussed in more detail in each respective section.

The primary scan volume for each fighter is to look inside the section. This is to say you look through your wingman to find the threat. The fighters should prioritize their primary sector 75% of the time. The secondary scan volume is outside the section or away from your wingman. The fighters should prioritize their secondary sector 25% of the time. Don't forget to look within twenty degrees of the horizon as well as in front and behind the section with a deliberate scan to effectively sanitize the airspace.

The fighters have the ability to clear the airspace while maneuvering. If executing a Tac Turn the fighters will be able to clear their old and new six o'clock. The fighter inside the turn will be able to clear the new six o'clock. The fighter outside the turn will be able to clear the old six o'clock. An aircraft can be challenging to detect at three nautical miles, however effectively employing these concepts can lead to a far less defensive scenario for the fighters.

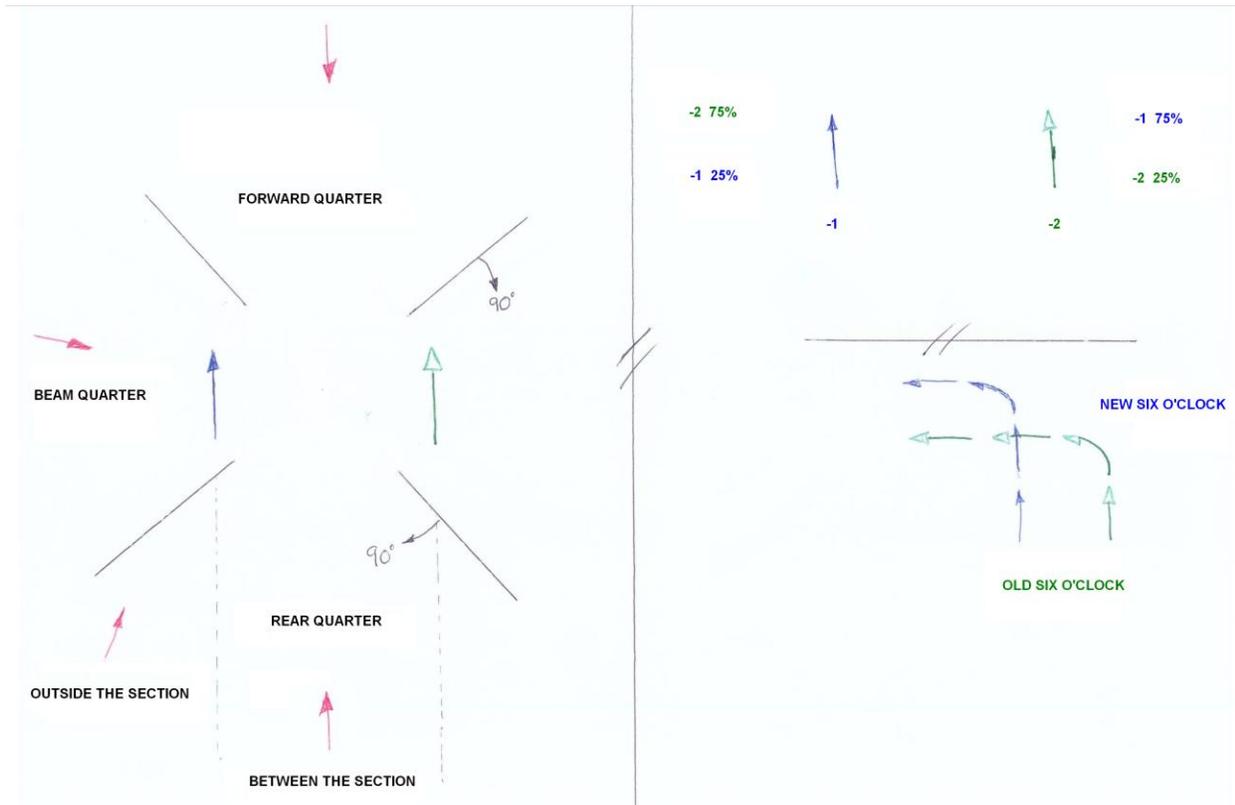


FIGURE XXX – LOOKOUT DOCTRINE

## 1102. COMMUNICATION

Lastly, before any tactics can be discussed the fighters must be able to communicate effectively. Clear, concise comm is paramount in a dynamic environment with limited radio time. The section should strive to use proper comm format to achieve this goal. As always, prioritize **directive** comm over **descriptive** comm with any fill-ins at the end. Training Rules and safety of flight comm has the highest priority over all others. Training Rule intentions will be initiated IAW the BFM Stage.

Combine directive and descriptive comm to build the whole picture. Avoid running commentaries, update the fight as it changes.

- Directive Comm – used to immediately drive the section or an individual fighter in order to react to a threat or other situation. It is used to avoid a defensive situation, increase survivability, deconflict or drive flow. Time is short, be clear and concise.
- Descriptive Comm – used to provide amplifying information. It can be used to describe the location of the bandit or a wingman. It can also be used to deconflict the fighters or describe what another fighter is doing to build the picture. Descriptive comm is not required if you are describing something that is obviously apparent to the other fighter. Use it to fill in the SA gaps or bring a low SA fighter back into the mix.

### COMMUNICATION BREVITY TERMS

ANCHORED (location) – Turning engagement at the specified location.

“Rage 42 ANCHORED Depot 295 / 42 / 18 thousand.”

BLIND – No visual contact with friendly aircraft. Opposite of VISUAL.

“Nickel 72 BLIND 12 thousand.”

BREAK (left/right) – Perform an immediate maximum performance turn in the direction indicated (default is a 180 degree turn).

“Combat BREAK right, TALLY 1, right 5 o’clock, 1 mile, 10 low!”

“Showtime 62 BREAK right, sensor nose!”

BREAK (left/right) 90 – Same as BREAK (left/right), however limit the turn to 90 degrees of heading change.

COME OFF (direction) – Maneuver as indicated to either regain mutual support or to deconflict flight paths. Implies VISUAL and TALLY.

- COME OFF can be used if the free fighter became more offensive or to establish a clear field of fire

“Smack 12, COME OFF left, shot in 5.”

DEFENSIVE – Aircraft is under attack, maneuvering defensively, and unable to ensure deconfliction or mutual support. Implies ENGAGED.

“Anvil 61 DEFENSIVE.”

ENGAGED – Intra-flight call from an aircraft maneuvering in the visual arena to relinquish deconfliction responsibilities. Implies TALLY and in an offensive or neutral position.

- Utilize descriptive or STATUS (relationship) comm to increase SA.

“Showtime 61 ENGAGED left, two-circle, 12 thousand to the deck.”

EXTEND(ING) (direction) – A short term maneuver to gain energy, distance, or separation with the intent of re-engaging.

- Calling EXTEND(ING) is not typically required.

FREE – Intra-flight call from an aircraft in the visual arena indicating he is assuming the free fighter role. Used to deconflict fighter flight paths.

HARD (left/right) – Perform a High G, energy sustaining turn in the indicated direction (default is a 180 degree turn).

HARD (left/right) 90 – Same as HARD (left/right), however limit the turn to 90 degrees of heading change.

“Nickel HARD left 90, TALLY 1, left 10 o'clock, 2 miles.”

KILL – In training, a fighter call to indicate kill criteria has been fulfilled.

“Taproom 41 KILL Goshawk left turn, 12 thousand.”

MERGE(D) – Friendlies and targets have come together in the visual arena.

NO JOY – Aircrew does not have visual contact with the non-friendly aircraft. Opposite of TALLY.

PADLOCKED – Aircrew cannot take eyes off an aircraft without risk of losing TALLY and/or VISUAL.

POSIT – Request for friendly position and altitude; response in terms of a geographic landmark or from a common reference point (e.g. the tail of the waypoint needle referencing bullseye). Implies BLIND/NO JOY.

“Showtime 32 POSIT.”

“Showtime 32 ANCHORED Rock 143 / 25 / 12 thousand.”

**SET** – Set (or have set) a particular speed in KIAS or Mach.

STATUS (relationship) – Request for an individual’s tactical situation. If the request is from the free fighter to the engaged fighter use it to communicate relative position in a fight. Implies the free fighter has two in sight. **The engaged fighter should respond with ownship position/attitude/relationship.** If the request is from the engaged fighter to the free fighter use it to build SA between the fighters.

“Smack 12 STATUS.”

“Smack 12 low, South, right turn.”

“Smack 11 TALLY/VISUAL.”

“Mace 42 tally/blind. Mace 41 STATUS.”

“Mace 41 I’m at your right 2 o’clock, 30 low, free, shot in 5.”

**SWITCHED** – Attacker is changing from one aircraft to another.

- Calling SWITCHED is not typically required if both fighters have high SA.

“SWITCHED SWITCHED.”

TALLY – Sighting of a non-friendly aircraft. Opposite of NO JOY.

“Combat 11 TALLY 1, right 1 o’clock, 2 miles, 5 high.”

TUMBLEWEED – I have limited SA and require additional information.

UNABLE – Cannot comply as requested or directed.

- Call UNABLE if a request or direction would result in a BFM or SEM error.

“Anvil 21 COME OFF left.”

“Anvil 21 UNABLE.”

VISUAL – Sighting of a friendly aircraft. Opposite of BLIND.

## CHAPTER 12 SECTION ENGAGED MANEUVERING CONCEPTS

### 1200. SECTION ENGAGED MANEUVERING FUNDAMENTALS

You need to know the SEM Fundamentals listed below like boldface! These concepts are the tools to success during SEM and all of your training will be centered on these fundamentals! Weapons envelopes, sight pictures, and techniques will all change at the FRS and Fleet, but these fundamentals WILL NOT CHANGE. Do not leave the Section Engaged Maneuvering Stage without understanding these basic principles.

#### SEM Fundamentals (in order)

- 1) Kill the Adversary
- 2) Avoid Becoming Defensive
- 3) Fly Your Best 1v1 BFM
- 4) Work Out-of-Plane / Out-of-Phase
- 5) Engaged Roles / Responsibilities / Communication

In order to be successful at SEM the fighters need to coordinate their attacks. Effective coordination and proper application of the SEM Fundamentals requires both fighters to be tally/visual. You must strive to track both aircraft while flying your best jet!

SEM is more than 1v1 plus 1. It is two fighters actively working together to achieve a kill. The fighters will be faced with multiple 1v1 BFM game plan options. You must learn how to adapt your 1v1 BFM decisions based on the section's current situation or the other fighter's location. However, do not do anything contrary to sound 1v1 BFM simply because you are working in section. If either fighter is not employing at their best the bandit will be able to gain angles and achieve a Weapons Engagement Zone (WEZ). The bandit's job gets much easier if he can go from "2v1 the hard way" to 1v1.

The fighters will start with the basic assumptions listed below. Anytime these change they must be updated in a timely manner.

#### SEM Basic Assumptions

- 1) Each fighter is visual.
- 2) Each fighter is no joy. This assumption changes to a tally assumption once tally has been communicated.

## **1201. KILL THE ADVERSARY**

As you read the following section keep in mind the overall goal of the fighters is to both survive and kill the adversary. This starts by executing your best 1v1 BFM. The fighters will have a hard time finding a Launch Acceptability Region (LAR) if they are not fighting their best BFM. Next use engaged communication and out-of-plane/out-of-phase to achieve the kill. These are the tools to win the fight.

### **WEAPONS EMPLOYMENT OPPORTUNITIES**

Often times it is the free fighter that achieves the kill. **Shots do not change the role status.** Referencing the *Engaged Communication* section, it is the free fighter's responsibility to ensure overall deconfliction responsibilities. This deconfliction must be maintained before, during and after the shot. Some engagements will yield shot opportunities that make deconfliction a challenge. Manage the fight to find a solution that best satisfies all responsibilities.

The sections below describe basic shot sight pictures for the free fighter with two-circle and one-circle engaged flow. Utilize these basic shots to build upon your understanding of SEM and how to achieve a LAR. There will be other shot opportunities during engagements this section does not describe. If the bandit presents a weapons employment opportunity and you can honor your other responsibilities take the shot.

The engaged fighter may also have weapons employment opportunities. These shots will be similar to those seen in 1v1 BFM.

### **CLEAR FIELD OF FIRE**

When a shot presents itself a clear field of fire must be ensured. A clear field of fire is defined as:

- Friendly/neutral aircraft are outside the HUD FOV at trigger squeeze.

Realize a defensive scenario may bias your decision away from this rule of thumb. Take into account the severity of the defensive situation before you pull the trigger. If you assess that sensor nose will not be a factor before your missile would impact the bandit then wait for a clear field of fire.

### **SHOT AND KILL REMOVAL COMM**

Engagements will continue until there is proper kill removal comm. Shot comm **is not** descriptive (e.g. "Rage 11 Fox-2 Goshawk on the right"). Shot comm consists of your callsign and the weapon employed. Kill comm is descriptive and should be adequate enough to determine which aircraft has been employed upon. If a shot is determined to be invalid after the shot call, do not call the "kill". This will allow the fight to continue.

Fighter: "Sweep 72 Fox-2."  
Fighter: "Sweep 72 kill Goshawk left turn 16 thousand."  
Bandit: "Copy Kill."

The bandit may call "P<sub>k</sub> continue" negating the previous shot/kill call. A "P<sub>k</sub> continue" is used in the Fleet to simulate actual ordinance "Probability of Kill" limitations (not every weapon works every time). In the Training Command a "P<sub>k</sub> continue" will be used to continue the set for added training. The fighters should continue to execute SEM and the reason for negating the kill will be debriefed.

The bandit may call shots during the fight but fighters will not be kill removed. Any shots by the adversary will be debriefed.

### **BASIC SHOT OPPORTUNITY – TWO-CIRCLE – FREE FIGHTER ABOVE**

The geometry of this engagement is important to understand. The free fighter must assess his relationship to the bandit. Nose-to-tail separation, lateral separation, altitude delta, angles off nose and angles off tail all influence the geometry of the engagement and possible shot opportunities. The free fighter does not want to yield a WEZ or offensive position to the bandit (e.g. the free fighter does not want to fly out in front of the bandit's nose). If poor geometry is assessed too late by the free fighter there may be little chance to salvage the current situation. Remember to survive and avoid becoming defensive. Decisions on which weapons employment opportunities to take and the risks associated with follow-on BFM are situational dependent. Always consider the impacts of your present actions to follow-on BFM and SEM should the shot not guide and fuse.

Out-of-plane shots can be difficult due to the poor turn performance of the T-45. Also, while maneuvering nose-low for a shot more altitude than normal is typically lost. "Fishing for the shot" can result in a loss of one to two thousand more feet than a normal nose-low maneuver. Typically four to five thousand feet of altitude separation is required if the shot is taken from the oblique. A pure nose-low shot and recovery may result in eight thousand feet of altitude loss.

In all cases, the free fighter must maintain deconfliction before, during and after the shot. There are several methods of assuring deconfliction while attempting to kill the bandit. Deconfliction is typically most challenging if the engaged aircraft is neutral to offensive. A defensive situation requires a shorter time to kill but follow-on maneuvering into the control zone is not an issue since the defensive fighter cannot occupy that space.

### **OUT-OF-PHASE FLOW**

Out-of-phase flow generally yields forward quarter shot opportunities from the oblique. Assess the geometry of the fight to determine if a valid shot and proper follow-on

mechanics are possible. Patience is required during this scenario, be mindful of the follow-on maneuvering before committing nose-low. For the shot, place your lift vector on the bandit appropriately and perform an energy excursion to achieve a valid LAR pulling the trigger with a clear field of fire. The free fighter's attitude at trigger squeeze will dictate the amount of altitude lost during the shot. The ideal shot would come at thirty to forty degrees AON. To achieve this, referencing eight thousand feet of altitude above the fight, execute your energy excursion for the shot just when you are 180 degrees out from the bandit. This type of shot is the earliest available and results in the least amount of altitude lost.

Immediately after the shot, pull to maintain at least one to two thousand feet of altitude separation from the fight while calling the shot and kill. Then trade airspeed for altitude to reset out-of-plane. Next assess the geometry to determine if in-phase or out-of-phase is appropriate.

