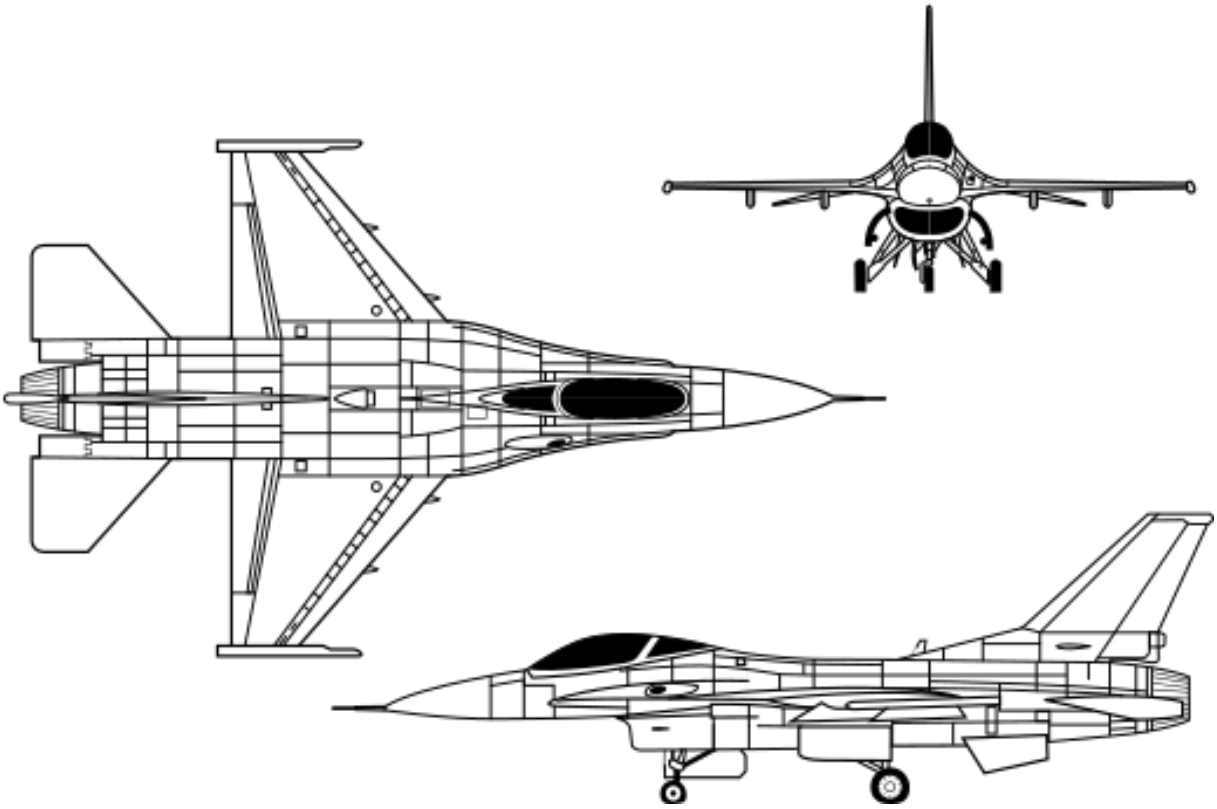
VIRTUAL UNITED STATES AIR FORCE MISSION QUALIFICATION HANDBOOK FOR THE GENERAL DYNAMICS F16 FIGHTING FALCON



APPROVED FOR USE BY

COMMANDER, AIR COMBAT COMMAND

COMMANDER, AIR EDUCATION AND TRAINING COMMAND

RELEASE RECORD

Release Date	Description	Author
14 Feb 2023	Initial Release of Holloman F16 MQT Handbook	vMaj Don Desfosse
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15 Sep 2023	Incorporated formatting improvements	vCol Don Desfosse
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COURSE INTRODUCTION

Mission Qualification Training (MQT) is a training program that upgrades newly assigned crewmembers to Combat Mission Ready (CMR) or Basic Mission Capable (BMC) to accomplish the unit mission. Depending on your assigned airframe, this may include basic fighter tactics, various air-to-ground strike profiles, and/or combat air patrol techniques. Mission qualification training for the F16 will be conducted with the 8th Fighter Squadron at Holloman Air Force Base, New Mexico.

Module 100, Local Area Orientation and Aircraft Familiarization prepares the pilot for the advanced training modules. The Local Area Orientation / Instrument element is mandatory for all pilots and will be accomplished in conjunction with the pilot's first MQT sortie. These training flights will be conducted in the F16 and are designed to acclimate the pilot to the surrounding training area and allow the pilot to adjust to the local operating area in which advanced training will be conducted, while increasing proficiency in the aircraft. Completion of Module 100 will earn the pilot the qualification of Basic Mission Capable (BMC), which will allow the pilot to operate the aircraft in operational and training environments, under the instruction of qualified instructor pilots. Module 100 is designed to be self-paced, meaning the pilot needs only report the completion of the sorties to training staff for credit.

Module 200, Air Combat Training introduces the pilot to the art of Air Combat maneuvering. During these sorties the pilot will demonstrate an understanding of the Basic Fighter Maneuvers (BFM) while gaining experience through completing numerous engagements online with the pilot's operational unit's instructor pilots. Pilots will train in offensive and defensive BFM in preparation for defensive fixed wing ACBT and offensive/defensive anti-helicopter ACBT. At a minimum, pilots will train for successful A/A self-defense at a goal of 50 percent against dissimilar aircraft or helicopters.

Module 300, Surface Attack Tactics introduces the pilot to Air-to-Ground Tactics. During these sorties the pilot will study and then demonstrate an understanding of the basic methods of employing Air-to- Ground weapons while gaining experience through completing numerous engagements online with the pilot's operational unit's instructor pilots. Pilots will conduct preplanned target strikes and close air support (using JTAC and FACs) while in a contested environment.

Module 400, Air to Air Refueling introduces the pilot to Air to Air Refueling operations. During these sorties, the pilot will study and then demonstrate an understanding of approaching a tanker, flying formation with other aircraft and a tanker, the areas (observation, astern and reform).

Upon successful completion of each of these modules, the pilot will be certified as Combat Mission Ready (CMR).

TRAINING TERMS

MARSA: Military Authority assumes Responsibility (for) Separation of Aircraft:
MARSA procedures are used when military aircraft must operate in proximity and with close coordination. Under such conditions, it may be impractical for standard civilian air traffic controllers to ensure safe separation of the aircraft. MARSA procedures delegate the separation responsibility temporarily to the military authority operating the flights, thereby relieving ATC of the separation workload

SUA: Special use airspace:
An area designated for operations of a nature such that limitations may be imposed on aircraft not participating in those operations, often of a military nature. The designation of SUAs identifies for other users the areas where such activity occurs, provides for segregation of that activity from other users, and allows charting to keep airspace users informed of potential hazards. Types important to this course include restricted airspace, military operations area, warning areas and alert areas.

MOA: Military Operating Area:
Airspace established outside Class A airspace to separate or segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. Often positioned over isolated, rural areas to provide ground separation for any noise nuisance or potential accident debris, whenever a MOA is active, nonparticipating IFR traffic may be cleared through the area provided ATC can ensure IFR separation; otherwise, ATC will reroute or restrict nonparticipating IFR traffic. Although MOA's do not restrict VFR operations, pilots operating under VFR should exercise extreme caution while flying within, near, or below an active MOA.

Restricted Airspace:
An area of airspace, typically used by the military in which the local controlling authorities have determined that air traffic must be restricted or prohibited for safety or security concerns. It is depicted on aeronautical charts with the letter "R" followed by a serial number. Restricted areas almost always start at the surface and can extend up to FL180.

Warning Area:
Airspace of defined dimensions, extending from three nautical miles outward from the coast of the U.S., that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. It is depicted on aeronautical charts with the letter "W" followed by a serial number.

OPERATIONAL REQUIREMENTS / SETTINGS

REQUIRED SIMULATOR SETTINGS

Parameter	Setting	Notes
Unlimited fuel:	**Off**	Self-explanatory
"G" Forces:	**On**	To ensure student doesn't overstress aircraft
Damage and Collisions:	**On**	To ensure damage, overclocking, etc. is monitored
Realism Sliders:	**Max**	Self-explanatory
Air Traffic Tags:	**Off**	Self-explanatory

GENERAL INSTRUCTIONS

1. Remember to include your sortie number in the MISREP comments.

2. Include your vUSAF.us Axxxx and sortie number in your VATSIM flight plans.

3. If VATSIM ATC is available, follow all departure/arrival instructions. Always notify ATC when you enter Restricted Airspace / MOA and FIVE MINUTES before EXITING restricted airspace, MOA, etc. Upon entering restricted airspace, MOA, etc., you will be under visual rules only, as radar service will always terminate when in an active MOA.

