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Flying Operations

AIR OPERATIONS RULES AND PROCEDURES

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This publication implements Air Force Instruction (AFI) 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, and provides rules and procedures for Air-to-Air and Air-to-Surface training. It applies to aircrew, Air Battle Managers (ABM), Weapons Directors (WD), and Joint Terminal Attack Controllers (JTACs). This publication does not apply to the United States Space Force. This publication applies to all civilian employees and uniformed members of the Regular Air Force, Air Force Reserve, and Air National Guard (ANG). References to Major Commands (MAJCOMs) within this publication shall be interpreted to be inclusive of the ANG solely for the purposes of this publication. This publication does not apply to Undergraduate Pilot Training or Undergraduate Combat System Officer Training. Ensure all records generated as a result of processes prescribed in this publication adhere to AFI 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with the Air Force Records Disposition Schedule, which is located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication through command channels to Air Combat Command Weapons and Tactics Branch (ACC/A3TW) (**acc.A3TW@us.af.mil**) using the Department of the Air Force (DAF) Form 847, *Recommendation for Change of Publication*. This publication may be supplemented at any level, but all supplements must be routed to the office of primary responsibility (OPR) of this publication for coordination prior to certification and approval. The authorities to waive wing or unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See Department of the Air Force Manual (DAFMAN) 90-161, *Publishing Process and Procedures*, **Attachment 10** for a description of the authorities associated with the tier numbers. The waiver authority for un-tiered requirements in this document is the Air

Combat Command Director of Operations (ACC/A3). Waiver requests should be submitted through the chain of command to ACC/A3. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force. Compliance with **Attachment 4** and **Attachment 5** is mandatory.

SUMMARY OF CHANGES

This document contains substantial revisions and must be reviewed in its entirety. Revisions include (1) updated definitions of Ground Controlled Intercept (GCI)/Airborne Warning and Control System (AWACS) vice Range Training Officer (RTO) control, (2) updated Instrument Meteorological Conditions (IMC) rules, (3) updated LIMITED maneuvering category for rotary wing and tiltrotor aircraft, (4) removed redundant information throughout already codified in Air, Land, Sea, Application Center (ALSA) publications, (5) clarified war calls vice weather calls throughout, (6) removed Bingo Fuel as a required TERMINATE call, (7) added training rules for laser threat emitters, and (8) condensed **Attachment 2** to only Red Air coordination brief items.

Chapter 1

INTRODUCTION

1.1. General Information.

1.1.1. MAJCOM Supplements. MAJCOM/Direct Reporting Unit (DRU)/Field Operating Agency (FOA) level supplements to this volume will be coordinated with ACC/A3TW prior to approval and publishing IAW Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations*. **(T-2)**

1.1.2. Waivers. The OPR of this publication prefers recommendations for changes instead of waiver requests. Unless explicitly annotated below, the waiver authority for this publication is the lead command Air Combat Command (ACC). Units should forward requests for waivers through their command channels to ACC/A3. Exercise directors will brief all participants on waivers prior to conducting associated activities. All waiver approvals will include an expiration date. **(T-1)**

1.2. Additional References. **Attachment 1** provides references, adopted forms, abbreviations and acronyms, and terms used in this publication. A complete list of multi-service and Air Force (AF) tactics, techniques, and procedures can be found at **https://intelshare.intelink.gov/sites/561jts/SitePages/Home.aspx** and **http://www.alsa.mil/**.

1.3. Roles and Responsibilities.

1.3.1. ACC/A3.

1.3.1.1. ACC/A3 implements guidance in AFI 11-200 as lead MAJCOM for CAF Aircrew Training by authoring this document.

1.3.1.2. ACC/A3 is the waiver approval authority for all un-tiered requirements in this document. Waiver requests to this document should be routed through chain of command to ACC/A3.

1.3.2. ACC/A3TW.

1.3.2.1. Manages air operations rules and procedures as OPR of this publication.

1.3.2.2. Compiles change requests to this document from all applicable MAJCOMs for inclusion in each rewrite cycle.

1.3.3. MAJCOMs, DRUs, and FOAs.

1.3.3.1. All MAJCOMs, DRUs and FOAs will comply with directive guidance published in lead AFMANs and in applicable MDS and aircrew-specific publications. **(T-1)**

1.3.3.2. MAJCOMs, DRUs, and FOAs may supplement this publication, but supplements must be routed to the OPR (ACC/A3TW) of this publication for coordination prior to certification and approval. **(T-1)**

1.3.3.3. Units should implement training plans, exercises, products, scenarios, etc. to enable a safe training environment IAW instructions laid out in this publication. Compliance with this publication is mandatory but does not preclude sound aircrew judgement when encountering situations not clearly defined in this publication.