If the free fighter's shot was forward quarter aggressively reestablishing out-of-plane and out-of-phase best fulfills the free fighter's responsibilities. If the shot was aft of the bandit's 3/9 line or out-of-phase would be a BFM error (e.g. you think you might fly out in front of the bandit) reestablish out-of-plane but turn in-phase with the engaged fighter. Always remember the hierarchy of the SEM Fundamentals. While out-of-plane and out-of-phase are important, "Avoid Becoming Defensive" is a higher priority. Sacrifice out-of-plane and out-of-phase to avoid a defensive situation.

### IN-PHASE FLOW

If a large amount of lateral or nose-to-tail separation exists in-phase flow may be the best option. Remember, in-phase with a two-circle engagement requires the free fighter to execute a sound rate fight. For proper shot mechanics, place your lift vector on the bandit appropriately and execute an energy excursion to achieve a valid LAR pulling the trigger with a clear field of fire. Use sight pictures from 1v1 OBFM for the timing of the shot. Immediately after the shot, reestablish out-of-plane. If you have transitioned to a more offensive position than the engaged fighter coordinate a role swap.

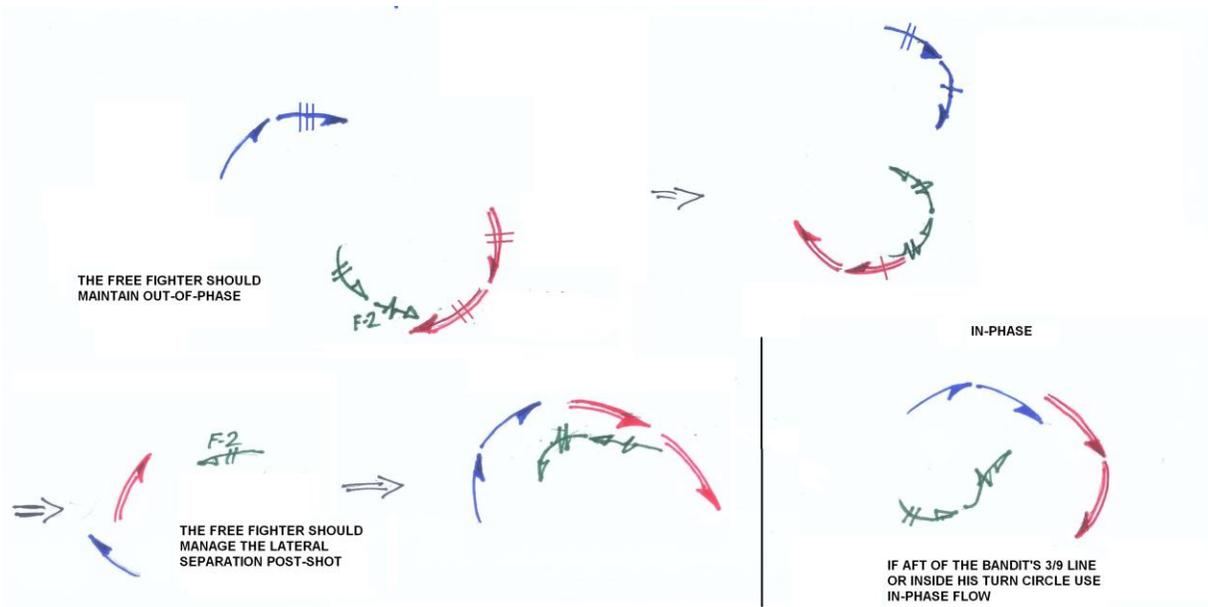


FIGURE XXX – BASIC TWO-CIRCLE SHOTS AND FOLLOW ON FLOW

## BASIC SHOT OPPORTUNITY – ONE-CIRCLE – FREE FIGHTER BELOW

### OUT-OF-PHASE FLOW

Out-of-phase from a one-circle fight can be conceptualized as following the bandit in an apparent two-circle fight (nose-to-tail). Just after the bandit reaches the apex of his turn place your lift vector on the bandit appropriately and perform an energy excursion to achieve a LAR just after the bandit and engaged fighter merge. Pull the trigger when a clear field of fire is established. While calling the shot and kill, overbank and pull in the shortest direction to place the fight on your 3/9 line again. This will maintain lateral separation from the engagement. As you continue to follow the bandit (nose-to-tail) assess your energy state and follow-on weapons employment opportunities. Trade altitude for airspeed and/or perform extensions to gain energy for the next shot. If you do not have energy to pitch-in at the next weapons employment opportunity, turn to maintain out-of-phase and gain energy after placing the fight on your 3/9 line again.

### IN-PHASE FLOW

In-phase flow will typically present forward quarter shot opportunities. In-phase is less desirable because both fighters are on one side of the bandit's canopy and it puts the free fighter in front of the bandit's nose. This will simplify the bandit's problem and may allow him to switch to a neutral merge and negate a shot opportunity. If an in-phase situation occurs employ weapons but realize the caveats associated with this flow. The shot mechanics and timing are the same as the out-of-phase shot.

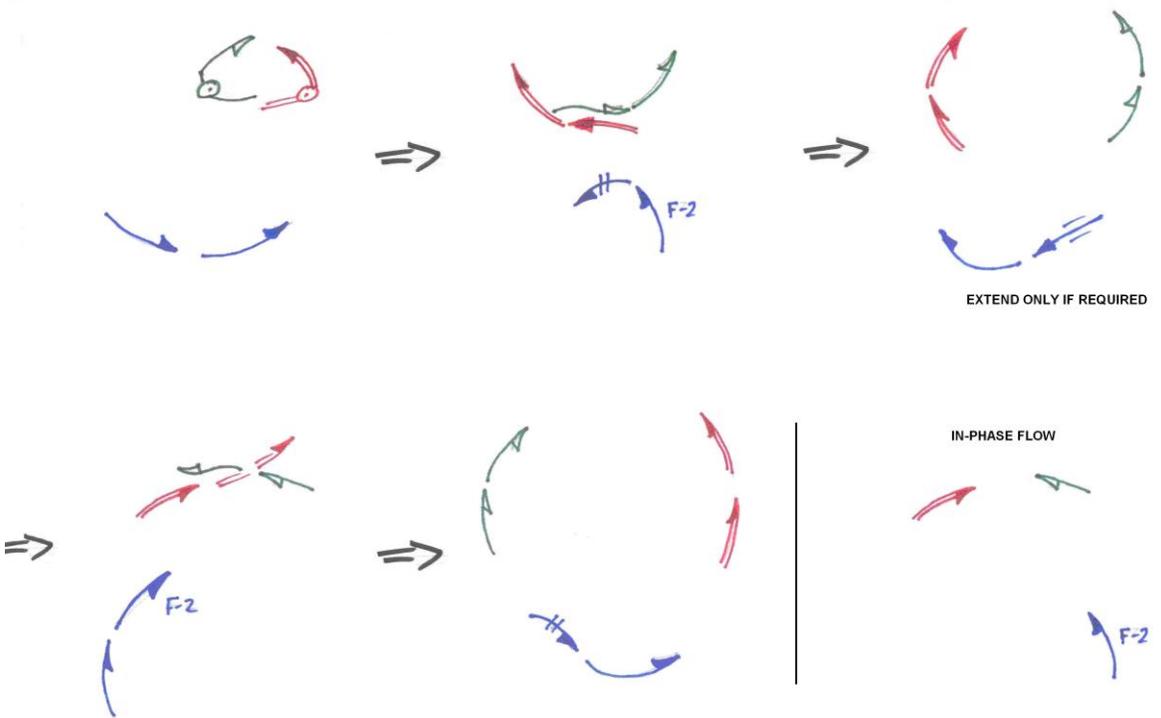


FIGURE XXX – BASIC ONE-CIRCLE SHOTS AND FOLLOW ON FLOW

## 1202. AVOID BECOMING DEFENSIVE

The second SEM Fundamental is for both fighters to survive. As you read the following paragraphs each fighter needs to assess then make appropriate decisions that avoid a defensive situation. One wrong turn could lead to weapons separation for the bandit to achieve a kill on a fighter. Be wary of your decisions. Forego out-of-plane, out-of-phase and/or any ideal flow to survive, then look for other opportunities to employ the fundamentals to achieve a kill.

## 1203. BFM EXECUTION

Each fighter needs to execute his best 1v1 BFM while coordinating their attack. All the lessons you have learned about 1v1 Perch and HA BFM will apply. Your ability to apply those skill sets to SEM will influence your success in this environment. Coordination and roles will ultimately resolve any deconfliction issues and questions about initial moves.

The engaged fighter is responsible for executing his 1v1 BFM game plan. This puts pressure on the bandit preventing the bandit from keeping his energy up and spending time tracking the free fighter. Also, an arcing engaged fighter is giving the bandit an opportunity to achieve a WEZ and/or offensive position. The *Visual Pick-up Concepts*

section provides guidance on BFM game plans that work with the overall SEM game plan.

Often the engaged fighter will be neutral and unable to achieve a LAR. Therefore, the free fighter often achieves the kill. You have to “earn the right to be free” by controlling merges and working hard to set out-of-plane and out-of-phase.

Both fighters should never pull for the bandit’s control zone at the same time. This will result in two aircraft simultaneously going for the same piece of sky. **By definition the engaged fighter owns the bandit’s control zone!** Apply sound judgment to this rule. If the engaged fighter is unable to enter the bandit’s control zone (e.g. defensive) do not forego weapons employment opportunities or chances to transition to an offensive position. Additionally, should the free fighter become the most offensive fighter entry to the control zone is acceptable and a role swap is warranted. The free fighter is always responsible for coordinating deconfliction until a role swap is completed.

Sound BFM keeps the fight tight. A tight fight yields less turning room and weapons separation for the bandit. The fighters want to control these critical BFM tools. If a fighter needs to gain energy or separation then an extension can be used.

- Extension – a short term maneuver used to gain energy, distance or separation with the intent to re-engage.

The separation can then be used as weapons separation for a shot or to gain an offensive advantage. Increased energy will also allow a fighter to pitch-in to the fight. To perform an extension, unload (altitude permitting) varying the duration of the unload to meet the separation and/or energy requirements. You can extend wings level or in an angle of bank. As a rule of thumb, a three second unload will yield a twenty knot airspeed increase. A short ease from a pull may be enough to gain required separation. However, easing a pull for too long is less effective than an extension, because it will increase your turn radius and decrease your turn performance with little energy addition.

Recall from 1v1 HA BFM the fighter, at each merge, must assess angles, altitude and energy (yours and the bandit’s). Then check turn across the bandit’s tail and set the desired flow. The bandit can always turn to change the flow. However, proactive BFM will force the bandit to turn to set the flow he desires. Reactive BFM allows the bandit to control the merge and flow from the outset. The fighters must attempt to set the flow to best affect the fighter’s situation (e.g. one-circle away from wingman). **In general, if able to force one-circle flow (especially if away from your wingman) then do so, as long as you aren’t making a BFM error.**

#### **1204. OUT-OF-PLANE / OUT-OF-PHASE**

The most basic idea that the fighters need to understand and execute is to work out-of-plane and out-of-phase. **It is the responsibility of the free fighter to establish out-of-plane and out-of-phase without committing a BFM error.** If out-of-plane/out-of-

phase would result in a BFM error continue with proper BFM and look for the next opportunity to set proper flow. Out-of-phase flow, in a basic sense, is turning in the opposite direction of the engaged fighter. It can also be conceptualized as having the fighters on opposite sides of the bandit's canopy.

The free fighter must watch and take into account the actions of the engaged fighter then control the impending merge. Then the free fighter must force a tight pass to avoid giving up turning room. As the free fighter approaches a merge he must assess if a turn to set out-of-phase would be a BFM error. Do not set out-of-phase if it would be a BFM error, this may result in a defensive situation (fundamental number two). With out-of-phase set the fighters can reference the bandit's lift vector placement to determine roles. The fight will appear as a one-circle fight to one fighter and a two-circle fight to the other. Since the bandit cannot put his lift vector on both fighters simultaneously the bandit is making a BFM error to someone.

Ideally, the free fighter would control the merge orientation to best establish out-of-phase while attempting to set the desired flow (one-circle or two-circle). For example, if out-of-phase one-circle flow away from your wingman is desired set the pass so you would check turn across the bandit's tail and reverse to set the flow. Be proactive vice reactive with BFM and SEM Fundamentals.

Out-of-plane complicates the bandit's problem. It forces him to look high and low to maintain tally two. It uses the BFM concept of out-of-plane maneuvering to gain angles on the adversary as well. Finally, it provides a discriminator to bandit lift vector placement which helps the fighters determine roles. Out-of-plane does not have to be twelve thousand feet of separation, nor is it two thousand feet. Too little out-of-plane simplifies the bandit's problem. Too much out-of-plane can complicate the fighter's situation. Vertical separation must be managed to optimize the BFM and SEM picture.

The fighters must also recognize when out-of-plane/out-of-phase is not required. If the bandit makes a BFM error to a fighter or presents a LAR, forego out-of-plane/out-of-phase and kill the adversary (fundamental number one)! Roles still define deconfliction so proper SA and communication is required regardless of the scenario.

## **1205. ENGAGED ROLES / RESPONSIBILITIES / COMMUNICATION**

Understanding how to determine roles is important to understanding SEM. Defining roles is of paramount importance so each fighter knows their responsibilities. **The reason roles are defined is to establish deconfliction between the fighters and to coordinate their individual responsibilities.**

There will be times that the fighters need to have a "first guess" role definition. These initial roles may only last a couple seconds or they may last the duration of the fight. They are used to define initial moves, to eliminate confusion when there is little time to use comm, or as a tiebreaker in certain scenarios. The circumstances and the bandit ultimately decide who is engaged. The roles may be redefined as often as necessary to

best optimize the fighters' situation. Be patient to communicate the roles and know your responsibilities before and after roles are communicated. It should be noted that you cannot call "free" before a fighter has called "engaged."

## **DEFINING ROLES / RESPONSIBILITIES**

Sometimes the Engaged Fighter Criteria is of little consequence or does not help the fighters determine who is engaged. During these times, **to best determine who the bandit is actively fighting, reference the bandit's lift vector placement. When the bandit's lift vector placement is inconsequential utilize the Engaged Fighter Criteria.** You must learn when and how to apply these concepts.

### Engaged Fighter Criteria (in order)

#### 1) Most Defensive Fighter

- Use this if one or both fighters are defensive. A good way to conceptualize this is who will be shot first or who has the least angles off the bandit's nose. The bandit's lift vector placement, angles off your tail and range to the bandit may be of little consequence. Additionally, if one fighter is defensive and the other in neutral or offensive, the defensive fighter is engaged.

#### 2) Most Offensive Fighter

- Use this if one or both fighters have an offensive advantage.

#### 3) First Fighter to the Merge

- Use this if the bandit merges with one or both fighters. The first fighter executes his HA BFM game plan while the other fighter maneuvers accordingly.

#### 4) Lead by Exception

- The wingman always owns deconfliction with his lead! When in doubt as the Tac Wing, watch the Tac Lead, deconflict then execute SEM.

### Engaged Fighter Responsibilities

- Execute 1v1 BFM Game Plan
- Clear the Bandit's Sensor Nose

### Free Fighter Responsibilities

- Kill the Adversary
- Maintain Overall Deconfliction Responsibilities
- Maintain Overall SA to the Fight and the Surroundings

## ENGAGED COMMUNICATIONS

Engaged communications (comm between the free fighter and engaged fighter) requires little if both fighters are tally/visual. A commentary of the fight does not benefit the fight. Instead center your comm around getting your wingman to regain sight of the fight. Once, your low SA wingman is high SA again, little comm is required. Clear and concise comm achieves this goal. Proper section engaged maneuvering comm structure is centered on these basic calls:

- 1) Directive comm
  - a. "Rage 11 break left."
- 2) Role establishment
  - a. "Rage 11 engaged nose-high one-circle South."
  - b. "Rage 12 free."
- 3) Continuous updates to tally/visual status
  - a. "Rage 11 tally/blind 19 thousand."
  - b. "Rage 12 tally/visual, your left 8 o'clock 40 low."
  - c. "Rage 11 tally/blind."
- 4) Descriptive comm is used much less frequently. It is used to increase a fighter's SA commensurate with the previously stated assumptions (e.g. "tally 1 left 10 o'clock two miles, level") or to describe your own actions if they differ from the known gameplan or to build SA for your wingman.