4. You are ultimately responsible for the safety and proper operation of your aircraft and proper separation from other aircraft.

MODULE 100: LOCAL AREA ORIENTATION AND FAMILIARIZATION

SORTIE 101: LOCAL AREA FAMILIARIZATION

OBJECTIVE: Introduce and familiarize pilot with aircraft and local operating areas

LOCATION: HOLLOMAN AFB, NM (KHMN), BEAK (A, B, and C) MOA, TALON MOA (A, B and C)

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: CLOUDx[1].CLOUD BEAK /D00+30[2] CME TALON /D00+30 PIO

PLANNED ALTITUDE: 12500

SUMMARY

This sortie will take you to the BEAK and TALON MOAs, which are part of the Holloman AFB training environment. This mission is simply to introduce you to the training environment in which you will be training.

MISSION INSTRUCTIONS

1. Conduct the required preflight checks and prepare aircraft for takeoff.

2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the CLOUD departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the CLOUD departure procedure.

3. Follow the CLOUD departure to enter the BEAK C MOA, entering just northeast of CLOUD intersection. Conduct a flight pattern from generally South to North, taking note of landmarks, mountain ranges, rivers, etc., to help you identify your location during future operations. Plan for approximately 30 minutes in the MOA. After familiarizing yourself with the BEAK MOA, proceed to the Chisum VOR (CME), then South into the TALON MOA.

4. Upon entering TALON MOA, conduct a similar airspace familiarization, working yourself to the West. Plan for approximately 30 minutes in the MOA.

5. After completing the airspace familiarization, navigate to the Pinion VOR (PIO), and navigate outbound from the Pinion VOR back to Holloman.

6. Make a non-precision approach to the field. When you have a visual on the airfield, request the overhead break (from ATC, if available) on approach to the field. When approved, conduct one overhead break at Holloman, enter the traffic pattern, and perform at least five (5) touch and go landings on the runway, depending on the wind/weather.

SPECIAL INSTRUCTIONS

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx[3] / vUSAF MQT Training Flight 101 / Activate BEAK and TALON MOAs

NOTES

1. Use the current published departure procedure (e.g., CLOUD1, CLOUD4, etc.).

2. This indicates an enroute delay. Format is /DHH+MM.

   Examples:
   0 hour 30 min delay = /D00+30
   1 hour 30 min delay = /D01+30

3. Use your vUSAF number, e.g. A4999.

SORTIE 102: NIGHT OPERATIONS

OBJECTIVE: Introduce and familiarize pilot with aircraft and local operating areas

LOCATION: HOLLOMAN AFB, NM (KHMN), BEAK (A, B, and C) MOA, TALON MOA (A, B and C)

TIME: PLAN TO TAKE OFF AT SUNSET (+/- 15 MINUTES)

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: CLOUDx[1].CLOUD BEAK /D00+20[2] CME TALON /D00+20 PIO

PLANNED ALTITUDE: 12500

SUMMARY

This sortie is largely the same as sortie 101, but is conducted at night and includes a precision approach and a low approach.

MISSION INSTRUCTIONS

1. Conduct the required preflight checks and prepare aircraft for takeoff.

2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the CLOUD departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the CLOUD departure procedure.

3. Follow the CLOUD departure to enter the BEAK C MOA, entering just northeast of CLOUD intersection. Conduct a flight pattern from generally South to North, taking note of landmarks, mountain ranges, rivers, etc., to help you identify your location during future operations. Plan for approximately 20 minutes in the MOA. After familiarizing yourself with the BEAK MOA, proceed to the Chisum VOR (CME), then South into the TALON MOA.

4. Upon entering TALON MOA, conduct a similar airspace familiarization, working yourself to the West. Plan for approximately 20 minutes in the MOA.

5. After completing the airspace familiarization, navigate to the Pinion VOR (PIO), and navigate outbound from the Pinion VOR back to Holloman.

6. Make a precision approach to the field, resulting in a low approach, and then on the climb out, enter the traffic pattern, and perform at least five (5) touch and go landings on the runway, depending on the wind/weather.

SPECIAL INSTRUCTIONS

In the remarks of your flight plan, include the following:

vUSAF.us Axxxx[3] / vUSAF MQT Training Flight 102 / Activate BEAK and TALON MOAs

NOTES

1. Use the current published departure procedure (e.g., CLOUD1, CLOUD4, etc.).

2. This indicates an enroute delay. Format is /DHH+MM.

   Examples:
   0 hour 30 min delay = /D00+30
   1 hour 30 min delay = /D01+30

3. Use your vUSAF number, e.g. A4999.

SORTIE 103: LOW ALTITUDE FLIGHT OPERATIONS

OBJECTIVE: Conduct a visual military training route

LOCATION: HOLLOMAN AFB, NM (KHMN)

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: VISUAL FLIGHT RULES

ROUTE: CLOUDx.CLOUD IR192 PIO

PLANNED ALTITUDE: 1500 AGL WHILE ON IR192

SUMMARY

In preparation for Modules 200 and 300, this training evolution will prepare you for low-level high-speed flight. This training will be exceptionally useful during periods of hostilities in which terrain following is needed to avoid anti-aircraft fire and/or enemy aircraft. You will fly IR192 from Point A to Point P at a ground speed of 350kts and at an altitude of 1500' AGL.

MISSION INSTRUCTIONS

1. Conduct the required preflight checks and prepare aircraft for takeoff.

2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the CLOUD departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the CLOUD departure procedure.

3. Follow the CLOUD departure to enter the BEAK C MOA, entering just northeast of CLOUD intersection. Maneuver to approach IR192 point A from the North-Northwest (NNW) flying South-Southeast (SSE) to cross IR192 point A at 12000 MSL.

4. Upon crossing IR192 point A, descend to 1500 AGL. Follow IR192 to point P.

5. After crossing IR192 point P, climb as necessary to maintain a safe (at least 1500 AGL) clearance from terrain, navigate to the Pinion VOR (PIO), and navigate outbound from the Pinion VOR back to Holloman.

6. When you have a visual on the airfield, request the overhead break (from ATC, if available) on approach to the field. When approved, conduct one overhead break at Holloman, enter the traffic pattern, and perform at least three (3) touch and go landings on the runway, depending on the wind/weather.

IR-192

ORIGINATING ACTIVITY: 49 OSS/OSOA, 744 Delaware Ave., Holloman AFB, NM 88330-8014 DSN 572-3536, C575-572-3536.

SCHEDULING ACTIVITY: 49 OSS/OSOS, 744 Delaware Ave., Holloman AFB, NM 88330-8014 DSN 572-3536, C575-572-3536.

HOURS OF OPERATION: Sunrise-0600Z++

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross at 120 MSL to or as assigned	A	PIO 344/24	N32°56.00' W105°20.10"
10 AGL B 120 MSL to	B	PIO 357/16	N32°47.80' W105°15.40'
10 AGL B 110 MSL to	C	PIO 007/16	N32°46.60' W105°12.20'
01 AGL B 80 MSL to Alternate Exit: from-Talon Low MOA only	D	PIO 041/18	N32°42.50' W105°01.30'
01 AGL B 90 MSL to	E	CNM 294/42	N32°40.00' W104°54.50'
01 AGL B 90 MSL to Alternate Entry: from TALON Low MOA only	F	CNM 307/33	N32°40.10' W104°39.00'
01 AGL B 48 MSL to	G	CNM 341/26	N32°40.80' W104°17.00'
01 AGL B 70 MSL to	H	CNM 021/24	N32°36.00' W103°58.00'
01 AGL B 70 MSL to	I	CNM 074/19	N32°16.80' W103°51.50'
01 AGL B 70 MSL to	J	CNM 126/15	N32°04.50' W104°02.10'
01 AGL B 70 MSL to	K	SFL 058/41	N31°58.50' W104°20.00'
01 AGL B 70 MSL to	L	SFL 058/32	N31°55.80" W104°30.00'

SPECIAL INSTRUCTIONS

In the remarks of your flight plan, include the following:

vUSAF.us Axxxx / vUSAF MQT Training Flight 103 / IR192 points A through P

SORTIE 104: BASIC FORMATION TRAINING

OBJECTIVE: Learn proper procedures and techniques for formation flying

LOCATION: HOLLOMAN AFB, NM (KHMN), BEAK (A, B, and C) MOA

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: CLOUDx[1].CLOUD BEAK /D00+45[2]

PLANNED ALTITUDE: 16500

SUMMARY

This sortie will take you to the BEAK MOA for formation flight orientation and practice. On this sortie, you will be joined by your instructor pilot (IP), who you are to follow as the number 2 aircraft in the formation. Your sim and/or settings will undoubtedly be slightly different, so you will literally have to "wing it" using a good sense of the situation (situational awareness – SA), your knowledge and experience of how the F16 flies.