Chapter 2

GENERAL TRAINING PROCEDURES

2.1. General Information. This chapter provides general procedures applicable to air-to-air and air-to-surface training missions.

2.2. Philosophy. Successful mission accomplishment demands effective coordination among all participants to include command authorities, controlling agencies, friendly surface-to-air sites, and airborne weapons systems. Operation Plans (OPLANs) and Operation Orders (OPORDs) will provide the foundation for this coordination.

2.2.1. Coordinate missions flown with other commands, services, Contract Air Training Services (CATS), and foreign nation services in advance. In the event of conflicting guidance, apply the most restrictive guidance (Training Rules (TRs), operating instructions, etc.) of participating units.

2.2.2. Contract Air Training Services. When conducting operations with CATS, this publication is the standard for training rules. Additionally, Operations Group Commanders or equivalent must consider their test/training requirements, the capabilities and currencies of both their assigned and contracted (if applicable) personnel/aircraft, along with the airspace and environmental factors in order to determine whether more restrictive TRs and procedures are required than prescribed in this publication. **(T-3)** If more restrictive guidance is deemed necessary by the Operations Group Commander or equivalent, local TRs and procedures will be published as local guidance and will be distributed to the applicable contract aircrew. **(T-3)** For additional guidance with respect to CATS, reference AFI 10-220, *Contractor's Flight and Ground Operations.* **(T-3)**

2.2.3. The host AF unit has operational control of deployed units upon arrival for training. The host AF unit commander:

2.2.3.1. Identifies the program/mission objectives, ensures the safe conduct of operations, and designates mission commanders for all composite or combined force training. **(T-2)**

2.2.3.2. Identifies flying training missions based on unit tasking and the experience levels of participating aircrews. **(T-3)**

2.2.3.3. Briefs all deployed aircrews on local operating procedures and training areas. **(T-3)**

2.2.3.4. Briefs both host and deployed aircrews on participating aircraft characteristics, dissimilar formation procedures, and other relevant areas. **(T-3)**

2.2.4. The results of training are unclassified; however, mark and handle training results CONTROLLED UNCLASSIFIED INFORMATION IAW Department of Defense Instruction (DoDI)5200.48_Department of the Air Force Instruction (DAFI)16-1403, *Controlled Unclassified Information,* when associated with weapons systems and their tactical capabilities or deficiencies. **(T-2)** Refer to appropriate security classification guides for additional guidance. Air Combat Command, Flight Operations and Training Division (ACC/A3T), is the release authority for all requests of tactics and training data to all non-Department of Defense agencies.

2.3. Check-in and Check-out Procedures. Aircrew will check-in and check-out with the controlling agency using guidance in ALSA publications, MAJCOM instructions and other governing documents. In training missions, the aircrew will add the following requirements:

2.3.1. Check-in. **(T-2)**

2.3.1.1. Lost link emergency mission location and altitude (Remotely Piloted Aircraft [RPA] only). **(T-2)**

2.3.1.2. Actual vs. Simulated Weapons. **(T-2)**

2.3.1.2.1. Aircrew checking-in to a Close Air Support (CAS) mission will clearly identify actual versus simulated weapons load out to the Air Support Operations Center (ASOC)/Forward Air Controller-Airborne [FAC(A)]/JTAC. **(T-2)**

2.3.1.2.2. ASOC/FAC(A)/JTAC will provide a read back to the aircrew the actual weapons load-out. **(T-2)**

2.3.2. Check-out. The controlling agency is responsible for prioritizing aircraft recoveries.

2.3.2.1. During check-out aircrew will contact the controlling agency with call sign, location, and recovery base or recovery request. **(T-2)**

2.3.2.2. The ABM/WD will, as conditions permit:

2.3.2.2.1. Provide recovery instructions including base status and weather. **(T-2)**

2.3.2.2.2. Copy and relay in-flight reports and/or weather reports. **(T-2)**

2.4. Airspace Control.

2.4.1. General Information. Effective airspace management and utilization is a shared responsibility between aircrew and the controlling agency. During training missions, airspace is generally reserved for only those aircraft participating in the training. As aircrew, ABMs, WDs, ASOCs, and JTACs transition to combat operations, airspace allocation is determined by the Air Space Control Order (ACO), mission priorities, and airspace needs of multiple users.