## FIGHT DESCRIPTORS

In any fight, altitude, attitude (nose-low/nose-high/level) and the offensive/defensive/neutral situation are excellent pieces of information to provide. Additionally, altitude and attitude calls help set out-of-plane and also reduces the scan volume for a low SA fighter. **The idea is for every transmission to add SA to the current engagement.** Speak clearly and be concise. Work big to small and give the other fighter time to process the information. Refer to the *Lost Sight Game Plan* section for examples of status comm.

- One-Circle – Any one circle fight will travel down range. Communicate the axis of the fight using a cardinal/sub-cardinal heading. Neutral one-circle fights have the engaged fighter and bandit across from each other. Offensive and defensive one-circle fights may transition to two-circle or redefine nose-low.

"Sweep 11 engaged nose-high, one-circle North-West."

- Two-Circle – Two circle fights will stay over a certain point. The engaged fighter needs to communicate the direction of turn. Neutral fights will come to merges or the aircraft will be cross-circle from each other.

"Sundown 81 engaged left two-circle, 11 thousand, the bandit's cross-circle."

"Anvil 32 defensive, nose-low, right two-circle."

- Attitude – Nose-high / nose-low / level.
- Altitude – Current altitude and any trends.

### EXAMPLES

"Showtime 41 tally 1 left 11 o'clock, 1 mile, level."

"Showtime 42 tally 1."

"Showtime 42 engaged nose-high, one-circle West."

"Showtime 41 free, shot in 5."

"Rage 32 going nose-high to the right."

"Rage 31 engaged nose-low, left two-circle."

"Rage 32 free."

"Switched, switched."

"Rage 31 tally/blind."

"Rage 32 merge in 5."

"Rage 31 tally/visual."

"Rage 32 engaged one-circle, West, 19 thousand."

"Rage 31 free."

"Taproom 41 engaged right two-circle, offensive, 11 thousand."

"Taproom 42 free."

"Taproom 42 shot in 5."

"Taproom 42 blown shot."

"Taproom 41."

"Switched, switched."

"Taproom 42 engaged nose-high, one-circle, North."

"Taproom 41 free."

"Taproom 41 Fox-2."

"Taproom 41 kill Goshawk, right turn, to the West."

If comm ever begins to break down the fighters are losing mutual support and the adversary will be able to exploit this lack of coordination. In other words, fighters begin to die. Also, a breakdown in comm leads to diminishing SA for the fighters and can lead to safety of flight situations. **Prioritize listening to the radio and speak when adding SA.** Be patient, use comm brevity terms and plain language to be effective.

As you can see SEM is a very dynamic environment. Comm will be used to drive the fighters or build SA. Referencing the SEM Basic Assumptions outlined above, all that must be communicated are the roles. However, briefly describing the fight is a good technique and should be attempted. If the fighters are tally/visual comm will be minimal.

## 1206. SWITCHES

Understanding the bandit's 1v2 game plan can help the fighters make decisions. The bandit, if high SA and proficient, will have an energy game plan attempting to merge with one fighter and fight the other. This will drive the bandit to switch from one fighter to the next. This complicates the problem and forces the fighters to make decisions. A switch does not necessarily change the roles. The circumstances following a switch will determine the roles. Continue to use the Engaged Fighter Criteria and the bandit's lift vector placement to determine if a role swap is advantageous or warranted.

While the bandit switches he is not max performing and is giving up angles and possibly a weapons employment opportunity. If the engaged fighter can take a shot the best time is just after the merge with the free fighter. **During the switch, the engaged fighter should maneuver towards the bandit's control. The free fighter must honor the bandit's sensor nose by making a high aspect merge and maintain his role and responsibilities. This includes, maintaining fighter deconfliction and controlling the merge to bracket the bandit.** A bracket is best because if the bandit turns two-circle into the engaged fighter (away from you at the merge) out-of-phase is naturally set by your turning across the bandit's tail. If the bandit turns across your tail a reversal will force one-circle flow away from your wingman.

If the bandit places his lift vector on the free fighter after the merge redefine the roles (e.g. one-circle fight post-merge). If both fighters are tally/visual the fighters can be aggressive with their game plan in accordance with the *Safety and Contingencies Chapter*. Sound engaged communication and role adherence will provide the fighters a timely kill.

If the engaged fighter is tally/blind at the switch maneuver as describe below however adopt the appropriate mindset as described in the *Safety and Contingencies Chapter*. The free fighter will typically be off the bandit's nose. If the bandit is in a turn, look between the bandit's nose and lift vector to gain tally/visual. Update what you see as this occurs.

If the free fighter is not tally/visual the engaged fighter must use directive comm to avoid a defensive scenario for the fighters. Descriptive comm (e.g. "the bandit's nose is down") has little effectiveness since this comm does not result in specific actions from the free fighter. The free fighter must adhere to the engaged fighter's directive comm and update what he sees as this occurs.

In the event that both fighters lose SA during the switch (both fighters have updated tally/blind) establish deconfliction, primarily via altitude, based on the last known position and initiate a KIO. Continuing with two blind fighters with no alitutde deconfliction would be a training rule violation and potential safety of flight.

If a fighter is blind during a switch call "blind" and use comm to be directive and build SA between the fighters. Lagging the merge may be prudent. The free fighter is typically off the bandit's nose or on his lift vector. If both fighters are blind clear your flight path and lift vector, deconflict via altitude and KIO if unable to resolve deconfliction.

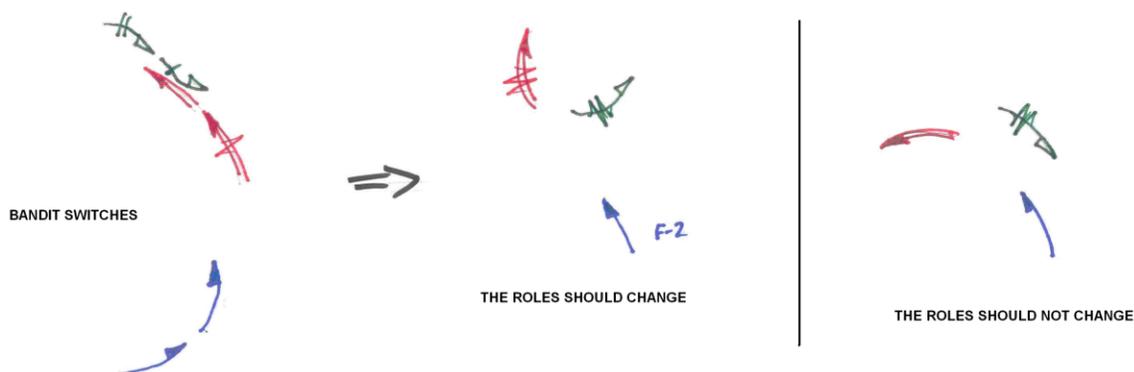
Two common switches are shown below and are an initial guide. Build off of these during varying scenarios.

### **BASIC SWITCH – TWO-CIRCLE FIGHT – FREE FIGHTER ABOVE**

As the bandit switches from low-to-high his turn rate will suffer greatly. The fighters should look for weapons employment opportunities. The engaged fighter should, if high SA, put his lift vector on/in lead of the Bandit to gain a shot opportunity. Then maneuver to the control zone. If low SA, continue to pull toward the bandit but maintain your altitude (stiff arm the impending merge) while attempting to regain visual.

The free fighter must recognize an impending high-to-low merge and control it appropriately (ideally the free fighter would be able to flatten out the high-to-low merge). Additionally, attempt to maneuver to set the pass so that the bandit is between you and your wingman (bracket the bandit). Then check turn across the bandit's tail to take out the turning room, assess the merge geometry and make the appropriate BFM/SEM decision. Unless it would be a BFM error, attempt to force one-circle flow, going as nose-high as you can. Since the engaged fighter will most likely have apparent two-circle flow, forcing one-circle will also establish out-of-phase. Finally, it is important to be aware that if you are unable to flatten out the merge and thus continue downhill, your flight path will take you down towards your wingman. Maintain SA during the switch.

If the bandit follows the free fighter one-circle a role swap is warranted. In doing so, the bandit will turn his tail to the other fighter and die quickly. If the bandit does not follow the free fighter the engaged fighter should have gained a considerable amount of angles. The engaged fighter should be able to transition to OBFM and obtain a quick kill. Since the bandit stayed with the engaged fighter the free fighter must re-evaluate his flow. In general, the free fighter should maneuver to keep the fight tight, avoid turning your tail to the bandit and re-evaluate out-of-plane and out-of-phase.



**FIGURE XXX – BASIC TWO-CIRCLE SWITCH**  
**BASIC SWITCH – NOSE-HIGH ONE-CIRCLE FIGHT – FREE FIGHTER BELOW**

When the switch is recognized the engaged fighter should turn in the shortest direction toward the bandit and maneuver to follow the bandit nose-low attempting to get below the merge while flying toward the bandit's control zone. Vary the lift vector placement to control range and angles. The roles have not swapped as of yet, maintain the engaged fighter mindset. If tally/visual look for weapons employment opportunities or opportunities to gain angles.

The free fighter should adjust his pull and attitude to control the impending low-to-high merge. Additionally, attempt to maneuver to set the pass so that the bandit is between you and your wingman (bracket the bandit). Then check turn across the bandit's tail to take out the turning room, assess the merge geometry and make the appropriate BFM/SEM decision. Unless it would be a BFM error, attempt to force one-circle flow, going as nose-high as you can. Since the engaged fighter will most likely have apparent two-circle flow, forcing one-circle will also establish out-of-phase. Finally, it is important to be aware that if you are unable to flatten out the merge and thus continue downhill, your flight path will take you down towards your wingman. Maintain SA during the switch.

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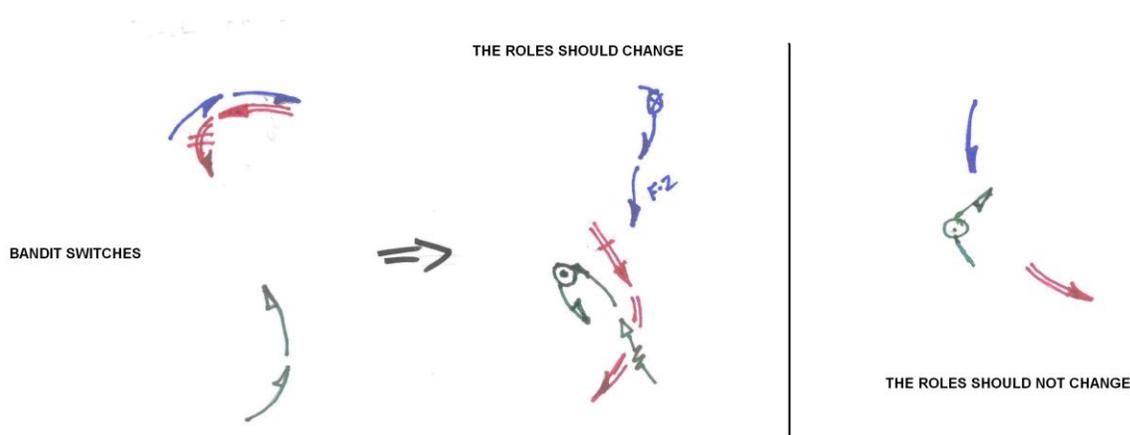


FIGURE XXX – BASIC ONE-CIRCLE SWITCH

## CHAPTER 13 FIGHTER GAME PLANS

### 1300. FORWARD QUARTER VISUAL PICK-UP

A visual pick-up in the forward quarter is the most offensive situation for the fighters. However, it also has the highest closure rates. Forward quarter closure is, on average, three seconds per nautical mile, so time is short. This requires expeditious comm and maneuvering to take advantage of the situation.

Both fighters must execute the appropriate engaged comm and immediately turn nose-on to the bandit to avoid giving up turning room. The fighters should watch the geometry of the initial merge(s) and apply Engaged Fighter Criteria to determine the "first guess" roles. After the initial merge(s) the fighters should assess the bandit's lift vector placement and communicate the roles accordingly. Additionally, the second fighter to the merge should use descriptive comm as required to build SA for his wingman.

"Mace 32 tally 1, left 11 o'clock, 2 miles, 5 low."  
"Mace 31 tally 1."

If one fighter is no joy approaching the merge the fighter with high SA should use directive and descriptive comm to drive flow and communicate the bandit's position. The no joy fighter should maneuver aggressively following the directive and descriptive comm. If the bandit is on your side of the formation an immediate hard turn to the stated clock-code will take you to the merge. Then scan off your nose to gain tally. If the bandit is on the opposite side of the formation point your nose slightly ahead of your wingman, scanning in front of your wingman to gain tally.

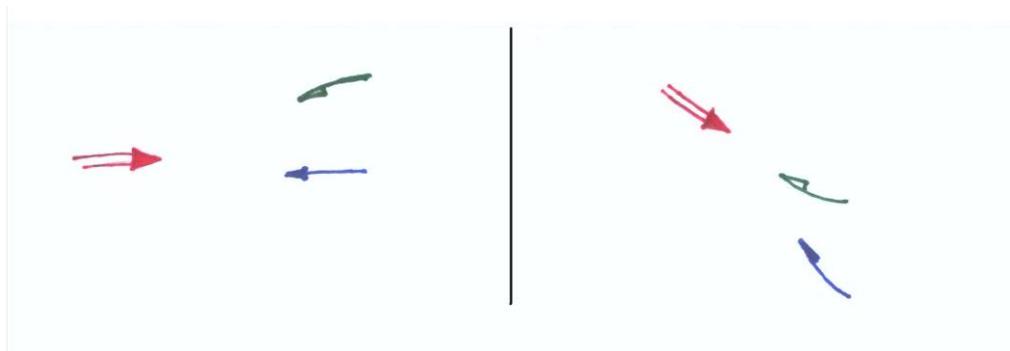


FIGURE XXX – VISUAL PICK-UP MANEUVERING

If the section enters unobserved, maneuver to take advantage of this situation. Utilize the turning room available to obtain an offensive advantage and the quick kill. The bandit may be tally one and turn his tail to a fighter with his initial move. If this is the case aggressively maneuver for the quick kill.

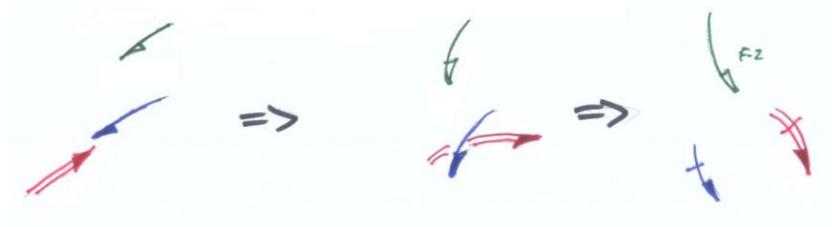


FIGURE XXX – QUICK KILL

Fighter game plans based on the geometry at the visual pick-up are discussed below. The initial engaged fighter should execute his 1v1 BFM game plan. **As a good going in game plan, the initial engaged fighter should take out any turning room then maneuver pure nose-high one-circle (lift vector in lead).** This keeps the fight collapsed, affords less weapons separation for the bandit and provides the best chance to set out-of-plane/out-of-phase. The initial free fighter should set two-circle flow with the bandit.

### FIGHTERS BRACKET IN SPREAD

The Tac Lead is the engaged fighter by default. If the bandit comes directly between the section, the Tac Lead is expected to aggressively maneuver to engage the bandit. The Tac Wing should watch the Tac Lead's initial move, maneuver to take out turning room and set out-of-plane and out-of-phase without making a BFM error. If the engaged fighter has an angular advantage at his merge a two-circle fight, vice nose-high one-circle, would be the best game plan.