The purpose of this mission is to offer you an opportunity to experience firsthand formation flight and certify you as ready to begin the advanced levels of combat training. Do not be discouraged if you do not fly a perfect formation on the first time or two out - you may repeat the exercise as many times as needed till you are able to comfortably get into and stay in position with the lead aircraft.

MISSION INSTRUCTIONS

1. Conduct the required preflight checks and prepare aircraft for takeoff.

2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the CLOUD departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the CLOUD departure procedure.

3. Follow the CLOUD departure to enter the BEAK C MOA, entering just northeast of CLOUD intersection.

4. Follow the directions of your IP. You should practice joins, breaking off, breakaway maneuver, lost visual procedures, etc.

5. At some point, your IP is likely to swap lead pilots for a period of time during the sortie. For this sortie, unless the IP specifies otherwise, the first designated lead pilot for this sortie will squawk Mode C.

6. When the formation training objective is complete, your IP will give you instructions to recover at Holloman.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 104 / Activate BEAK MOA

NOTES

1. If you are unable to schedule a time to conduct your formation flight live online, this flight may also be conducted with a non-IP pilot or by using a pre-recorded flight. You will be responsible for recording your flight to submit to your IP for grading purposes.

2. Remember, when flying in formation, the lead (number 1) pilot is responsible for navigating, communicating with ATC. The lead pilot uses his transponder, squawking Mode C. All other formation pilots squawk standby. That said, recall the mission instructions, above, for this sortie.

MODULE 200: AIR COMBAT TRAINING

SORTIE 201: ADVANCED FORMATION MANUEUVERS

OBJECTIVE: Show proficiency in conducting advanced formation maneuvers

LOCATION: HOLLOMAN AFB, NM (KHMN), R5107BCD

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: IZZYYx.IZZYY R5107BCD /D01+00

PLANNED ALTITUDE: IP DISCRETION (UP TO FL220)

SUMMARY

In this sortie you will be introduced to advanced flight maneuvers such as route formations, turning rejoins, hook turns, check turns, shackles, etc. You will need to become intimately knowledgeable with the associated reference material to be successful in this course.

Use basic formation maneuvers to depart your installation and enter the airspace with your IP. Once inside the training airspace, follow your instructor's directions.

MISSION INSTRUCTIONS

1. Conduct the required preflight checks and prepare aircraft for takeoff.

2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the departure procedure.

3. When the training objective is complete, your IP will give you instructions to recover at Holloman.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 201 / Activate R5107BCD

SORTIE 202: OFFENSIVE BASIC FIGHTER MANEUVERS (BFM)

OBJECTIVE: Practice offensive basic fighter maneuvers (BFM) against an air-to-air (A/A) adversary

LOCATION: HOLLOMAN AFB, NM (KHMN), R5107BC

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: IZZYYx.IZZYY R5107BC /D01+00

PLANNED ALTITUDE: IP DISCRETION

SUMMARY

In this sortie you will practice offensive fighter maneuvers. You will need to become intimately knowledgeable with the associated reference material to be successful in this course.

MISSION INSTRUCTIONS

1. Use basic formation maneuvers to depart your installation and enter the airspace with your IP. Once inside the training airspace, follow your instructor's directions.

2. With your IP at a minimum distance of 1-2NM from your position, close and engage the IP with the intention to maneuver behind for a gunshot within the allowed parameters outlined in vAFI 11-415.

3. A minimum of five (5) engagements lasting no longer than 2 minutes shall be performed with your IP. If no hit / kill is scored within the allotted time, the engagement is considered a draw. Both you and the IP shall then disengage, separate and then reengage in a new round and repeat the exercise.

4. When the training objective is complete, your IP will give you instructions to recover at Holloman.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 202 / Activate R5107BC

SORTIE 203: DEFENSIVE BASIC FIGHTER MANEUVERS (BFM)

OBJECTIVE: Practice defensive basic fighter maneuvers (BFM) against an air-to-air (A/A) adversary

LOCATION: HOLLOMAN AFB, NM (KHMN), R5107BC

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: IZZYYx.IZZYY R5107BC /D01+00

PLANNED ALTITUDE: IP DISCRETION

SUMMARY

In this sortie you will practice defensive fighter maneuvers. You will need to become intimately knowledgeable with the associated reference material to be successful in this course.

MISSION INSTRUCTIONS

1. Use advanced formation maneuvers to depart your installation and enter the airspace with your IP. Once inside the training airspace, follow your instructor's directions.

2. With your IP behind your 3/9 line within 1.0 NM or less, maneuver your jet successfully to prevent your IP from getting into position for a gun shot on your aircraft (follow vAFI 11-415 for gun kill parameters). To be successful you need to prevent your IP from successfully hitting you for sixty (60) seconds.

3. A minimum of five (5) engagements lasting no longer than 2 minutes shall be performed with your IP. If no hit / kill is scored within the allotted time, the engagement is considered a draw. Both you and the IP shall then disengage, separate and then reengage in a new round and repeat the exercise.

4. When the training objective is complete, your IP will give you instructions to recover at Holloman.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 203 / Activate R5107BC

SORTIE 204: AIR COMBAT QUALIFICATION

OBJECTIVE: Demonstrate both offensive and defensive basic fighter maneuvers (BFM) against an air-to-air (A/A) adversary

LOCATION: HOLLOMAN AFB, NM (KHMN), R5107BC

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: IZZYYx.IZZYY R5107BC /D01+00

PLANNED ALTITUDE: MINIMUM 500 AGL TO UNLIMITED

SUMMARY

In this sortie you will demonstrate proficiency in both offensive and defensive fighter maneuvers. You will need to become intimately knowledgeable with the associated reference material to be successful in this course.

MISSION INSTRUCTIONS

1. Depart your installation and enter the airspace.

2. Once established in the airspace, your IP will depart a remote field and will enter the airspace. From this point, use your training to evade your IP while attempting to set up for the kill shot on him.

3. A minimum of five (5) engagements lasting no longer than 2 minutes shall be performed with your IP. If no hit / kill is scored within the allotted time, the engagement is considered a draw. Both you and the IP shall then disengage, separate and then reengage in a new round and repeat the exercise.

4. When the training objective is complete, your IP will give you instructions to recover at Holloman.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 204 / Activate R5107BC

MODULE 300: SURFACE ATTACK TACTICS

SORTIE 301: BASIC SURFACE ATTACK

OBJECTIVE: Practice conventional air-to-ground (A/G) maneuvers

LOCATION: HOLLOMAN AFB, NM (KHMN), PECOS MOA

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: CLOUDx.CLOUD CME PECOS /D01+00 CME

PLANNED ALTITUDE: IP DISCRETION

SUMMARY

In this sortie, you will learn how to perform the basic Air-to-Ground maneuvers such as a chandelle, dive and recovery, and loft. Using these maneuvers, you will learn how to properly keep a target in sight, find the proper "sight picture" for weapon release, and how to maneuver after release in a manner that makes it difficult for ground defenses to hit your aircraft.

MISSION INSTRUCTIONS

1. Conduct the required preflight checks and prepare aircraft for takeoff.

2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the departure procedure.

3. When the training objective is complete, your IP will give you instructions to recover at Holloman.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 301 / Activate PECOS MOA

SORTIE 302: CLOSE AIR SUPPORT

OBJECTIVE: Demonstrate tactical mission employment in a close air support scenario

LOCATION: HOLLOMAN AFB, NM (KHMN), PECOS MOA

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: CLOUDx.CLOUD CME PECOS /D00+45 CME

PLANNED ALTITUDE: IP DISCRETION

SUMMARY

In this sortie, you will the fundamentals of close air support.