2.4.2. Continuum of Control. The continuum of control is grouped into five levels: close, tactical, broadcast, advisory, and autonomous. Transition between levels of control may occur rapidly and continuously throughout the mission. The continuum allows maximum use of aircrew and ABM/WDs' situational awareness (SA) while minimizing missed opportunities. **Table 2.1** shows the Continuum of Control.

Table 2.1. The Continuum of Control.

Close Control	**Tactical Control**	**Broadcast Control**	**Advisory Control**	**Autonomous Operations**
Target and commit information provided to specific flights		Target information provided but not to specific flights	Radar target information not available and not provided	Communication not available
Vectors and altitude	Aircrew responsible for tactical positioning			

Note: Only Close, Tactical, and Broadcast Control satisfy the requirement for positive radar control from GCI/AWACS.

2.4.2.1. Close Control. The ABM/WD is responsible for vectors, intercept geometry, and altitude deconfliction.

2.4.2.2. Tactical Control. Tactical control enables the maximum use of aircrew and ABM/WD radar, communication, and SA to accomplish the mission. It is the standard employment level for the execution of training missions and employs informative, comparative, and directive communications.

2.4.2.2.1. Aircrew will structure communications to support SA of all participants. **(T-2)** Call sign usage is critical to mission success.

2.4.2.2.2. ABM/WDs will keep aircrew informed about all situations affecting their mission or execution through clear and concise communications. **(T-2)**

2.4.2.3. Broadcast Control. Broadcast control is a means for ABM/WDs to support air operations in a covert or saturated environment. ABM/WDs provide informative communications primarily to pass target information to multiple missions by referencing a designated location.

2.4.2.4. Advisory Control. The controlling agency uses advisory control when they lose radar capability. ABM/WDs may use procedural control to manage airspace allocation depending on the controller's training and certification, and published procedures/restrictions.

2.4.2.5. Autonomous Operations. Autonomous operations occur when the aircrew cannot receive information or guidance from Tactical Command and Control (Tac C2) or the controlling agency. During autonomous operations that are not pre-planned, both aircrew and Tac C2/controlling agency will attempt to re-establish communications. **(T-2)**

2.4.3. Methods of Airspace Control. ABMs, WDs, FAC(A)s, ASOCs, and JTACs use positive or procedural methods to control and deconflict airspace between participating aircraft, between aircraft and surface fires/missions, and between participating and non-participating aircraft.

2.4.3.1. The method of airspace control is dictated by system capabilities, personnel/agency training/certification, and requirements published in the Airspace Control Plan (ACP), Federal Aviation Administration (FAA) Air Traffic Control (ATC) regulations, host nation Aeronautical Information Publications, Special Instructions (SPINS), and/or other governing documents.

2.4.3.1.1. Procedural control methods depend on adherence to published procedures with real-time changes directed by the controlling agency based on mission requirements, weather, and competing/conflicting requirements.

2.4.3.1.2. Positive control methods rely on radar, other sensors, tactical data links, and transponder usage to positively identify, track and direct air assets.

2.4.3.2. Tac C2 focus for airspace control is safety of all users through the application of deconfliction methods. Tac C2 does not provide standard ATC services as defined by FAA/ICAO (International Civil Aviation Organization) or host nation rules.

2.4.3.3. During Visual Meteorological Conditions (VMC), aircrew must use all available sensors to clear their flight path utilizing see and avoid procedures.