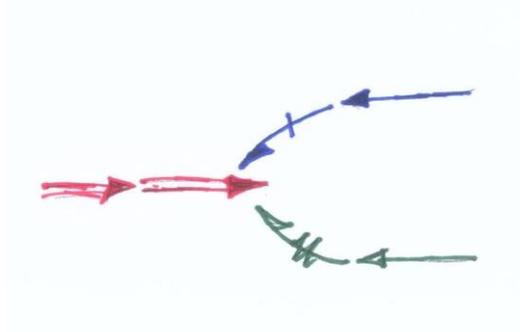


FIGURE XXX – BRACKET IN SPREAD DIRECTLY BETWEEN THE SECTION

If the bandit is between the section but makes a merge with either fighter, the first to the merge is the engaged fighter initially. The engaged fighter should maneuver pure nose-high one-circle and assess. The free fighter should aggressively maneuver nose-on to the bandit to take out turning room, then set out-of-plane and out-of-phase unless a BFM error would be made.

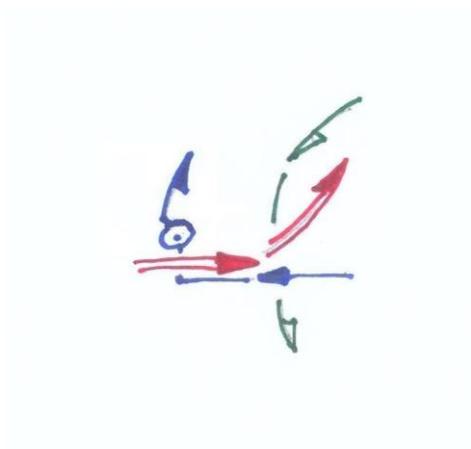


FIGURE XXX – BRACKET IN SPREAD

### **BANDIT OUTSIDE THE SECTION**

Both fighters must immediately and aggressively turn nose-on to the bandit to avoid giving up turning room. The first to the merge is initially engaged, a pure nose-high one-circle maneuver is a good going in game plan. If the fighters do not bracket the bandit the first fighter to the merge must avoid the tendency to turn away from your wingman. This will expand the fight and potentially lead to a lost sight situation. Additionally, there is a good chance the free fighter will have a wide pass with the bandit. This geometry will make it difficult for the second fighter to the merge to set out-of-phase.

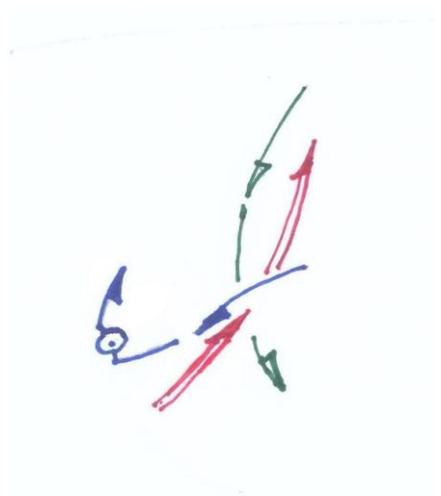


FIGURE XXX – OUTSIDE THE SECTION

### 1301. BEAM QUARTER VISUAL PICK-UP

A visual pick-up forward of the fighter's 3/9 line at or outside of one and a half nautical miles will allow the fighters to have neutral merges. If the bandit is acquired aft of the fighter's 3/9 line the merge geometry will be significantly different. A beam entry at or inside of one nautical mile will have flow more like a rear quarter engagement.

The fighters will execute a break turn into the bandit while using proper engaged comm. A break turn for 180 degrees is inappropriate; therefore a break left/right 90 call is used to direct the section. Both fighters should continue the break turn only as long as required to take out turning room and then look to bring the bandit down the same side. Once a tight pass is assessed ease your pull to save your energy. "First guess" roles define the first to the merge as the initial engaged fighter.

"Nickel break right 90, tally 1, right 3 o'clock, 2 miles, level."

"Nickel 62 tally 1, chaff/flares."

Initial moves at each merge will heavily depend on merge geometry and each fighter's energy state. The fighters will be at an energy deficit to the bandit and may be at an angular disadvantage as well. Understanding the expected merge geometry and energy states of each fighter gives the section the best chance at setting out-of-plane, out-of-phase and executing their best 1v1 BFM. After the initial merge(s) the fighters should assess the bandit's lift vector placement and communicate roles accordingly. The second fighter to the merge should use descriptive comm as required to build SA for the near fighter. **With this said, a good going in game plan will be for the initial engaged fighter (first to the merge) to turn across the bandit's tail level to slightly nose-low. The initial free fighter (second to the merge) should check turn across the bandit's tail, and reverse nose-high to set out-of-phase and out-of-plane.**

If the section enters unobserved, maneuver to take advantage of this situation. Utilize the turning room available to obtain an offensive advantage and the quick kill. The bandit may be tally one and turn his tail to a fighter with his initial move. If this is the case aggressively maneuver for the quick kill.

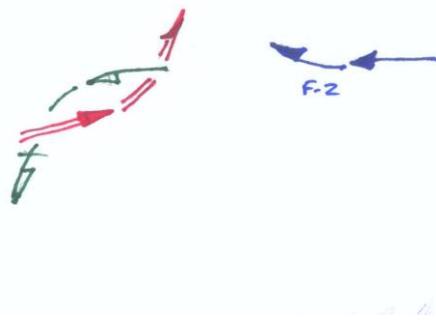


FIGURE XXX – QUICK KILL

### **VISUAL PICK-UP FORWARD OF THE FIGHTER'S 3/9 LINE**

The fighters will be able to take all the angles and turning room away from the bandit. Engaged fighter 1v1 BFM game plans will depend on the energy assessment at the merge. In general, if below minimum vertical airspeed nose-high is not wise. A level to slightly nose-low initial move across the bandit's tail capturing the upper end of the rate band may be the best or only option for the engaged fighter. The free fighter should have minimum vertical airspeed, should check turn across the bandit's tail and maneuver to set out-of-plane and out-of-phase.

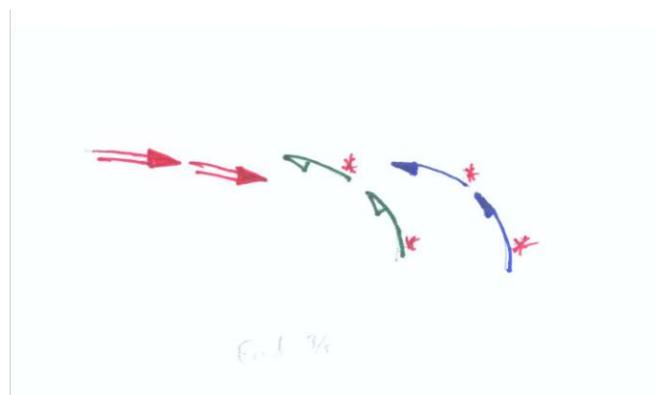


FIGURE XXX – VISUAL PICK-UP MANEUVERING

### **VISUAL PICK-UP AFT OF THE FIGHTER'S 3/9 LINE**

The first fighter to the merge will have a wide pass with the bandit, will not be able to take all the angles away and will be below minimum vertical airspeed. Turning across the bandit's tail level to slightly nose-low is the best if not only option, again targeting the upper end of the rate band. The free fighter will be able to make a tight pass and maneuver to set out-of-phase. The free fighter's airspeed will likely be less than minimum vertical and the ability to set out-of-plane may be difficult. The fighters are at

a significant energy disadvantage which may lead to an angular disadvantage if the engagement lasts too long. Timely maneuvering and comm are required to survive.

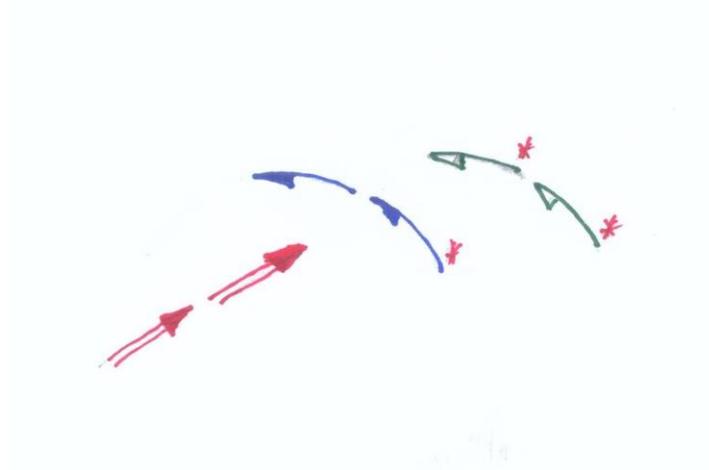


FIGURE XXX – VISUAL PICK-UP MANEUVERING

## 1302. REAR QUARTER VISUAL PICK-UP

A visual pick-up in the rear quarter is the most defensive scenario for the fighters. Each fighter must initially assume the engaged fighter role and execute his best DBFM applying the DBFM Axioms to survive. As the fight progresses reference the bandit's lift vector placement and the Engaged Fighter Criteria to define roles. Since both fighters are engaged, both fighters are responsible for deconfliction!

### SAME DIRECTION BREAK TURN

Typically a same direction break turn into the bandit will afford the biggest range, angles and closure problem for the bandit to solve. **An immediate nose-low or nose-high break turn/maneuver from either fighter would be a BFM error and should be avoided.**

“Anvil break left, tally 1, left 7 o'clock, 1 mile, level.”

“Anvil 11 tally 1 chaff/flares.”

“Anvil 12 chaff/flares.”

T-45 limitations typically restrict the fighters to one redefinition. If the bandit is acquired outside the section his nose may sweep through/towards each fighter. Redefinition criteria (DBFM Axiom number four) may be met by each fighter as forward motion on the canopy stops and target aspect decreases (DBFM Axioms two and three). Assuming the bandit is tally two and proficient, both the near fighter and then far fighter may elect to redefine. This could allow the bandit to be offensive on both fighters on the deck where survival options (DBFM Axiom number one) would be extremely limited.

**To avoid this extremely defensive flow and to simplify the rear quarter visual pick-ups a caveat will be added to the DBFM Axioms. The near fighter will not redefine in the situation described in the above paragraph.** The near fighter will execute his break turn, use a “chaff/flares” call to “keep the shot on the rail” and stay level pending the next move from the bandit. Continue to assess the bandit's actions then make the appropriate BFM and SEM moves.

NEAR FIGHTER STAYS LEVEL

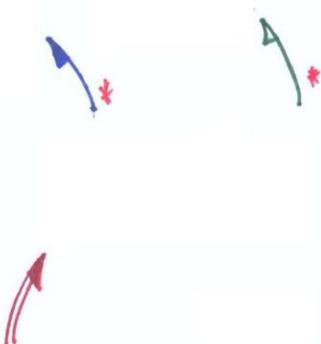


FIGURE XXX – INITIAL BREAK TURNS

If the bandit turns to engage the near fighter this will look very similar to a Defensive Perch Set. The near fighter should act according to the DBFM Axioms (redefining appropriately) while the far fighter pulls for a shot. The bandit's error will lead to a quick kill.

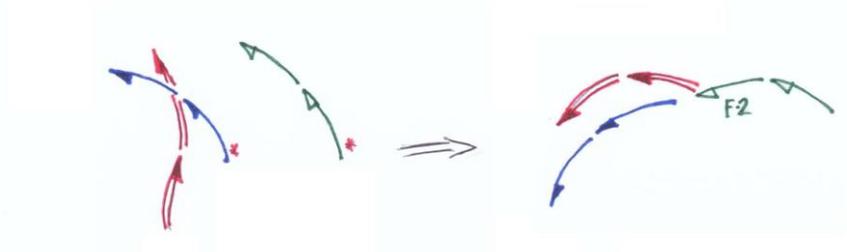


FIGURE XXX – QUICK KILL

If the bandit is proficient and is tally two he will not turn his belly to the far fighter. In doing so, the bandit may be able to lag both fighters in an attempt to execute an AWE on the furthest fighter away. Recall from DBFM, as soon as you can no longer pull the bandit forward on your canopy you should intercept a capture pull. As long as you can pull the bandit forward continue with the energy excursion. Be patient and assess the bandit's actions to make the most appropriate SEM and DBFM decisions.

The far fighter should initially be able to pull the bandit forward then must assess the bandit's actions and fight geometry. Assess if a high aspect pass can be made, if the bandit may have an in-close flight path overshoot or if the bandit is lagging to your attack window. If the far fighter assesses the bandit is attempting to lag to his attack window redefine IAW with the *Far Fighter Redefines* section below.

If the far fighter is able to force a high aspect pass after the initial break turn he is the first to make a high aspect merge, should assume the engaged fighter role and attempt to set one-circle flow away from his wingman. The engaged fighter can apply a slightly liberal mindset to the amount of turning room lost by turning one-circle. Weigh the costs of giving up turning room with the reversal versus continuing with in-phase flow. The engaged fighter should use descriptive comm as required to build SA for the free fighter.

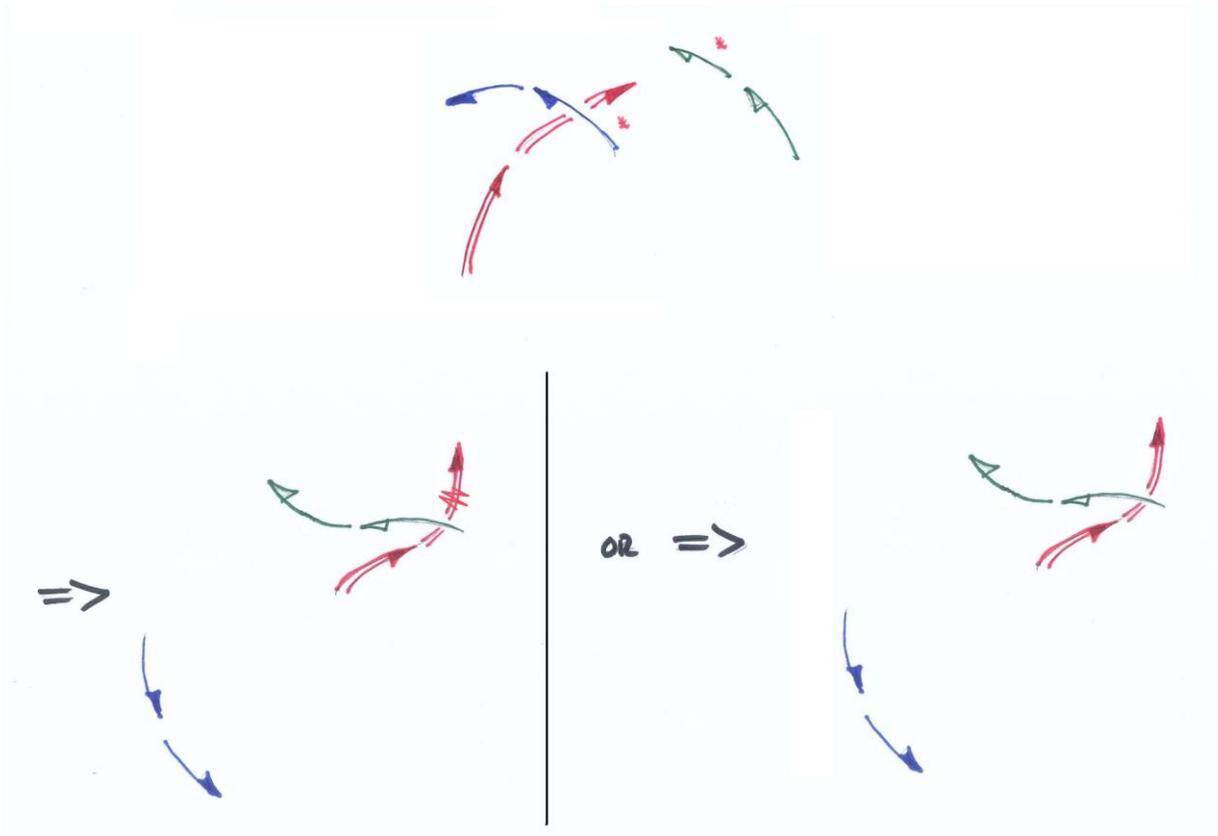


FIGURE XXX – FAR FIGHTER MAKES A MERGE

If, during the two-circle defensive fight, the bandit is having difficulty bringing his nose to bear on the fighters (e.g. stuck in lag) the fighters should not continue in this Lufberry with altitude below them. Since the engaged fighter does not want to sacrifice his altitude unnecessarily the free fighter should use the available altitude to set out-of-plane potentially gaining angles on the adversary.