MISSION INSTRUCTIONS

1. Use advanced formation maneuvers to depart your installation and enter the airspace with your IP.

2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the departure procedure.

3. Once in the range, your IP will separate and become the Airborne Forward Air Controller (FAC). He will then use the “9-Line” or “6-Line” strike coordination technique to give targets to be attacked. You will then attack the targets using the specified strike pattern or the best strike pattern for the situation given. In situations where 2 aircraft perform the strike pattern, your IP will decide whether to be “wingman” or “lead” and fly that portion of the pattern. A minimum of 5 strikes must be performed.

4. When the training objective is complete, your IP will give you instructions to recover at Holloman.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 303 / Activate PECOS MOA

MODULE 400: AIR-TO-AIR REFUELING (AAR)

SORTIE 401: AIR-TO-AIR REFUELING (AAR)

OBJECTIVE: Practice conventional air-to-air refueling (AAR) maneuvers

LOCATION: HOLLOMAN AFB, NM (KHMN), BEAK MOA, R5109

TIME: DAYTIME

WEATHER: REAL WORLD

FLIGHT RULES: INSTRUMENT FLIGHT RULES

ROUTE: CLOUDx.CLOUD AR644s /D00+45

PLANNED ALTITUDE: IP DISCRETION (NORMALLY BLOCK FL160-FL180)

SUMMARY

In this sortie, you will learn how to perform the basic Air-to-Air refueling procedures.

MISSION INSTRUCTIONS

1. Conduct the required preflight checks and prepare aircraft for takeoff.
2. **IF ATC IS AVAILABLE**: Request standard IFR departure based on above route. Taxi to the active runway as assigned by ATC and depart the airfield using the departure procedure.

   IF NO ATC IS AVAILABLE: Depart using Visual Flight Rules but adhering to the departure procedure.
3. When the training objective is complete, your IP will give you instructions to recover at Nellis.

SPECIAL INSTRUCTIONS

Regardless of the standard instructions, follow the direction of your instructor pilot (IP). Your IP may deviate from these standard procedures to accomplish various training objectives, accommodate weather, sim differences, etc.

In the remarks of your flight plan, include the following:
vUSAF.us Axxxx / vUSAF MQT Training Flight 401 / Activate BEAK MOA / Activate R5109

QUALIFICATION

Upon successful completion of the each of the sorties and modules, your instructor will certify to both AETC and ACC that you have successfully completed the qualification training (MQT), and should be certified as Combat Mission Ready (CMR). Your commander will, upon concurring with your instructor, notify AFPC to annotate your official record.

Congratulations!

APPENDIX ONE: NINE-LINE CLOSE AIR SUPPORT (CAS) BRIEF

Description of 9-Line Brief Elements

The table below details the line-by-line elements of the CAS brief.

Line	Element	Description
1	IP/BP	• Initial Point (IP) is the starting point for the run-in to the target 5-15nm from the target area (8-12nm optimal). • For rotary-wing aircraft, the Battle Position (BP) is where attacks on the target are commenced, normally 1-5km from target area. • This is the first reference point of the nine-line brief.
2	Heading	• Given in degrees magnetic from the IP to the target or from the center of the BP to the target • Terminal controllers give an offset (offset left/right) if a restriction exists (Fixed-wing only); the offset is the side of the IP-to-target line on which aircrews can maneuver for the attack
3	Distance	• Given from the IP/BP to the target • For fixed-wing aircraft, the distance is given in NM and should be accurate to a tenth of an NM • For attack helicopters, the distance is given in meters from the center of the BP and is accurate to the nearest 100m
4	Target elevation	Given in feet above mean sea level (AMSL).
5	Target description	• Should be specific enough for the aircrew to recognize the target. • Target should be described using the acronym STD: o S = Size (how many? i.e.,4) o T = Type (what is it? i.e., Tank, Troops, APC) o D = Description (where is it? what is it doing? i.e., In the open, on a road) • Describe a single target and adjust to other targets after the desired effects are met. • A good description of the target assists the aircrew with correct weaponeering.
6	Target location	The terminal controller can give the target location in: • Grid coordinates (most commonly accepted method). If using grid coordinates, terminal controllers must include the 100,000-square meter grid identification (Example: TH 804677). • Latitude and longitude. • Visual description from a conspicuous reference point. • Because of the multiple coordinate systems available for use, the datum that will be used must always be specified (i.e., WGS-84).
7	Mark	• The type of mark the terminal controller will use [White phosphorous (WP), Illumination (Illum) on deck, laser, Infrared (IR) pointer, etc.]. • The mark must be distinguishable in the operational environment. • Assists in CAS accuracy.

		• Enhances situational awareness. • Reduces the possibility of fratricide. • An effective mark is within 300 meters of the target. • WP and other indirect marks should be on the deck 30 seconds prior to Time on Target (TOT). • Illumination on deck should land 45 seconds prior to TOT. • A backup mark should be used whenever possible, preferably a different type from the primary (i.e. primary mark – WP, backup mark – Illum on deck). • The terminal controller may “talk the aircrew onto the target” by verbally describing the target to be attacked.
8	Friendlies	• The direction and distance of friendlies from the target. • A cardinal/semi-cardinal direction from the target (North, North East, North West, South, South East, South West, East, or West). • Distance given in meters. • If the friendly position is marked, identify the type of mark. • Do not pass friendly grid locations during the 9-line.
9	Egress	The instructions the aircrews use to exit the target area. Can be given: • As a cardinal/semi-cardinal direction • By using control points The word, “Egress,” is used before delivering the egress instructions
-	Remarks	Included if applicable: • Threat and location • Hazards to aviation • Laser-to-target line (in degrees magnetic) • Ordnance delivery • Airspace control areas (ACAs) • Weather • Restrictions • Additional target information • Laser, illumination, and night vision capability • Danger close - Friendlies within 600m • Final attack heading (final attack cone headings) Note: Final attack headings are a restricted run-in and the aircraft must fly within it during the bomb run. It should be expressed as a cone, i.e., "FAH 060 - 090 degrees" and should allow the greatest latitude possible to the pilot while facilitating the FAC’s requirement to ensure the safe execution of the support. Some examples of when a final attack cone might be required are: • To aid in the visual acquisition of the aircraft by the terminal controller. • To deconflict the aircraft with the Gun Target Line (GTL). • To ensure the aircraft will not fly over or toward friendly troops during the bomb run. • When using a laser to mark the target. (The aircraft must fly a particular heading to detect

		the laser energy.) • To provide further safeguarding to the aircraft from surface threats.
-	Timing	TOT/TTT: The terminal controller gives aircrew a TOT or TTT. • TOT is the synchronized clock time when ordnance is expected to hit the target: o Is the timing standard for CAS missions. o When using TOT, there is no time “Hack” statement. • TTT (Rarely used with the advent of GPS). Is the time in minutes and seconds, after the time “Hack” statement is delivered, when ordnance is expected to hit the target. • The time “Hack” statement indicates the moment when all participants start the timing countdown.

WHAT IT SOUNDS LIKE:

Aircraft to JTAC Check In - Report on Station

Aircraft: _____ (Controller call sign), this is _____ (Aircraft call sign)
1. Identification/Mission Number: _____
NOTE: Authentication and an appropriate response are suggested here.
The brief may be abbreviated for brevity or security ("as fragged" or "with exception")
2. Number and Type of Aircraft: _____
3. Position and Altitude: _____
4. Ordnance: _____
5. Time on Station: _____
6. Abort Code: _____ (if applicable)

JTAC to Aircraft 9-Line Brief

Note: Omit data not required; do not transmit line numbers. Units of measure are standard unless otherwise specified. Denotes minimum essential information required in a limited-communication environment. Bold denotes pilot's required read back items.

Terminal controller: _____, this is _____ (Aircraft call sign) (Terminal controller)

1. IP/BP: _____
2. Heading: _____ Offset: L or R (FW ONLY)
3. Distance: _____
4. Target Elevation: _____ (in feet MSL)
5. Target Description: _____
6. Target Location: _____ (latitude/longitude, grid coordinates, offsets or visual)
7. Type mark: _____ Code: _____ (WP/laser/IR/beacon) (actual code) Laser-to-target line: _____ degrees
8. Location of friendlies: _____ Position marked by:
_____
9. Egress _____
Remarks (as appropriate): _____ (Final attack heading/cone, threats, hazards, weather, altitudes, requested ordnance, danger close)
Time on Target: TOT _____ - or - Time to Target: standby _____ plus _____... Hack

APPENDIX TWO: AAR SCRIPT

PLANE	TYPE	PILOT	POUNDS
1			
2			
3			
4			
5			

At 15 miles from the tanker the first contact is made between the receiver and tanker.