### FAR FIGHTER REDEFINES

Avoiding in-plane two-circle defensive flow with the bandit behind both fighters is highly desired. **If redefinition criteria (DBFM Axiom number four) have been met for the far fighter, redefine.**

If the far fighter assesses the bandit is lagging to his AW a redefinition would ideally be performed before sensor nose is factor. However, if you can still pull him forward on the canopy regardless of sensor nose keep pulling him forward. By continuing to pull him forward you may be able to force a high aspect pass or in-close flight path overshoot. Use expendables to survive.

If the bandit is in lag on both fighters and the far fighter has yet to redefine he can be a little liberal with DBFM Axiom number three (target aspect decreasing). As long as the

bandit is inside your bubble a redefinition is not a BFM error and will greatly aid the section's SEM game plan.

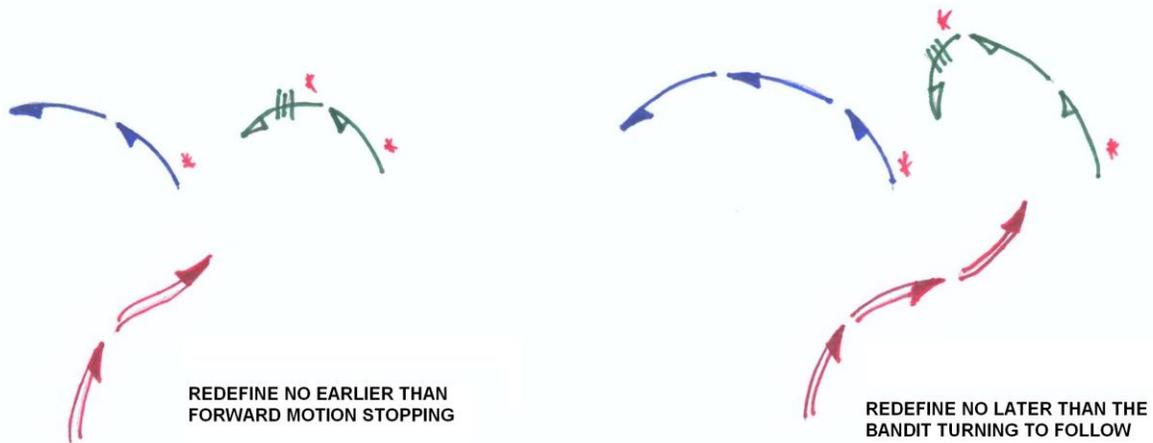


FIGURE XXX – FAR FIGHTER REDEFINES

You must be visual of your wingman before executing the redefinition! Sacrifice tactics for safety in a training environment. A “redefining” call should be made to increase fighter SA. Deconfliction should not be an issue since the redefinition comes so early in the defensive break turns. Again, maintain SA to your wingman!

“Rage 32 redefining, chaff/flares.”

**As a Rule of Thumb for, do not redefine any earlier than forward motion stopping on your canopy or any later than the bandit reversing his turn to follow. This redefinition should come within the first 90 degrees of turn for the far fighter.**

#### **REDEFINITION FROM IN-PLANE DEFENSIVE FLOW**

If the far fighter misses his redefinition opportunity due to a late tally, fight geometry or poor headwork, in-plane defensive two-circle flow will ensue. The geometry of the misaligned turn circles (MATC) and the timing of the AWE on the initial far fighter will dictate the geometry of the engagement. It will take time to determine which fighter is engaged. During this time both fighters are engaged and deconfliction is the responsibility of both fighters. Good communication is paramount!

As the fighters maneuver defensively, the inside fighter will turn his belly to the outside fighter. If the inside fighter loses sight of the outside fighter he must call “blind” (Training Rules) with altitude. The outside fighter should see the inside fighter forward of his aft visibility limit. If the outside fighter is visual and can maintain deconfliction responsibilities call “visual continue” (Training Rules) with altitude, otherwise call “blind”

(Training Rules) with altitude. Regardless of the scenario the outside fighter should call “visual” with altitude as soon as the inside fighter moves forward of his aft visibility limit. This will be done to increase overall fighter SA. Comm is crucial to the success of the fighters in such a dynamic environment!

Example comm flow if inside fighter calls “blind”

“Rage 32 blind, 16 thousand.”

“Rage 31 visual, continue, 15 thousand.”

Example comm flow if inside fighter never calls “blind”

“Rage 31 visual, 15 thousand.”

Each fighter must assess the bandit’s nose and can use descriptive comm to aid each other’s DBFM. Use the DBFM Axioms appropriately to determine how and when to tighten down your pull and/or redefine. As MATC play out, the bandit’s sensor nose will become a factor to a fighter, potentially to the outside fighter first. The Engaged Fighter Criteria has identified which fighter is engaged. Eventually, the engaged fighter will redefine resulting in out-of-plane flow. The redefinition will force the bandit to make a choice. A “redefining” call will be made to increase fighter SA.

“Rage 31 redefining, chaff/flares.”

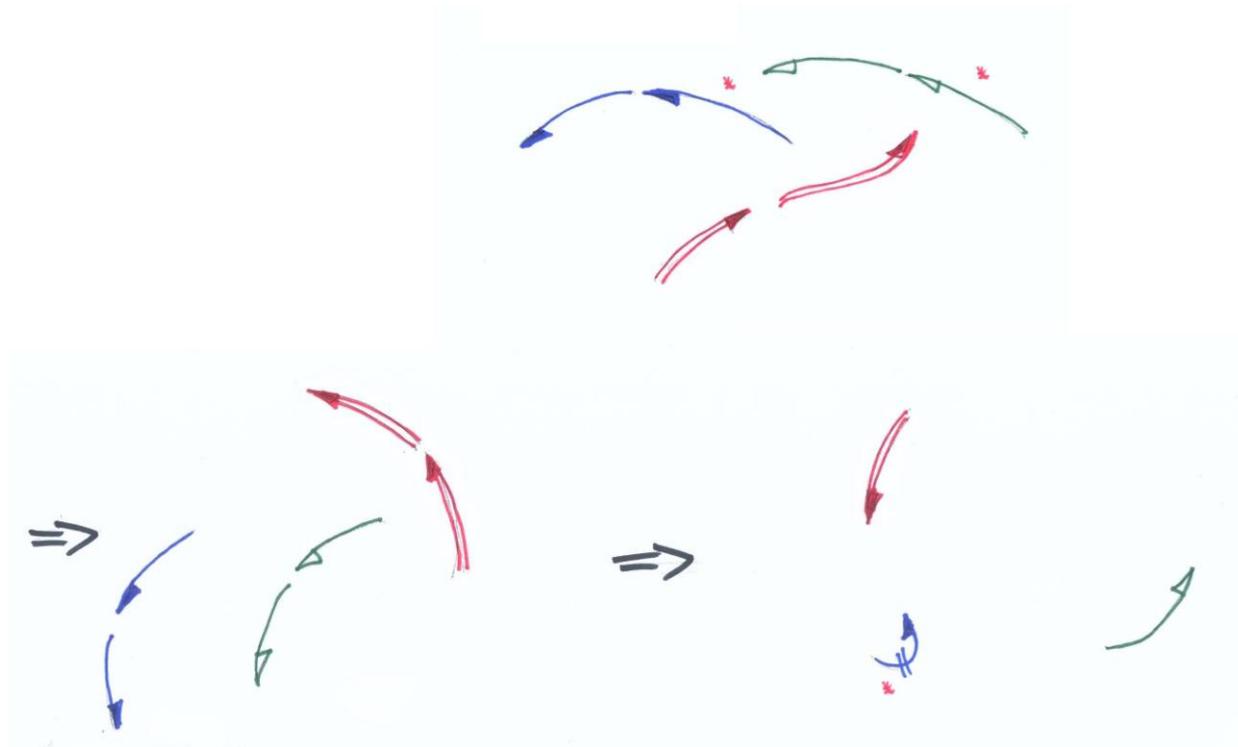


FIGURE XXX – REDEFINITION FROM IN-PLANE DEFENSIVE FLOW

## POST-REDEFINITION OUTCOMES

The beneficial side effect afforded from DBFM will force the bandit to choose which fighter to follow – the nose-low fighter or the level fighter. Use directive and descriptive comm to increase fighter survivability and keep SA high! Reference the bandit's lift vector placement to determine roles.

If the bandit follows the nose-low fighter he is engaged. The free fighter should be able to see the fight coming out of his aft visibility limit below the horizon. Execute a slight ease – out-of-phase is not required – then place your lift vector on the bandit appropriately and execute an energy excursion for a shot shortly after the bandit's redefinition follow.

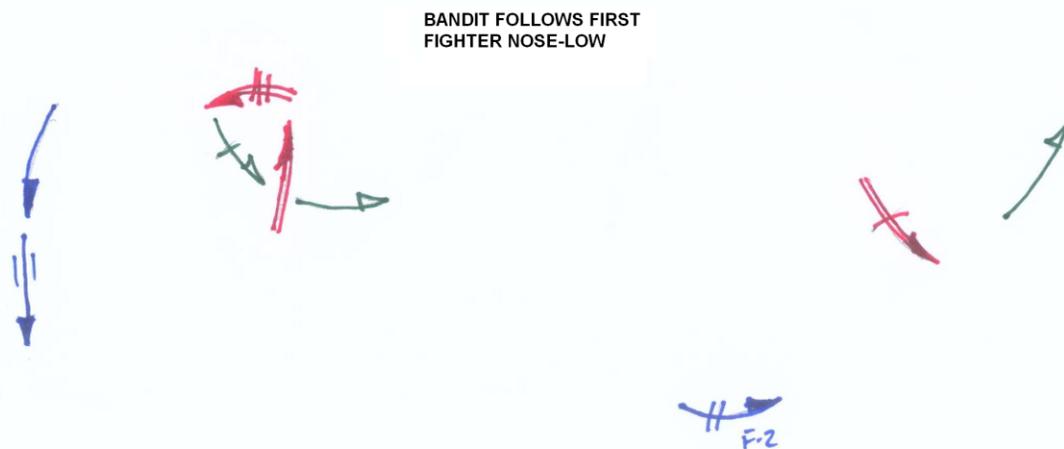


FIGURE XXX – FAR FIGHTER REDEFINES BANDIT FOLLOWS

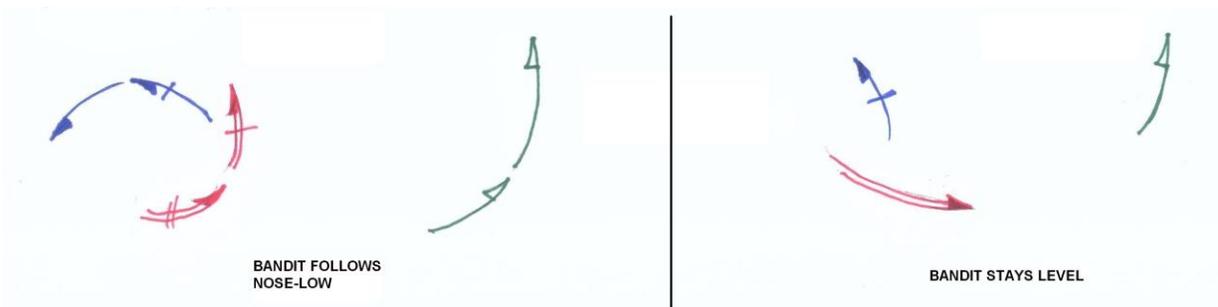


FIGURE XXX – REDEFINITION FROM IN-PLANE DEFENSIVE FLOW OUTCOMES

If the bandit stays with the level fighter he is engaged and the nose-low fighter is free. As the defensive flow plays out the engaged fighter may need to execute his own redefinition. The free fighter is below the engaged fighter and if both fighters are blind, use altitude to deconflict. This will likely result in a KIO vice continuing the fight.

In all cases, the engaged fighter must continue to execute his best 1v1 DBFM. This fight may take some time to resolve. Keep fighting! Never give up! Continue to update the fight as it changes. The free fighter must not arbitrarily reverse. A reversal may set out-of-phase but may also increase separation so much that you lose sight of the fight. Additionally, reversing directly in front of the bandit attempting to set out-of-phase would be a BFM error and may lead to a defensive situation.

## **CROSS TURN OPTION**

If a bandit is detected directly between the section a cross turn is a valid choice. The advantage of the cross turn is it immediately sets out-of-phase, forcing the bandit to make an early decision.

This cross turn can be conceptualized as a slightly nose-high break turn (three to five degrees up Flight Path Angle (FPA – velocity vector)) for the high fighter and a slightly nose-low break turn (three to five degrees down FPA) for the low fighter in towards each other. The slightly nose-high and nose-low break turns diverge the flight paths slightly increasing the out-of-plane problem for the bandit without egregiously impacting DBFM.

To initiate the flow call for a cross turn. The directive and descriptive comm along with this pre-briefed understanding will provide the requisite SA. **For deconfliction purposes, do not redefine until after the fighters' flight paths have crossed!** A “chaff, flares” call can be used as well to “keep the shot on the rail”. Once the bandit chooses who is engaged (bandit's lift vector placement) define the roles.

“Anvil cross turn, tally 1, 6 o'clock, 1 mile, level.”

“Anvil 11 tally 1, chaff/flares.”

“Anvil 12 chaff, flares.”

The engaged fighter should continue the defensive break turn as long as he can pull the bandit forward on his canopy. As the bandit turns to follow, monitor his target aspect and motion on the canopy. **If the fighters' flight paths have crossed and redefinition criteria (DBFM Axiom number four) have been met, redefine.** Here the engaged fighter can again be a little liberal with DBFM Axiom number three (target aspect decreasing). As long as the bandit is inside your bubble a redefinition is not a BFM error. Again, the advantages of the out-of-plane maneuver are tactically significant in SEM, establish deconfliction early on and avoid in-plane maneuvering. A “redefining” call should be made to increase fighter SA. The bandit is now forced to decide to follow nose-low or stay level.

“Anvil 11 defensive, redefining, chaff/flares.”

**As a Rule of Thumb, do not redefine any earlier than fighters passing each other with forward motion stopping on your canopy or any later than the bandit turning to follow.**

If the bandit follows the engaged fighter nose-low communicate the roles accordingly. When the free fighter sees the bandit execute his redefinition follow extend, if required, then reposition the lift vector on to the bandit appropriately, performing an energy excursion for a weapons employment opportunity. The free fighter also has the opportunity to use descriptive comm to aid the engaged fighter in determining the bandit's actions (e.g. “the bandit's following you”). Sound comm will keep fighters alive and provide a timely kill.

If the bandit stays level, bandit lift vector placement dictates the roles. The engaged fighter may have a shot opportunity after another 180 degrees of turn. If not, the engaged fighter should control the merge so the bandit is between you and your wingman (bracket the bandit) as long as it wouldn't be a BFM error. Check turn across the bandit's tail, then attempt to set one-circle flow away from your wingman without making a BFM error. The engaged fighter should use descriptive comm as required to build SA for the free fighter. Continue to update roles as required. In any case out-of-plane and out-of-phase will provide shot opportunities. Utilize sound comm to keep SA high.