RECEIVER:	SHELL 01, _____ FL ____ NOSE COLD, SWITCHES SAFE
TANKER:	_____, YOU ARE CLEARED TO THE OBSERVATION AREA LEFT LOW. ALTIMETER 29.92, FL_____, HDG_____
RECEIVER:	SHELL 01, _____ VISUAL, REQUESTING _____ POUNDS.
TANKER:	_____, SHELL 01, COPY

(AT 10NM SEPARATION)

TANKER:	(ATC) SHELL 01 ACCEPTING MARSA AT THIS TIME WITH _____ AT ANGELS ____
	NOTE: MARSA CAN BE ACCEPTED ONCE COMMS ARE ESTABLISHED

(AT 3NM SEPARATION YOU ARE IN THE OBSERVATION AREA)

RECEIVER:	_____, REQUEST ASTERN
TANKER:	_____, YOU ARE CLEARED ASTERN

(AT 1NM OR LESS)

RECEIVER:	_____, STABLE AND READY
TANKER:	_____, CLEARED TO CONTACT
RECEIVER:	CLEARED TO CONTACT, _____

(AT 500 FEET OR LESS)

TANKER:	SHELL 01 CONTACT, POSITIVE FLOW
TANKER:	_____, SHOWING NO FLOW ((WHEN REQUESTED AMOUNT HAS BEEN OFFLOADED)
RECEIVER:	COPY, REQUEST DISCONNECT
TANKER:	_____ DISCONNECT. YOU TOOK _____ LBS.
TANKER:	_____, CLEARED TO THE HOLDING AREA RIGHT LOW (IF MORE THAN ONE AIRCRAFT)
RECEIVER:	SHELL 01, I WILL BE CLEARING LOW AND RIGHT, HAVE A GOOD DAY (IF ONLY ONE AIRCRAFT)
TANKER:	_____, COPY YOU ARE CLEARED, HAVE A GOOD DAY
TANKER:	(ATC) ____ SHELL 01 IS CLEAR OF _____, TERMINATING MARSA
TANKER:	_____ DISCONNECT. YOU TOOK _____ LBS.

NORMAL TANKER REFUELING SPEEDS

B1	320	**C5**	275	**F15/16/22/35**	300
B2	255	**C17**	265	**V22**	200
B52	275	**C130**	200	**KC46/KC135**	295

APPENDIX THREE: SUPPLEMENTAL TRAINING MATERIAL

FLYING OFFENSIVE BFM

OK, how do you actually stay behind an enemy aircraft and shoot them down? Well, it iseasy if the bandit flies straight and level or just banks into a gentle turn. When a bandit does a high G turn into you and jams your AMRAAM while simultaneously dropping flares to spoof your sidewinder, you've got a real offensive BFM problem on your hands.

Here is how the problem develops. When you start from 1.0-1.5NM back on the bandit and he turns, you will only be in a missile WEZ (Weapons engagement Zone) for a few seconds. If you cannot shoot him during this time (due to flares and jamming), the bandit's turn will quickly causeyou aspect, angle-off and range problems. You will not be able to solve these problems by just driving straight on pointing at the bandit (which is the most common mistake pilots make). If all you think about is taking that one chance to shoot a missile and do not do any BFM, you'd better hope that your missile turns the sky full of hair, teeth and eyeballs or you will end up getting an AA-11 ARCHER up the tail.

In solving BFM problems, there are three primary positions that are utilized in pursuing a banditand they are:

- LAG Pursuit
- PURE pursuit
- LEAD Pursuit

LAG PURSUIT - Lag pursuit is where you place your flight path marker BEHIND the bandit's Six o'clock. This will keep your jet on the outside of the bandits turn radius, however if the bandit shows slow down or you should speed up, you run the risk of pulling out in front of the bandit.

PURE PURSUIT - Pure pursuit is where you place your flight path marker directly on the bandit's aircraft, this mode of pursuit is best when closing distance with the bandit, however youwill run the risk of collision if you do not monitor your closure rate.

LEAD PURSUIT - Lead pursuit is where you place your flight path marker in front of the bandit.This will place you inside of the bandits turn and rapidly close distance with the bandit dependingon your closure rate.

The following is an example hypothetical engagement, where an enemy aircraft is at your12 o'clock position.

The bandit is at your 12 o'clock and has started a MAX G turn to get on YOUR! 6 o'clock.

Watch your airspeed; if you are not at corner velocity, get there fast. For your fighter, cornerspeed is between 330-440 knots. Be heads up on the bandit's speed. Many crafty enemy pilots will snap the power to idle to get you to overshoot. As the bandit enters his turn, go into LAG PURSUIT and watch your closure rate.

In FLIGHT SIMULATOR, activate the MULTIPLAYER TRACKING feature and go to the TRACK view. Once in that view, place your LIFT VECTOR (an imaginary line running vertically from bottom of your jet to the top at the center of your wing) right on the bandit. Then pull hard into the bandit at MAX G, the target should begin to come around into your 12 o'clockposition. As you see the wings of the target come into view off of your nose, go to LEAD PURSUIT. When the opportunity presents itself, take a shot.

The key to successful offensive BFM is to utilize CORNER VELOCITY, NOSE POSITION, TURN and ENERGY MECHANICS, and LIFT VECTOR POSITION to solve ASPECT, ANGLE-OFF and RANGE problems. And as a couple of tips from the old school fighter pilots: Lose sight, lose the fight, Speed is life.

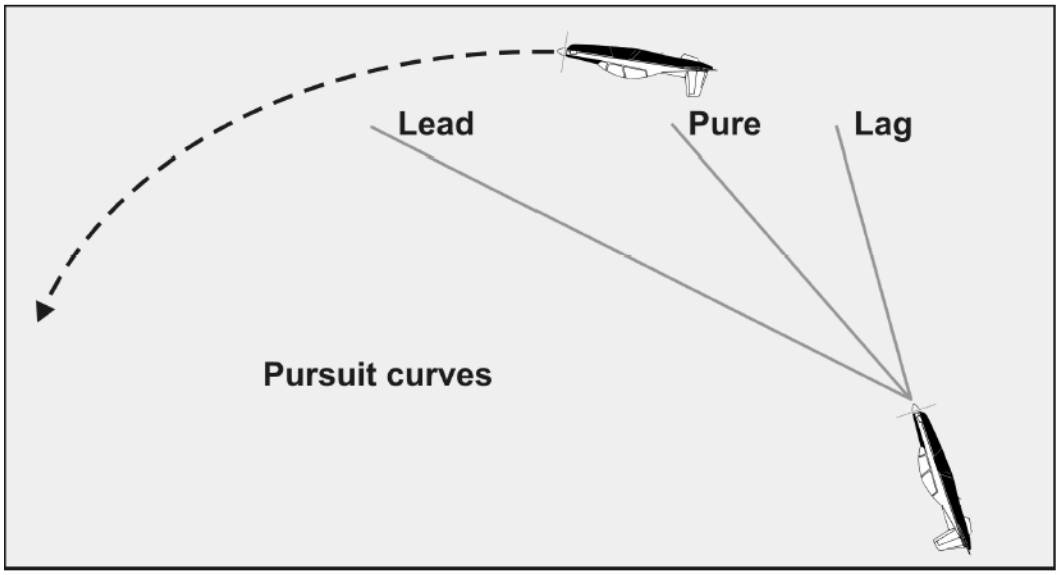

Figure 1

DEFENSIVE BFM

Defensive BFM is very straightforward once you actually detect that you are under attack. Most fighter pilots throughout history of air combat, however, have beenshot down by adversaries that they did not detect until it was too late.

The first thing you need to do on defense is create BFM problems for the bandit. Recall how difficult it is for you to stay behind a well-known aircraft when youtry to fly offensive BFM. What's the secret of becoming hard to kill? First and foremostis creating offensive BFM problems for the bandit. Simply, put your lift vector right onthe bandit and turn a MAX G at corner velocity.