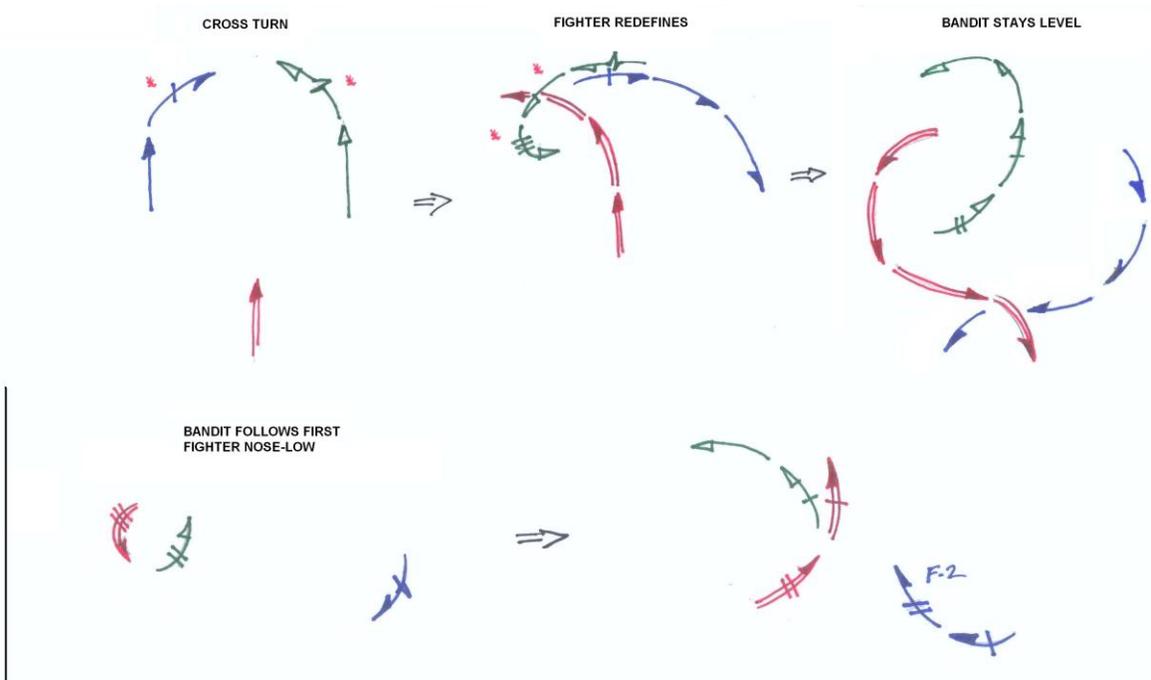


FIGURE XXX – CROSS TURN OPTION AND OUTCOMES

## CHAPTER 14 LOST SIGHT GAME PLAN

### 1400. INTRODUCTION

It is critical that both fighters, especially the free fighter, maintain tally/visual not only to execute SEM but also for safety of flight. **You must learn to be able to track your wingman's position and the bandit's position while fighting your best jet.** The engaged fighter cannot clear the bandit's sensor nose (responsibility number two) if he is blind and/or no joy. Similarly, the free fighter cannot kill the adversary or maintain overall deconfliction (responsibilities one and two) if he is blind and/or no joy.

That being said, if a fighter becomes blind and/or no joy use comm to build SA. Prioritize listening to the radio, deconflict and avoid arcing around the sky. If you are blind/no joy first deconflict via altitude. Then determine where you shouldn't be. Typically, two-circle fights descend and one-circle fight's go uphill or stay level.

### 1401. COMMUNICATIONS AND MANEUVERING

If the engaged fighter is no joy, the free fighter should describe the bandit's position in relation to his wingman. The free fighter may also have to be directive to maintain pressure on the bandit or prevent a weapons employment opportunity for the bandit.

Engaged Fighter: "Sundown 41 no joy."  
Free Fighter: "Sundown 41 the bandit's at your right 2 o'clock, 1 mile, 10 high."  
Engaged Fighter: "Sundown 42 tally."

If the free fighter is blind or no joy similar descriptive comm can be used to regain visual or tally. Additionally, the engaged fighter must use directive comm to avoid a shot on the free fighter or a defensive situation. If the engaged fighter is blind as well he should assess the situation, communicate his position and continue fighting.

Free Fighter: "Rage 61 tally/blind 16 thousand."  
Engaged Fighter: "Rage 61 I'm at your right 3 o'clock, 1 mile, 20 high."  
Free Fighter: "Rage 61 tally/visual."

Free Fighter: "Combat 21 blind/no joy 18 thousand."  
Engaged Fighter: "Combat 21 break left, bandit at your left 8 o'clock, 1 mile, 10 low."  
Free Fighter: "Combat 21 defensive."

The free fighter, when tumbleweed, should place the down range direction of a one-circle fight on his 3/9 line. Assess lateral and vertical separation via a "posit" call and/or A/A TACAN. To collapse range, maneuver in the same direction of a one-circle fight, climbing if necessary while considering deconfliction. With one or two in sight execute reversals into the direction of the fight until you are tally/visual or ready to pitch-in for weapons employment. Time the reversals to keep the engagement within ten to twenty

degrees of your 3/9 line. If you are blind/no joy reverse every fifteen to twenty seconds, continuing to assess the fight's position in relation to yours.

A two circle fight will stay over a certain location. The free fighter, when blind/no joy, should use the A/A TACAN and/or a "posit" call to determine lateral and vertical separation from the fight. If you are directly below the fight extend away from the fight. Two-circle fights tend to travel downhill, thus decreasing altitude and using comm will help maintain deconfliction.

Either fight has the potential to travel uphill or downhill. Amplifying information should be included in descriptive comm to further build the picture. As the free fighter you must continue to provide deconfliction. Altitude is an excellent way of ensuring deconfliction while aggressively maneuvering to gain SA. If anything changes the fighters need to update each other in a timely manner.

Free Fighter: "Showtime 22 tally/blind 14 thousand."  
Engaged Fighter: "Showtime 22 I'm at your right 4 o'clock, 2 miles, 30 high."  
Free Fighter: "Showtime 22 tally/visual."

Free Fighter: "Taproom 11 blind/no joy 12 thousand."  
Engaged Fighter: "Taproom 12, tally/blind, engaged one-circle, West, 18 thousand."  
Free Fighter: "Taproom 12 posit."  
Engaged Fighter: "Taproom 12 Vegas 153 / 60 / 19 thousand."  
Free Fighter: "Taproom 11 blind/no joy, climbing to 16 thousand."  
Engaged Fighter: "Taproom 12."  
Free Fighter: "Taproom 11 status."

Free Fighter: "Rage 21 blind/no joy 12 thousand."  
Engaged Fighter: "Rage 22, tally/blind, engaged left two-circle 14 thousand."  
Free Fighter: "Rage 21 extending West, under you at 10 thousand."  
Engaged Fighter: "Rage 22."  
Free Fighter: "Rage 22 posit."  
Engaged Fighter: "Rage 22 anchored Depot 345 / 33 / 12 thousand."

## 1402. ONE IN SIGHT AND TWO IN SIGHT

Eventually a tumbleweed fighter will be brought back into the fold. "One in sight" is used when a fighter sees one aircraft but is unsure who that aircraft is. When a fighter communicates "one in sight" use descriptive comm outlined above to gain two in sight.

- One-circle Engagement – Look left/right and above/below of the aircraft to gain two in sight.

- Two-circle Engagement – Use the offensive/defensive/neutral status to narrow down your scan volume. If offensive or defensive look forward and aft of the aircraft in sight. If neutral look across the circle or wait for a merge.

“Status” means you see both aircraft but you don’t know which aircraft is the bandit. When a fighter transmits “two in sight” or “status” use status *relationship* comm **describing ownship (yourself) relative position to avoid blue-on-blue (fratricide)**. The engaged fighter should differentiate using several relationships.

## RELATIONSHIP DESCRIPTORS

- Laterally (cardinal/sub-cardinal direction)
- Vertically (high/low)
- Attitude (nose-high/nose-low/level)
- Heading
- Position (offensive/defensive/neutral)

## EXAMPLES

“Anvil 52 one in sight”

“Anvil 51 engaged left two-circle, 12 thousand, the bandit’s cross-circle.”

“Anvil 52 status.”

“Anvil 51 my nose coming through North .”

“Anvil 52 tally/visual.”

“Mace 32 status.”

“Mace 31, high, North-West, in a right turn.”

“Mace 32 tally/visual.”

“Nickel 71 status high/low.”

“Nickel 72 high.”

“Nickel 71 tally/visual.”

You can see that anything other than tally/visual is a question. The free fighter is looking for additional information to complete the picture. Mace 31 provided descriptors in both the vertical and horizontal to aid the free fighter. Nickel 72 answered Nickel 71 using the requested relationship.

Another effective technique is to communicate when a merge is occurring or impending. By communicating this, a fighter that has one in sight, can gain two in sight or tally/visual by following an aircraft to the merge.

## CHAPTER 15 SEM CANNED SETS

### 1500. OVERVIEW

The SEM sets will introduce you to a visual pick-up from each quarter. You will begin with three canned sets where the initial pick-up, merge, and Bandit move will be known. From there, you will move on to sets where the pick-up and merge will be set, but the Bandit move and, therefore, flow will be unknown after the initial merges. Finally, you will finish with the Tap-the-Cap scenario where the Bandit will not be handcuffed and can jump the fighters from any quadrant, leaving all other factors of the fight to be determined.

On your first SEM flight, the engagements will be canned with the fighters knowing who the Bandit will engage and the flow of the entire engagement. These “canned sets” provide a foundation for future engagements and reinforce basic engaged/free fighter responsibilities. The purpose of the Canned Sets is to control the merges and perform the initial moves correctly all the while utilizing effective communication between the fighters. Additionally, they are an exercise for the free fighter to practice shots from out-of-phase flow and the mechanics for maintaining the free fighter role. While time to kill is very important, it is not the most important training objective on the first event. You must know the initial moves and the associated comm cold! Focus your studies on the Canned Sets and, as your experience grows, try to understand the more advanced concepts talked about in the Fighter Game Plans Chapter. As a note, the Free Fighter IP will evaluate the set for training objectives and call KIO when satisfied. During all other sets the bandit will typically hold the hammer for training objectives.

As you move to your second flight, the engagements will start just like the Canned Sets. However, this time the Bandit can engage either fighter after the initial merges. Additionally the Bandit will be allowed switch, potentially causing a change in engaged/free fighter roles.

Finally, your SEM training will culminate with the “Tap-the-Cap” exercise where all that is known to the fighters is which quadrant the Bandit will be coming from, which the Bandit can brief or audible real time. Initial merges and follow-on flow are unknown. Tap-the-Cap will require sound formation keeping and a good lookout doctrine. During every engagement, you will utilize SEM fundamentals to achieve a timely kill on the Bandit.

Focus your studies on the Canned sets. However, you are responsible for reading and preparing for *all* concepts and possibilities outlined in this FTI, as they may be tested anytime after your first flight.

<b><u>SEM 4101</u></b>	<b><u>SEM 4102</u></b>
1. Canned RQ Demo x 2	1. RQ Demo Switch x 2
2. Canned RQ x 2	2. RQ x 1
3. Canned BQ x 2	3. BQ x 1
4. Canned FQ x 2	4. FQ x 1
	5. TTC
<b><u>SEM 4103</u></b>	<b><u>SEM 4201</u></b>
1. RQ x 1	1. RQ x 1
2. BQ x 1	2. BQ x 1
3. FQ x 1	3. FQ x 1
4. TTC	4. TTC

**Canned Sets (Known Start / Known Flow)**

1. Canned Rear Quarter
2. Canned Beam Quarter
3. Canned Forward Quarter

**Unknown Flow Sets (Known Start / Unknown Flow)**

1. Rear Quarter
2. Beam Quarter
3. Forward Quarter

**Unknown Start / Unknown Flow**

1. Tap-the-Cap

## 1501. CANNED REAR QUARTER SET

The bandit will be 45° AOT, co-altitude, and 1.0nm from the near fighter. He will then call for the fighters to accelerate to 330kts. When the bandit is ready, he will call set. When the fighters are ready, they will call “speed and angels”. The bandit will turn in towards the fighters to arrive nose on within the fighter’s rear quarter. The bandit will then initiate the “fight’s on” comm. The fighter furthest from the bandit will call for the break turn to initiate the engaged comm. The bandit will present a high aspect merge (<1000ft) with the far fighter after about 120 degrees of turn.



FIGURE XXX – REAR QUARTER SETUP

During the canned set, the Bandit is handcuffed to a one-circle nose-high game plan with the second fighter to the merge. The canned nature of this set will handcuff the Bandit and engaged fighter to continue one-circle flow away from the free fighter.

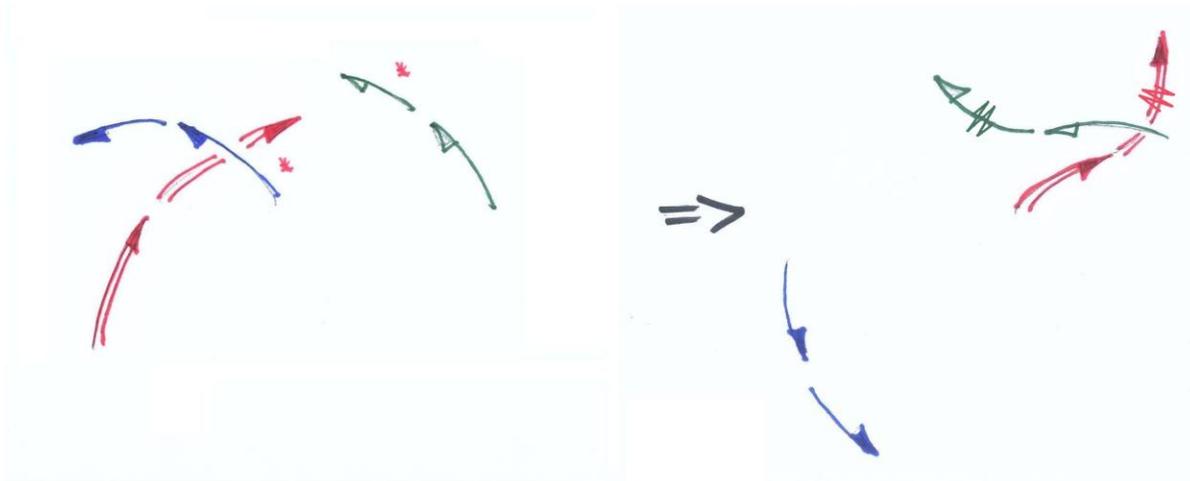


Figure XXX - CANNED REAR QUARTER SET

## NEAR FIGHTER INITIAL MOVES

As the near fighter, break and stay level (DBFM Axiom caveat described earlier). When the Bandit lags to your wingman, reset your nose 5-10° nose low, ease to a compromise pull targeting 330 to 350 KIAS and two nautical miles from the engaged fighter while assessing the Bandit's intentions.

## FAR FIGHTER INITIAL MOVES

As the far fighter, make the initial break comm while breaking into the Bandit and assess the Bandit's pursuit. If executed well, a good break turn into the Bandit will force a high aspect pass. At the merge, reverse your turn to set nose high one-circle flow away from your wingman (50-60 degrees nose-high). As the Bandit follows you nose high one-circle, his lift vector has now dictated that you are **the engaged fighter**. Communicate your engaged role and use descriptive comm as required to build SA for the free fighter. Continue to fight one-circle flow away from your wingman until the free fighter is able kill the Bandit. You should always fight your best 1v1 BFM and take shots if the opportunity presents itself instead of simply waiting for your wingman to kill the bandit. However for the sake of the free fighter's training, do not call these shots.

## FOLLOW-ON FLOW

As the near fighter, you will see the Bandit lag towards your wingman. When the Bandit engages your wingman, you are now **the free fighter**. Communicate your free role and adjust your pull to place your lift vector on the Bandit and kill him as he is flowing away from you one-circle, engaged with your wingman. Use the shot opportunity described in the *One-Circle Flow Free Fighter Below* Section. **Whatever happens, do not stick your nose into a fight without having two in sight and be sure to overbank and pull away to deconflict from the fight!**

## COMM FOR THE CANNED REAR QUARTER SET

Viper 1: "Viper 1 setting up for the Rear Quarter canned set."  
"Rage set 330."  
Rage 31: "Rage"  
Viper 1: "Viper 1 set."  
Rage 31: "Rage 31 speed & angels left."  
Rage 32: "Rage 32 speed & angels right."  
Viper 1: "Viper 1 in."

(Viper will maneuver to set the presentation)

Viper 1: "Fight's On."  
Rage 32: "Rage break left, tally 1, left 8 o'clock, 1 mile, level."  
Rage 31: "Rage 31 tally 1."  
Rage 32: "Rage 32 left-to-left."  
Viper 1: "Left-to-left."

(Rage 32 reverses and the Bandit engages Rage 32 in one-circle flow)

Rage 32: "Rage 32 going nose-high to the right."  
"Rage 32 engaged nose-high, one-circle North."  
Rage 31: "Rage 31 free."

(Both aircraft must update tallies throughout the engagement (e.g. Rage 32 tally/blind 19 thousand).)

Rage 31: "Rage 31 Fox-2. Rage 31 kill Goshawk in a left turn."

(The free fighter must solve deconfliction while calling the shot and kill.)

Viper 1: "Copy kill. Rage flow 180."  
Rage 31: "Rage 31 180."  
Rage 32: "Rage 32 180."

Viper 1 will initiate the KIO IAW with TACSOP.

## 1502. CANNED BEAM QUARTER SET

Bandit will be 20° acute, co-altitude, and 2.0nm from the near fighter when he calls for the fighters to accelerate to 330kts. When the Bandit is ready, he will call “set”. When the fighters are ready, they will call “speed and angels”. The Bandit will turn in towards the fighters to arrive nose on at the fighter’s beam quarter slightly forward to on the fighter’s 3/9 line. No closer than 1.5nm to the fighters, the Bandit will initiate the “fight’s on”.

During the canned set the bandit is hand cuffed to a two-circle game plan with the first fighter to the merge. The bandit will attempt to keep the fight neutral on the deck.



FIGURE XXX – BEAM QUARTER SETUP

### SECTION MINDSET AND INITIAL MOVES

The far fighter will call for the section to break left/right 90 call to initiate the engaged comm per the fighters’ lookout doctrine concept. The fighters will execute a break turn into the Bandit. Both fighters will continue their energy excursion until all the turning room has been taken out. Then, they will ease to a compromise pull to make the merge happen. **The Bandit will merge to the inside of the turn with both fighters and then engage in the first fighter to the merge in two-circle flow.**

This initial geometry leads to a lead/trail formation and defines the initial engaged/free roles for the fighters.

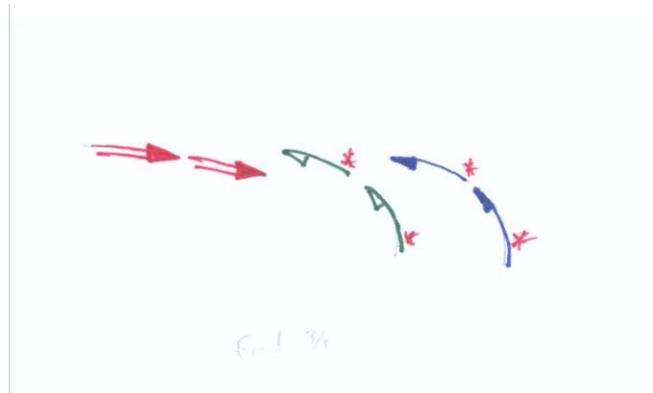


FIGURE XXX – BEAM QUARTER SETUP AND INITIAL BREAK TURN

### **NEAR FIGHTER'S INITIAL MOVES**

The near fighter will be the first fighter to the merge. More than likely, you will be below vertical airspeed because of your defensive break turn, so after the merge, turn level to slightly nose-low (5 to 10 degrees VV below the horizon) across the Bandit's tail, targeting the upper end of the rate band using a compromise pull. Maintain tally and regain visual while you are assessing the Bandit's actions. Monitor your wingman's merge and the Bandit's engaging move.

### **FAR FIGHTER'S INITIAL MOVES**

The far fighter will be the second fighter to the merge. While you are in your break turn, watch your wingman's initial move when he merges with the Bandit. You will see your wingman pull across the Bandit's tail slightly nose-low. After you merge with the Bandit, check turn across the Bandit's tail to take out any turning room. Then, reverse and execute a nose-high initial move (targeting 60 to 80 degrees nose-high) setting out-of-plane and out-of-phase flow away from your wingman. **As a technique, start your pull straight up then fall off opposite the side the bandit was on at your merge (fall-off to the left if you had a right-to-right).** Use descriptive comm as required to build SA for your wingman. Maintain tally to assess the Bandit's reaction.

### **ENGAGED FIGHTER MECHANICS (First Fighter to the Merge)**

The bandit will honor the second merge then turn across the second fighter's tail. The bandit will then maneuver aggressively nose-low cutting across the circle to make a neutral merge with the first fighter to the merge. The bandit's lift vector placement (on the first fighter to the merge) defines the roles. Control the merge gaining angles if you can. Most likely the two-circle fight will be neutral flow. Execute your best rate fight on the deck, taking any shots available but do not call them. The fight should stay neutral for the duration of the set.

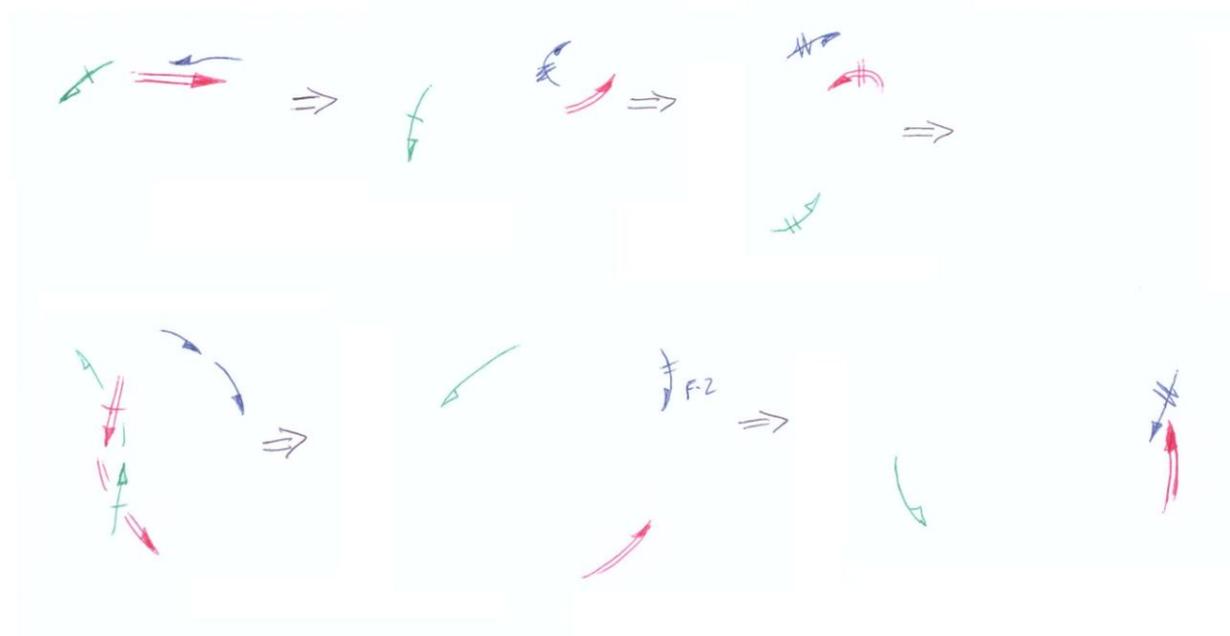


FIGURE XXX – BEAM QUARTER SET FLOW

**FREE FIGHTER MECHANICS (Second Fighter to the Merge)**

During the free fighter's initial nose-high maneuver tally can be maintained. Reorient your lift vector as required to set/maintain out-of-phase, one-circle flow. Maintain tally to keep SA to fight below then attempt to regain visual. A shot opportunity will come quickly when out-of-phase. After each shot maneuver to maintain out-of-plane and the free fighter role. This shot is described in the *Two-Circle Flow Free Fighter Above* Section. The most important thing to do is recover at least one to two thousand feet above the fight. You must maintain deconfliction as the free fighter! Call the shot and kill appropriately while turning in the appropriate direction (out-of-phase preferred unless it would be a BFM error).

## COMM FOR CANNED BEAM QUARTER SET

Viper 1: "Viper 1 setting up for the Beam Quarter canned set."  
"Anvil set 330."  
Anvil 51: "Anvil"  
Viper 1: "Viper 1 set."  
Anvil 51: "Anvil 51 speed & angels right."  
Anvil 52: "Anvil 52 speed & angels left."  
Viper 1: "Viper 1 in."

(Viper will maneuver to set the presentation)

Viper 1: "Fight's On."  
Anvil 51: "Anvil break left 90, tally 1, left 9 o'clock, 1 mile, level."  
Anvil 52: "Anvil 52 tally 1, left to left."  
Viper 1: "Left to left."

Anvil 51: "Anvil 51 left to left."  
Viper 1: "Left to left."

Anvil 51: "Anvil 51 going nose-high to the right."

(When the Bandit engages Anvil 52 in two-circle flow)

Anvil 52: "Anvil 52 engaged nose-low, left two-circle."  
Anvil 51: "Anvil 51 free."

(Both aircraft must update tallies throughout the engagement (e.g. Anvil 51 one in sight 21 thousand.)

Anvil 51: "Anvil 51 Fox-2. Anvil 51 kill Goshawk coming through North."

(The free fighter must solve deconfliction while calling the shot and kill.)

Viper 1: "Copy kill. Anvil flow 270."  
Anvil 51: "Anvil 51 270."  
Anvil 52: "Anvil 52 270."

Viper 1 will initiate the KIO IAW with TACSOP.

### 1503. CANNED FORWARD QUARTER SET

The Bandit will be directly abeam, co-altitude, and 2.0nm from the near fighter. He will call for the fighters to accelerate to 330kts. When the Bandit is ready, he will then call set. When the fighters are ready, they will call “speed and angels”. The Bandit will direct the fighters to TAC turn into him and provide a flow heading (approximately 90 degrees of the current heading). When the near fighter starts his turn, the Bandit will also begin to turn in towards the fighters to arrive nose on within the fighter’s forward quarter, setting up a bracket in spread. The Bandit will call “fight’s on”. **It is imperative that the far fighter completes his Tac Turn and maintains the flow heading until the fight’s on is called.** The fighters will flow to bracket the Bandit while the near fighter begins the engaged comm.

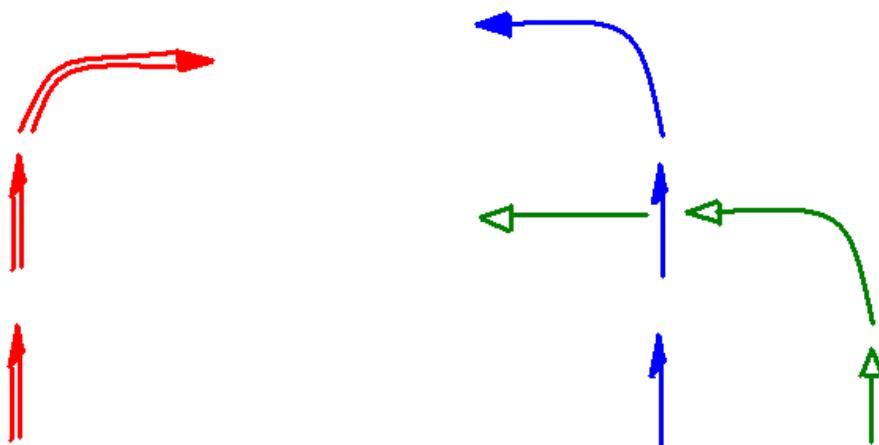


FIGURE XXX – FORWARD QUARTER SETUP

## BANDIT INITIAL MOVES

After turning in and calling “fight’s on”, the Bandit will merge with the near fighter. After this merge, the Bandit will turn and try to merge with the far fighter while engaging him in two-circle flow.

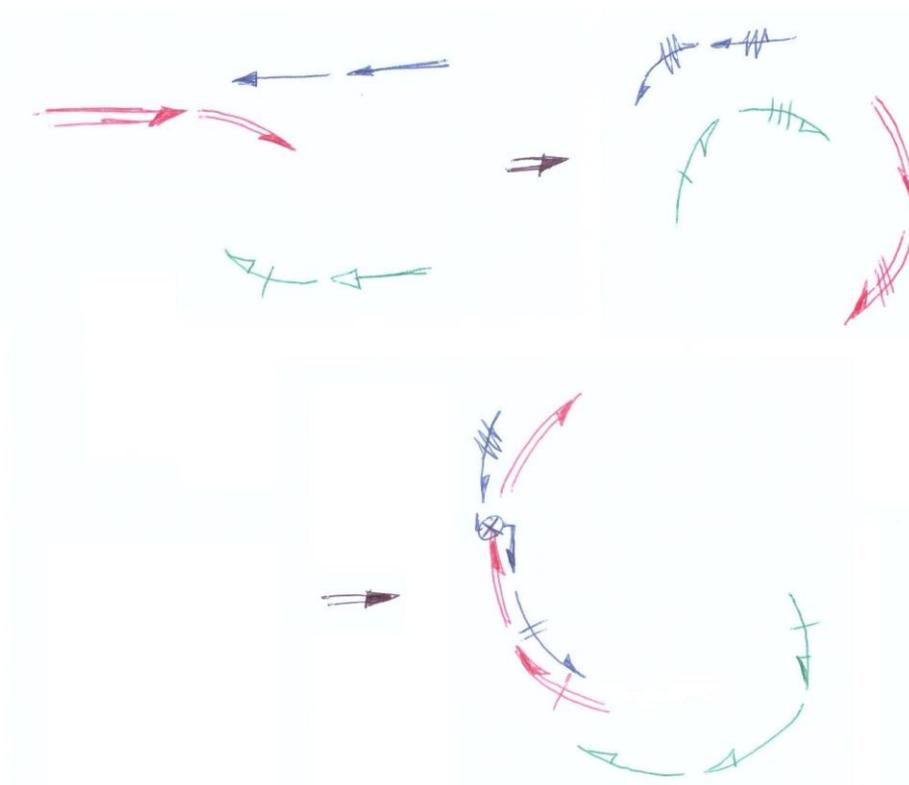


FIGURE XXX – FORWARD QUARTER SET

## FIRST FIGHTER TO THE MERGE INITIAL MOVES

If you are the first fighter to the merge (near fighter at speed and angels) the “first guess” roles define you as the **initial engaged fighter**. You should merge with the Bandit and then maneuver pure nose-high (anywhere within 20 degrees of pure vertical is acceptable), one-circle (lift vector in lead). Start by pulling straight up (a check turn across the bandit’s tail is not required) while monitoring your wingman’s merge and assess the Bandit’s actions. After the Bandit engages your wingman in two-circle flow, you should assume the role and responsibilities of the **free fighter**.

As you maneuver aggressively in the vertical maintain tally/visual. If tally/visual place your lift vector in lead on the bandit and pull for a shot. Come off out-of-phase or in-phase as appropriate with altitude deconfliction; be sure to call the shot and kill. This shot is achievable and will occur within 180 to 270 degrees of turn. Typically, out-of-phase flow is achievable post-shot and helps maintain SA after the shot. You can expect your recovery altitude to be at roughly 15 thousand feet.

If not tally/visual be sure to lower your nose such that you will be in out-of-phase flow (fall-off in the same direction as where your wingman was at the fight's on). From here it is similar to the beam quarter canned set. Ensure you are high SA before pointing your nose down into the fight.

## SECOND FIGHTER TO THE MERGE INITIAL MOVES

If you are the second fighter to the merge, you must first maintain the flow heading until the fight's on. Next overbank with your lift vector below your wingman such that you will pull yourself below your wingman's flight path. As you do this, max perform to take out any turning room and gain an offensive advantage. After the bandit merges with your wingman you will see him turn into you to honor your nose. While you, as the far fighter, are trying to be aggressive and take out turning room, **your primary responsibility at this merge is deconfliction!**

If performed correctly, the first fighter to the merge will be maneuvering pure nose-high then out-of-phase. Assuming the first fighter to the merge maneuvers as described above, you should turn across the bandit's tail two-circle, resulting in out-of-plane and out-of-phase flow. The bandit's lift vector placement has now identified you as **the engaged fighter**. Communicate your role accordingly, and execute your best two-circle fight taking shots if they are available but do not call them.