Figure 2 shows why this type of turn creates problems for the bandit:

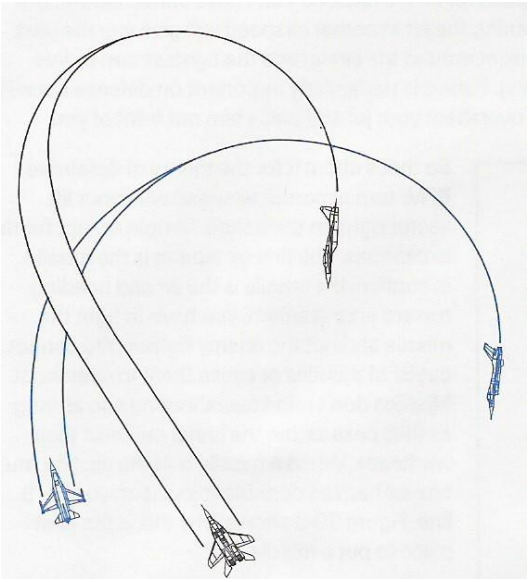

Figure 2

Notice how the turn in Figure 1-2 causes angle-off and aspect to build and also rapidly decreased the range. This type of turn forces the bandit to make a move and, more importantly, it forces the bandit to make just the right move. Anytime you force your adversary to react quickly and correctly to your maneuvers, there is always the chance he will make a human error. The idea here is to make your best defensive moveand force the bandit to do some good offensive BFM. A lame defense will invite contempt, along with sudden death. What could be worse? How about a long, slow ridein a chute with plenty of time to reflect on your shortcomings.

If a bandit shoots you down, make him earn it. Anyway, the fundamental building block of all good defensive BFM is the initial defensive turn. In order to createthe greatest BFM problems for the bandit, you must place your lift vector right on the bandit's noggin and pull hard on the stick. And maintain this hard turn at corner velocity for all the reasons I have already covered. That about covers defensive maneuvering. There are a few exceptions to this and they are:

Missiles, if a missile is in the air and headed toward your cranium, you have to fight the missile, not the bandit. You cannot out-BFM missiles or cause them to overshoot. Missiles don't mind overshooting you as long as they pass within lethal radius of theirwarheads. When a missile is in the air, you must turn as hard as possible to put the missile on your 3/9 line and place your lift vector right on the missile. The 3/9 line is the axis, which runs from wingtip to wingtip. By doing this, you force the missile to flythe longest path to your jet. This makes the missile work harder to get to you and causes it to lose energy

The other exception to the "pull straight at the bandit at corner speed technique" is the gun exception. If the bandit is in range for a gunshot and in your plane of motion with his nose in lead pursuit, forget all that you have just read so far. When a bandit is about to take a gunshot, you have to jinx. Part of that jinx is to moveout of plane with the bandit, more on defending against gunshots later.

GUN DEFENSE

When you are close enough to make out the bandit's wings, you are close enough for a gunshot. Additionally, when the bandit is in range and within 45 degreesof getting his nose on your jet, get ready to defend yourself against a gun attack.
Remember that the gun is an "ALL-ASPECT" weapon and the bandit does not need tobe on your 6 o'clock to kill you with it. Below is a rough outline procedure on how to defend against a gun attack; please bear in mind it is for reference not a step-by-step procedure.
Unpredictability is your greatest ally in this situation. Roll your jet at least 90 degrees and then pull max G to get out of the bandit's plane of motion. Bring the throttle backto idle, deploy speed brakes and try to cause the bandit to overshoot.

Hold your new plane for 3-5 seconds. Then make another plane of motion change by rolling another 90 degrees and pulling. The bandit that manages to stay behind you will correct for the new position, so you will have to constantly change your plane of motion while you slow down. Continue these maneuvers / jinks until you slowto roughly 150 knots. Then go full afterburner and take the fight straight up into the vertical and over the top. Most bandits do not have the thrust to weight ratio of your fighter and will not be able to stay with you during this maneuver. As you go up, be careful notto zoom. You have to keep G on the jet and fly a tight loop all the way back around toward the bandit. If you zoom, you may get a missile up the tail.

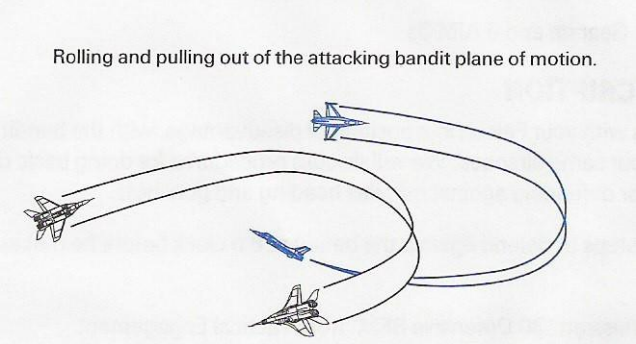

Figure 3

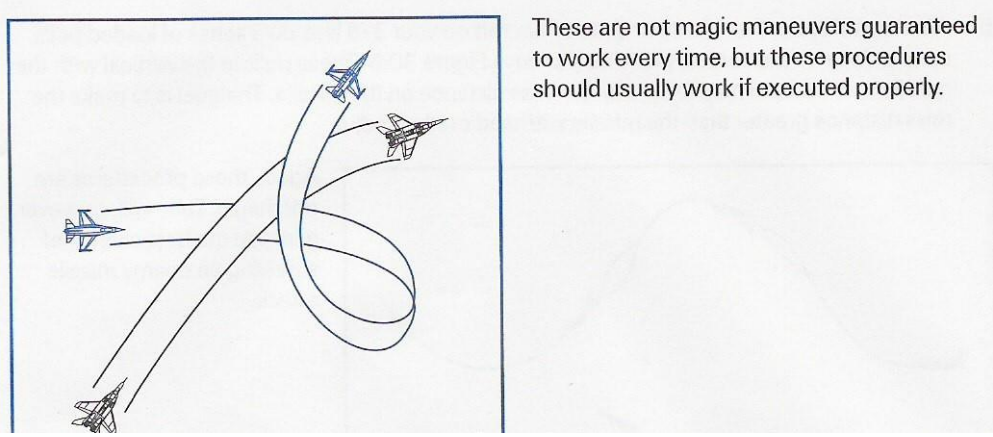

Figure 4

HEAD ON BASIC FIGHTER MANEUVERS

Head-on BFM is more complicated and requires more maneuvering than either offensive or defensive BFM. As you approach an enemy fighter head-on, you have several options, in contrast to the narrow choice you have on defense. On defense, it is simply turn hard into the bandit or die. Even if you start behind the bandit, your options are limited to flying the control position and shooting whenever you can. When you pass a fighter head-on, you have the option to separate, stay in the fight, or stay and tryto kill the bandit. In fact, the biggest decision you must make when passing a bandit head-on is whether you should get anchored into a turning fight. A lot of time and energy will be expended if you enter a turning fight with a bandit that starts from a head-on pass. Energy is, of course, what you need to maneuver and time can be used against you if a third bandit finds your fight. If you take too much time, you may be winning the fight you started with one bandit but losing a fight with a second bandit, you don't see. There are too many reasons to try to separate from a fight-and just as many to stay, try, and kill the bandit. This training sortie covers what to do when you decided to turn and fight.

OPTIONS AT THE PASS

As you approach a bandit head-on, focus on ending the fight as quickly as possible. Remember, the bandit is probably thinking the same way so stay craniums up. As you approach the bandit from head- on, shoot a heat missile if you can, and don't forget about your gun. In most head-on passes, you will have to sacrifice BFM to shoot the gun. So, it is not advisable to try and lineup for a gunshot all the time. If you are committed to separate out of the fight, however, it is a very good idea to try for a head-on gunshot before getting out of dodge.
Again, keep in mind that the bandit may be lining up for a gun attack on you. Even if heis not, head-on gunshots are dangerous because of the high collision potential. Your options as you pass the bandit are (1) you can go straight up in the vertical, (2) turn nose low, or (3) you can turn level. You can do a few other things like pitch back or split S, but these maneuvers are not optimum maneuvers for getting around on the bandit.

Before we discuss options in detail, remember the axiom taught to me by an oldfighter pilot named "Ghost": head-on fights are lost, not won. This means that head-on fights require a lot of maneuvering, and the odds of one of the players of making a mistake are high. The biggest mistake made during a head-on BFM is losing sight of thebandit. Since you can't fight what you can't see, this is a surefire way to get your six reamed good. The absolute best BFM move is no good if you lose sight of the bandit half way through the maneuver. Now let’s talk about each (good) option at the head-on pass:

THE SLICE

The quickest way to get your nose around on the bandit is by initiating a lead turn slice into the bandit. TO perform this maneuver, when the line-of-sight rate of the bandit starts to increase, start an immediate 8 G lead turn into the bandit with your noseapprox. 10 degrees below the horizon.