## COMM FOR CANNED FORWARD QUARTER SET

Viper 1: "Viper 1 setting up for the Forward Quarter canned set."  
"Shield set 330."  
Shield 81: "Shield"  
Viper 1: "Viper 1 set."  
Shield 81: "Shield 81 speed & angels left."  
Shield 82: "Shield 82 speed & angels right."  
Viper 1: "Shield Tac Left Flow 330."  
Shield 81: "Shield 330."

(Viper will maneuver to set the presentation)

Viper 1: "Viper 1 in."  
Shield 81: "Shield 81 left to left."  
Viper 1: "Left to left."  
"Fight's On."

Shield 81: "Shield 81 tally 1, 12 o'clock, 1 mile, level."  
Shield 82: "Shield 82 tally 1."

(Shield 82 / Viper 1 call the pass only if required.)

(When the Bandit engages Shield 82 in two-circle flow)

Shield 82: "Shield 82 engaged nose-low, right two-circle."  
Shield 81: "Shield 81 free."

(Both aircraft must update tallies throughout the engagement (e.g. Shield 82 tally/blind 11 thousand).)

Shield 81: "Shield 81 Fox-2. Shield 81 kill Goshawk coming through East."

(The free fighter must solve deconfliction while calling the shot and kill.)

Viper 1: "Copy kill. Shield flow 270."  
Shield 81: "Shield 81 270."  
Shield 82: "Shield 82 270."

Viper 1 will initiate the KIO IAW with TACSOP.

## CHAPTER 16 ADVANCED SETS (UNKNOWN FLOW)

### 1600. ENGAGEMENT MECHANICS

Multi-plane engagements can seem daunting. However, the fighters can break down each engagement into a series of steps to afford the best possible opportunities for success. The following flow takes you from the visual pick-up to the assessment of the fight and weapons employment opportunities. Use it while preparing for your SEM events and during each engagement to breakdown each presentation.

#### 1. Visual Pick-up

- Maneuver
  - Turning Room?
- Comm: Directive then Descriptive
- Control Merges

#### 2. Initial Moves

- “First Guess” Roles
  - Out-of-Plane/Out-of-Phase?

#### 3. Continuous Engagement Assessments

##### 1. Engaged Comm

1. Directive
2. Communicate Roles
3. EF and FF Update Tallies
4. Descriptive

##### 2. Switches

1. EF: Control Zone
2. FF: Control Merges / Bracket?
  - Out-of-Plane/Out-of-Phase? / One-circle?

##### 3. Repeat

### 1601. OVERVIEW

Now that you have learned the basic fundamentals and studied the flow for the canned sets, we will discuss some more advanced sets. The initial set-up for these scenarios, initial merge geometry and fighter initial moves will be exactly the same as the canned sets. However, after the initial tallies/ merges, the Bandit will be able to choose which fighter he will engage. The Bandit will also have the luxury of being able to switch between fighters. Recall the proper comm call for a switch is: “switched switched.” This comm call is not required if both fighters have high SA.

The fights will continue until the Bandit calls “Copy Kill”. Don’t be caught off-guard if the Bandit calls “P<sub>k</sub> continue” after your shot as the free fighter. Always be thinking about follow-on flow and deconfliction while you take your shots. After the Bandit call

“copy kill” he will direct the fighters to flow in a certain direction. Once the fighters have regain sufficient mutual support the KIO will be initiated IAW the TACSOP.

Viper 1: “Copy kill. Hammer flow 210.”  
Hammer 11: “Hammer 11 270.”  
Hammer 12: “Hammer 12 270.”

Viper 1 will initiate the KIO IAW with TACSOP.

### **1602. REAR QUARTER (UNKNOWN)**

This set has a canned setup just like the previous Canned Rear Quarter Set. After the “fight’s on” call, the far fighter will call for the break turn to initiate the engaged comm., at which time both fighters will execute a break turn into the Bandit. The bandit will merge with the far fighter (<1,000 feet) and can then choose which fighter to engaged, either the far fighter nose high or the near fighter level/slightly nose low.

### **1603. BEAM QUARTER (UNKNOWN)**

This set begins similarly to the Canned Beam Quarter Set. After the “fight’s on” call, the far fighter will call for the break turn to initiate the engaged comm. The fighters will execute a break turn into the Bandit. Both fighters will continue their energy excursion until all the turning room has been taken out. Then, ease ~~to a compromise the pull~~ to make the merge happen. **The Bandit will merge to the inside of the turn with both fighters.**

After the Bandit merges with the far fighter, he will choose which fighter to engage. The fighters will not know ahead of time who the Bandit will engage. Both fighters must watch diligently to see where the Bandit places his lift vector. If the Bandit pulls level or nose low, his lift vector has determined that the first fighter to the merge engaged. However, if, after the second merge, the Bandit reorients his lift vector up, then the second fighter to the merge who went nose-high is now engaged. Communicate the roles accordingly and execute the fighter’s Beam Quarter Visual Pick-up Game Plan.

### **1604. FORWARD QUARTER (UNKNOWN)**

This set will begin exactly the same as the Canned Forward Quarter Set. After the Bandit calls for the fighters to Tac Turn into him, he will initiate the “fight’s on” call. ~~The near fighter will initiate the Tally and ROE comm.~~ At the initial merge, the near fighter should go nose high and set one-circle flow. The far fighter should deconflict from his wingman’s merge, but also attempt to get an aggressive bite on the Bandit. After the far fighter merges he should pull across the Bandit’s tail ~~and set two-circle flow~~. The Bandit will have the option to choose the fighter with which to engage. Watch for the Bandit’s intentions and communicate the roles appropriately.

## CHAPTER 17 TAP-THE-CAP

In the FRS and Fleet, Tap-the-Cap is often used to train and test the fundamentals of Section Engaged Maneuvering by limiting what is known about the Bandit's location and intentions. The fighters must be able to apply visual mutual support and lookout doctrine to this environment and immediately react to a threat. A thorough understanding of the mechanics, communication, and initial moves for each visual pick-up is imperative to success. Apply sight pictures and fundamentals familiar to you until this point from the known starts to achieve the kill.

### **BLOCKS**

Once the fighters are visual of each other, the Bandit will detach. Blocks will be utilized to deconflict forces until required SA is gained, per training rules. The fighters will be in the 14 to 17 thousand-foot block, and the Bandit **will own everything** immediately above or below the fighters (e.g. the 10 to 13 thousand foot block and the 18 thousand foot and above block). Should circumstances dictate (e.g. inclement weather), the Bandit may modify the blocks during the course of the event in the name of safety. Both fighters must acknowledge the new blocks verbally over the radio, reading them back specifically. Being out of your block is a serious training rule violation. Even 20 feet high or low is **unacceptable**. It is prudent to give yourself at least two to three hundred feet of buffer from the bottom or top of the block. As fighter lead, this is also true of your wingman, so take his position into consideration once established in the block. Finally, a fighter cannot leave his own block until after the "fight's on" call **and** tally/visual. The Bandit may be above or below the fighters, but must have 2 in sight in order to be in the fighters' block. Maneuvering within your block is acceptable. Good headwork applies when a high SA fighter is directing a low SA fighter's movements.

Once cleared off, the fighters will maneuver to get into their block in a timely manner. Establishing deconfliction early is prudent should the Bandit lose sight.

### **CAP LOCATION**

Once the fighter's are visual of each other, the Bandit will detach himself to setup his presentation. The Bandit will call on/off heading shackles, check turns, TAC turns and In Place turns to maneuver the fighters towards the center of the working area. There is no specific starting point or CAP to maintain. A pre-briefed point can be used as a "get well" point should the bandit lose sight.

### **FORMATION KEEPING**

The Tac Wing should use small airspeed changes to stay in position. Overly aggressive maneuvering increases pilot workload leading to a less efficient scan, making it harder to detect a threat. If the Tac Wing is out of position before a turn, the fighters should work together to fix the position error. If the Tac Wing is grossly out of position following

a turn, a shackle may be used. In the end, it is the responsibility of the wingman to fly disciplined formation, striving to be directly abeam lead to maximize visual mutual support. The fighters should utilize the concepts discussed in the *Form – Sensor – Comm* chapter to gain early tallies and avoid defensive scenarios.

## **FIGHT INITIATION**

The Bandit will call “Ripper set 330” and when ready he will call “Viper 1 set”. After the Bandit’s set call A “set” call from each fighter will substitute for speed and angels comm during Tap-the-Cap. Each fighter, in order, will then call “set” assuming the following:

Visual  
DCS at 330 KIAS  
In the fighter block

Following the set calls, the Bandit will initiate the “fight’s on” with the Tac Lead echoing the “fight’s on.”

At any time the Bandit may be directive with the fighters to expedite the flow or to set a specific presentation (pre-briefed or audibled but known to the fighters). Follow the Bandit’s instructions and keep your eyeballs out. Also, the Bandit will use a “threat” call to bias the fighters scan in order to set a presentation (e.g. “Rage, threat, your left nine o’clock, low” or “Rage threat BRA 120, 5, high”). **Fighters will not maneuver based on the comm but should use the threat call to gain a tally then maneuver.**

## **RESETTING THE FIGHT**

Each engagement will end with a KIO after the Bandit directs the fighters to flow. The Bandit will detach himself to set up the next presentation. Once everyone is reset, the fight will initiate just like before.

## **TAP-THE-CAP COMM FLOW**

Once the fighters are visual each other:

Viper 1: "Viper detaching for a forward quarter Tap-the-Cap."  
Anvil 11: "Anvil."

Viper 1: "Anvil Tac left"  
Anvil 11: "Anvil"

Viper 1: "Anvil set 330."  
Anvil 11: "Anvil."

Viper 1: "Viper 1 set."  
Anvil 11: "Anvil 11 set."  
Anvil 12: "Anvil 12 set."

Viper 1: "Fight's On."  
Anvil 11: "Fight's On."

Anvil 11: "Snapper picture." (whenever required to gain SA)  
Viper 1: "Anvil threat BRA 090, 5 miles, low."

Anvil 12: "Anvil tally one, right one o'clock, 2 miles, level."  
Anvil 11: "Anvil 11 tally."

After the fighters have killed the Bandit:  
Viper 1: "Copy kill. Anvil flow 280."  
Anvil 11: "Anvil 11 280."  
Anvil 12: "Anvil 12 280."

Viper 1 will initiate the KIO IAW with TACSOP.

David Lobdell  
Commodore TW-1

**APPENDIX A**  
**SEM TRAINING OBJECTIVES AND COMMON ERRORS**

**SECTION ENGAGED MANEUVERING TRAINING OBJECTIVES**

- 1) 100% Training Rule Adherence
- 2) Tactical Formation
  - a. Visual Mutual Support/Lookout Doctrine
  - b. Setup Adherence
- 3) Minimize Time to Kill
- 4) Sound BFM Execution
  - a. Valid Shots
  - b. Clear Field of Fire
  - c. Proper Shot/Kill Removal Comm
  - d. Controlling Merges
  - e. Avoid Becoming Defensive
- 5) Out-of-Plane and Out-of-Phase Flow When Appropriate
  - a. Capitalizes on BFM errors presented by the Bandit because of out-of-plane/out-of-phase
  - b. Doesn't become defensive just to set out-of-phase
  - c. Re-evaluates flow when required to best set out-of-plane/out-of-phase
- 6) Efficient/Effective Engaged Communication
  - a. Establishment of Roles
  - b. Role Responsibility Adherence
  - c. Maintains tally/visual
- 7) Correctly Assess the Environment and Adapt
  - a. Recognize switches
  - b. Maneuvers and communicates changes in the fight appropriately

**COMMON SECTION ENGAGED MANEUVERING ERRORS**

- Engaged Communication
- Out-of-plane and out-of-phase mechanics and decisions
- Poor decisions results in a defensive situation
- 1v1 mechanics and decisions
- Lack of a clear field of fire
- Merge Mechanics
- Controlling Merges Poorly
- Poor post-shot free fighter mechanics
- Poor switch SA and mechanics
- Lost sight

## APPENDIX B CANNED SET COMM STUDY GUIDE

### REAR QUARTER COMM FLOW

Viper 1: "Viper 1 setting up for the Rear Quarter canned set."  
"Rage set 330."  
Rage 31: "Rage"  
Viper 1: "Viper 1 set."  
Rage 31: "Rage 31 speed & angels left."  
Rage 32: "Rage 32 speed & angels right."  
Viper 1: "Viper 1 in."

(Viper will maneuver to set the presentation)

Viper 1: "Fight's On."  
Rage 32: "Rage break left, tally 1, left 8 o'clock, 1 mile, level."  
Rage 31: "Rage 31 tally 1."  
Rage 32: "Rage 32 left-to-left"  
Viper 1: "Left-to-left."

(Rage 32 reverses and the Bandit engages Rage 32 in one-circle flow)

Rage 32: "Rage 32 going nose-high to the right."  
"Rage 32 engaged nose-high, one-circle, North."  
Rage 31: "Rage 31 free."

(Both aircraft must update tallies throughout the engagement (e.g. Rage 32 tally/blind 19 thousand).)

Rage 31: "Rage 31 Fox-2. Rage 31 kill Goshawk in a left turn."

(The free fighter must solve deconfliction while calling the shot and kill.)

Viper 1: "Copy kill. Rage flow 180."  
Rage 31: "Rage 31 180."  
Rage 32: "Rage 32 180."

Viper 1 will initiate the KIO IAW with TACSOP.

### BEAM QUARTER COMM FLOW

Viper 1: "Viper 1 setting up for the Beam Quarter canned set."  
"Anvil set 330."  
Anvil 51: "Anvil"  
Viper 1: "Viper 1 set."  
Anvil 51: "Anvil 51 speed & angels right."  
Anvil 52: "Anvil 52 speed & angels left."  
Viper 1: "Viper 1 in."

(Viper will maneuver to set the presentation)

Viper 1: "Fight's On."  
Anvil 51: "Anvil break left 90, tally 1, left 9 o'clock, 1 mile, level."  
Anvil 52: "Anvil 52 tally 1, left to left."  
Viper 1: "Left to left."

Anvil 51: "Anvil 51 left to left."  
Viper 1: "Left to left."

Anvil 51: "Anvil 51 going nose-high to the right."

(When the Bandit engages Anvil 52 in two-circle flow)

Anvil 52: "Anvil 52 engaged nose-low, left two-circle."  
Anvil 51: "Anvil 51 free."

(Both aircraft must update tallies throughout the engagement (e.g. Anvil 51 one in sight 21 thousand).)

Anvil 51: "Anvil 51 Fox-2. Anvil 51 kill Goshawk coming through North."

(The free fighter must solve deconfliction while calling the shot and kill.)

Viper 1: "Copy kill. Anvil flow 270."  
Anvil 51: "Anvil 51 270."  
Anvil 52: "Anvil 52 270."

Viper 1 will initiate the KIO IAW with TACSOP.

### FORWARD QUARTER COMM FLOW

Viper 1: "Viper 1 setting up for the Forward Quarter canned set."  
"Shield set 330."  
Shield 81: "Shield"  
Viper 1: "Viper 1 set."  
Shield 81: "Shield 81 speed & angels left."  
Shield 82: "Shield 82 speed & angels right."  
Viper 1: "Shield Tac Left Flow 330."  
Shield 81: "Shield 330."

(Viper will maneuver to set the presentation)

Viper 1: "Viper 1 in."  
Shield 81: "Shield 81 left to left."  
Viper 1: "Left to left."  
"Fight's On."

Shield 81: "Shield 81 tally 1, 12 o'clock, 1 mile, level."  
Shield 82: "Shield 82 tally 1."

(Shield 82 / Viper 1 call the pass only if required.)

(When the Bandit engages Shield 82 in two-circle flow)

Shield 82: "Shield 82 engaged nose-low right, two-circle."  
Shield 81: "Shield 81 free."

(Both aircraft must update tallies throughout the engagement (e.g. Shield 82 tally/blind 11 thousand).)

Shield 81: "Shield 81 Fox-2. Shield 81 kill Goshawk coming through East."

(The free fighter must solve deconfliction while calling the shot and kill.)

Viper 1: "Copy kill. Shield flow 270."  
Shield 81: "Shield 81 270."  
Shield 82: "Shield 82 270."

Viper 1 will initiate the KIO IAW with TACSOP.