How do you know when the line of sight is increasing you say? Just think of a car going in the opposite direction on the freeway. You see the car coming for a longway, but it does not move very much on your windshield. As it gets closer, though, itstarts to drift off to the left. When it is about to go by you, it moves rapidly off your windshield to your side window. When the movement of thetarget starts to accelerate, that's when you start your turn.

By pulling around with your nose low, you gain the use of gravity, which will preserve your airspeed and increase your effective turn rate. The slice should be one of the falcon pilot's favorite maneuvers. The reason is simple.

Since your fighter can outturn anything in the sky, a big lead turn, executed nose-low, will intimidate the bandit. Thisturn is intimidating because after completing it, you will gain angles on the bandit and still have plenty of energy for the next turn. The disadvantage of the slice is that it is ahigh G, nose-low maneuver that places the bandit at deep six and out of sight momentarily.

THE LEVEL TURN

Another good option at the pass is the level turn into the bandit. This option does not get your nose on the bandit as fast as the slice, but its big advantage is that atlow altitude you won't double-dribble yourself off the ground. In addition to being safer at low altitude, it is far easier to stay orientated to the horizon. The level turn isexecuted the same way as the slice, except you drag the nose along the horizon.
Because you don't get the same added boost from gravity with the level turn that you dofrom a slice, you will turn slower and loose more energy in this turn.

THE VERTICAL FIGHT

The last move is to pull straight up into the vertical. This move is only advised in a fewspecial instances. The vertical fight is used after a head-on BFM engagement is matureand you have a significant energy advantage over your opponent. As a general rule, don't go into the vertical on the first move, the reasons are threefold:

- Your opponent will gain angles on you with a nose low turn.
- You present a very good IR target against the blue sky for a heat missile.
- It is very difficult to fly a flawless vertical fight when starting with equal energy as the bandit. If you do go into the vertical on your first head-on pass, here is how you do it. As you pass the bandit, start wings-level pull at 550 knots. This is not corner velocity, but it doesn't matter. As you start your 7 G pull, you will bleed off knots like sweat off a pig. As you get pure vertical (straight up), pick up a visual on the bandit and pirouette torotate you lift vector right on him. When your lift vector is on him, pull down. If he seesyou, he will pull up into you. At this point, you will be on the receiving end of a nose high to nose low lead turns. In this situation, counter the lead turn by starting a lead turnof your own. After you counter the lead turn, continue around in a level turn to put yourlift vector on the bandit. The other option is to continue the vertical fight, if you go up again, do not wait till you have 550 knots. When you have 300 knots and are passing thebandit, go up. If you delay your pull up, the bandit will make angles on you. Once youget pure vertical, repeat the pirouette and pull. You know when you are winning this fight if the bandit no longer pulls his nose up into you. If you see he can't come up, he isout of energy. You now own the turning room above the bandit and can use it to converton him.

The time to use the vertical fight is normally after you pass the bandit the third time usingone of the first two options previously discussed. If you can tell he is slow, you may want to take it into the vertical. How do you know a bandit is slow? He can't rate his nose. Remember that if you are committed to going vertical, roll wings-level and makeyour initial pull straight up, then roll to find the bandit and then pull into him. Do not go into the oblique. You will give the bandit turning room. An old fighter pilot saying fromthe Vietnam era states: "You meet a better class of people in the vertical" This is still true in many ways today.

ONE-CIRCLE AND TWO-CIRCLE FIGHTS

The options that we discussed at the pass can result in either a one-circle or two-circle fight. If both fighters start a lead turn, then the fight will go two-circle as shown in figure31-3 and 31-2. This means two distinct circles are made.

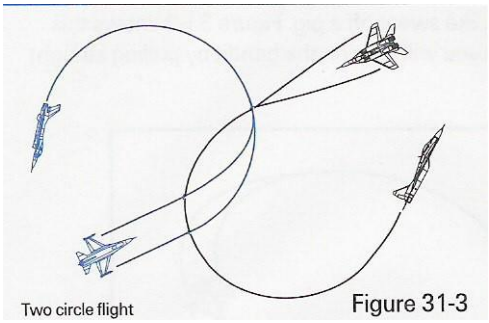

Figure 31-3

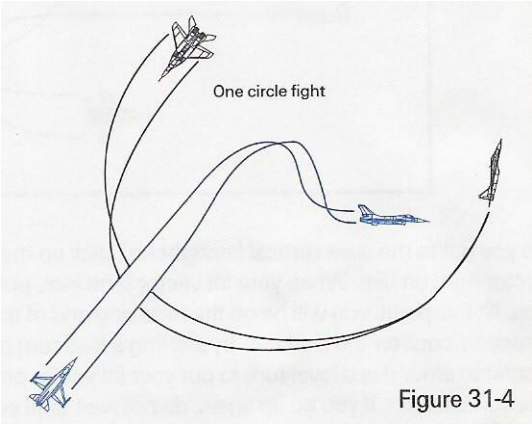

Figure 31-4

If one pilot turns away as shown in figure 31-4, then the fight goes one-circle.

BVR (BEYOND VISUAL RANGE) TACTICS

BVR tactics can also be referred to as intercept tactics. The BVR phase of thefight is the maneuvering outside visual range. The BVR are generally conducted beyond 10NM. The BVR tactics we will cover are:

- SINGLE SIDE OFFSET
- BRACKET
- TRAIL
- BEAM
- DRAG

Single side offset

In the single side offset, one or more jets will try to offset the targetto one side and then swing around to the target's six o'clock position. This does not mean the jets flying this maneuver will wait to shoot until they reach the target's 6 o'clock position. Long-range missiles can be deployed at any time during the intercept.

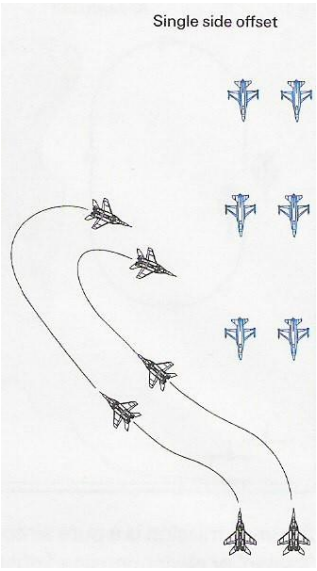

Figure 5

Bracket

A bracket is a two single side offsets being flown in a mirror image. A bracket places fighters on both sides of the target. This tactic is very effective because it sandwiches thetarget. If the target turns to engage one arm of the bracket, the other arm has an easy 6 o'clock entry. The bracket gives the target two choices-both of them bad.

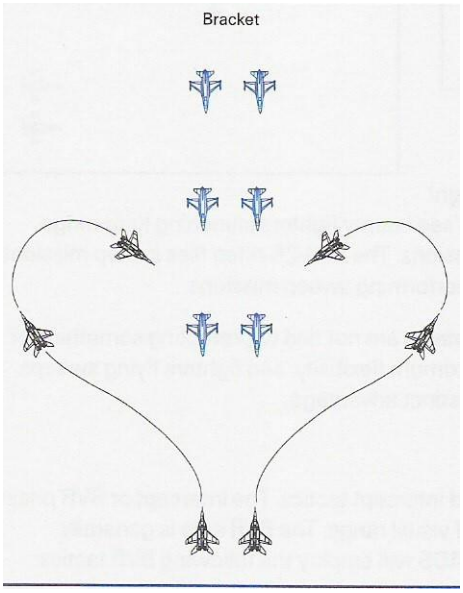

Figure 6

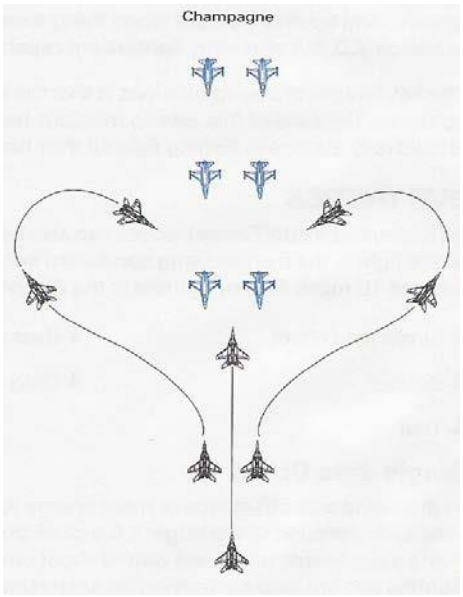

Figure 7

Posthole

Posthole is the same as the BRACKET maneuver, however, it is performed in the vertical, not horizontal, plane of motion.

Trail

A trail intercept consists of putting aircraft at various ranges in trail with one another. These aircraft can run straight at the target, or perform the single side offset or bracket. This tactic is effective if one side has more fighters than the other, because it makes it very difficult for the opposing fighters to deal with the depth of the formation.

Figure 8

Beam

Beaming, or "turning to beam", is a defensive tactic. This maneuver consistsof a 90-degree turn to place the opposing force on the "beam". This maneuver is usedto defeat a radar missile shot, or to break lock of a Doppler radar.

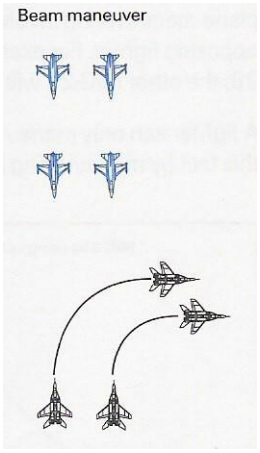

Figure 9

Drag

Dragging a bandit is very simple. Basically, it is the art of luring the bandit into following one aircraft while the other flies to gain angles on him while the banditis pre-occupied on the first jet.

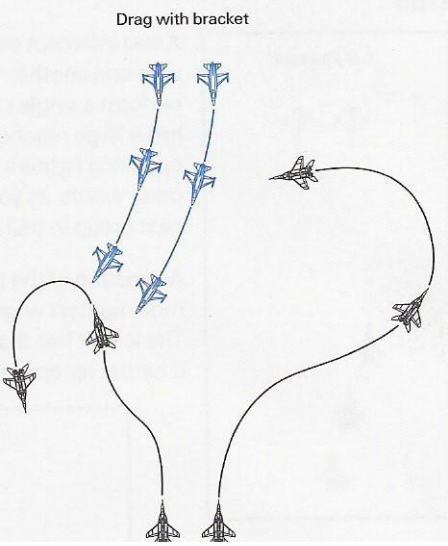

Figure 10

FORMATION MANAGEMENT

There is a variety of formations used when flying in formation into the combat area. Below is a rough depiction of each that are most commonly used. We will discuss each of them in more detail.

Spread

This formation is excellent for penetrating a high threat area because the flight goes thru the threat envelope at the same time. This forces the bad guys to pick asingle target.

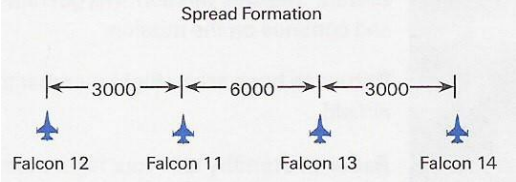

Figure 11

Arrowhead

The arrowhead is an excellent formation because your trailingelement can clear your 6 while your wingman stays close to you.

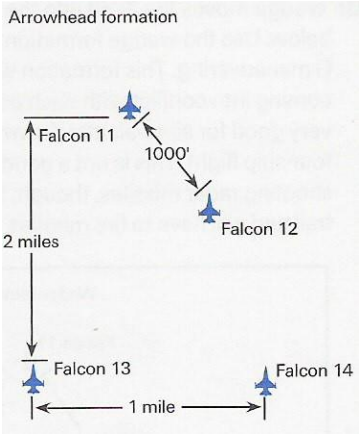

Figure 12

Box

This formation is good for low altitude penetrations / ingress. The formation is easy tomaneuver and provides great 6 o'clock coverage for the whole flight. In addition, the trailing element can easily provide support to the lead element.

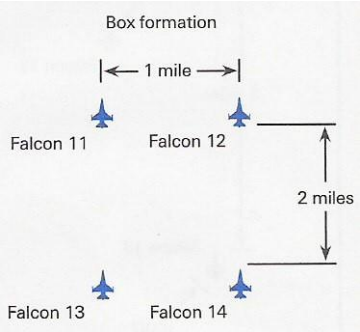

Figure 13

Res Cell

This formation hides the number of aircraft in your formation in an air-to-air fightand is useful when you are outside of about 20NM of enemy fighters. However, you should not be in RES CELL when entering a turning fight because the jets are packed to close together.

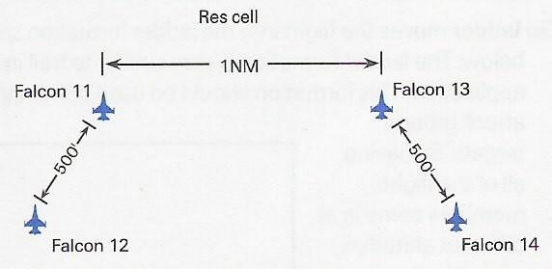

Figure 14

Wedge

Use the wedge formation when you anticipate a lot of high-G maneuvering. This formation will keep the flight members from coming into conflict with each other.The wedge formation is also very good for air-to-air attacks when you are planning to split up a four-ship flight.

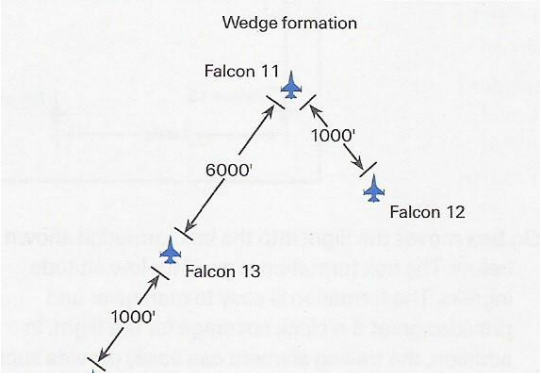

Figure 15

Trail

Trail is exclusively used for air-to-ground attacks. It is not useful in air-to-air engagements since it inhibits support from flight members.

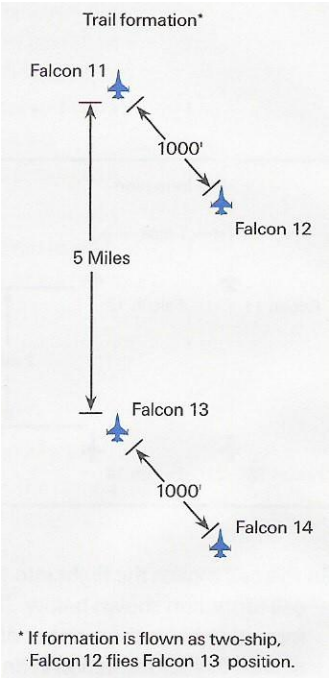

Figure 16

Ladder

Ladder is very similar to the trail formation and should be used for groundattack runs. The added advantage of the Ladder is that it complicates defenses by coming in at different altitudes.

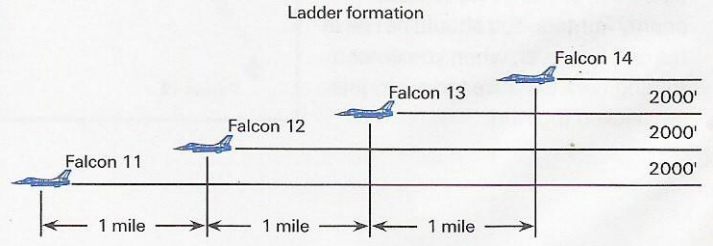

Figure 17

Stack

A stack formation makes it very difficult for enemy fighters to sort and attackyour formation, however, is that it is very difficult to maneuver. In addition, it is hardfor fighters in a stack formation to provide mutual support to each other because of altitude difference.

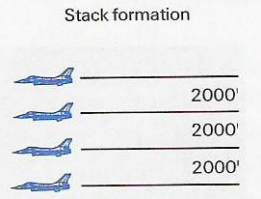

Figure 18

AIR TO GROUND TACTICS NOTES

Never fly directly at target from initial point (because you can't see it)

Approach at steep angle – 30-45 degrees

Drop munitions – target no lower than 8000 AGL

Chandelle / evade (MANPADs kill up to 15K feet, extremely lethal below 8K)

Though this was prepared for USN in DCS, the training is excellent and generic enough for all air to ground trainees: https://www.youtube.com/watch?v=mf1zlg7HA2A