2.4.3.4. ABM/WD/ASOC/FAC(A)/JTACs will use all available radar, data link, and other sensors to provide SA to aircraft under their control, and should communicate to aircrew when no longer able to provide positive control and deconfliction due to limited radar coverage or task saturation. **(T-2)**

2.5. Scenario Changes. Before the "FIGHT'S-ON" call (or "vulnerability" start time), exercise directors, mission commanders, and ABM/WDs will notify and receive acknowledgment from all aircrew for any scenario changes affecting safety of flight (e.g., airspace changes, weather in working area, block changes, altimeter setting). **(T-2)**

2.6. Exercises. The following instructions apply to major exercises including, but not limited to, Flag Exercises, Operational Readiness Inspections, and composite force training exercises:

2.6.1. SPINS. Exercise directors will publish and brief SPINS unique to their exercise. **(T-2)**

2.6.2. Qualifications. Commanders will ensure that exercise participation is limited to those events that aircrew and ABM/WDs are qualified to perform. **(T-2)** Mission Commander and other upgrades may be accomplished in a major exercise with appropriate supervision.

2.6.3. Briefing Requirements. Exercise directors will brief participants unfamiliar with this publication to ensure they know and understand the TRs. **(T-2)** For additional Joint Live Fire Exercise briefing requirements, refer to **Attachment 4**. Exercise directors will also publish modifications to TRs in the exercise planning document to accommodate differences in TRs. **(T-2)**

2.6.4. Pre-Mission Briefings (See **paragraph 3.3** for additional training rule briefing requirements):

2.6.4.1. Pre-mission briefings will include the applicable portions of the TRs and exercise SPINS. **(T-2)**

2.6.4.2. The mission commander, flight lead, squadron/wing supervisor, or weapons officer will conduct daily telephonic mission briefs, e-mail, and/or video teleconference with participating units in exercises when operational constraints make it impractical for face-to-face briefings. **(T-2)** This wing supervisor does not need to be flying in the mission, but must be a fully knowledgeable exercise participant. **(T-2)**

2.6.5. Separation of Aircraft. Exercise directors and mission commanders will develop and implement deconfliction plans that provide adequate separation of participating aircraft. **(T-2)** Use any combination of time, space (assigning specific geographical areas to flights), or altitude blocks to deconflict participating aircraft. **(T-2)**

2.7. General Air-to-Air Refueling Rules.

2.7.1. ABM/WDs and aircrew will refer to:

2.7.1.1. Mission Design Series (MDS) specific checklist. **(T-2)**

2.7.1.2. The applicable Air Force Manual (AFMAN) series 11-2, Volume 3, *Operations Procedures*. **(T-2)**

2.7.1.3. The applicable Air Force Tactics, Techniques, and Procedures (AFTTP) 3-3 series. **(T-2)**

2.7.1.4. Allied Technical Publication (ATP) 3.3.4.2, *Air to Air Refueling*, for detailed information with regard to Air-to-Air Refueling. **(T-2)**

2.7.2. Air-to-Air Refueling Communications. Emission control (EMCON) procedures must be tailored to receiver and tanker proficiency and flight safety. **(T-2)** In addition to the guidance provided here, reference ATP-3.3.4.2. for guidance on minimized radio transmissions between command and control, the receivers, and the tankers.

Chapter 3

GENERAL TRAINING RULES

3.1. Introduction. This chapter provides general training rules and procedures for day, night, and low altitude operations.

3.2. Gravity (G)-Awareness Exercise.

3.2.1. At a minimum, conduct a G-Awareness Exercise:

3.2.1.1. For aircraft requiring a G-suit, anytime aircrew plan or are likely to maneuver above five Gs during the mission. **(T-1)**

3.2.1.2. For aircraft not requiring a G-suit, anytime aircrew plan or are likely to maneuver above four Gs during the mission. **(T-1)**

3.2.2. Maintain a minimum of 6,000 feet between aircraft during the G-awareness exercises.

3.3. Briefing and Debriefing Requirements.

3.3.1. Briefings and debriefings should take place in the following order of priority: 1) Face to face; 2) Telephonic or electronic; 3) Airborne.

3.3.2. As a minimum, face-to-face, telephonic and electronic briefings will cover the items in the General Coordination briefing guide in **Attachment 2** or the CAS coordination and briefing guide in **Attachment 3**. **(T-2)** For electronic briefings, confirm that the briefing is received and understood by the recipient.

3.3.3. Flight debriefings will critically assess mission execution and offer solutions to problems encountered. **(T-2)**

3.4. Knock-It-Off (KIO) and Terminate Procedures. Use KIO or Terminate procedures to direct aircraft or aircrew to stop engagements, scenarios and tactical maneuvering. **(T-2)**

3.4.1. KIO Procedures. A KIO call ceases all tactical maneuvering and ends the overall scenario. Use KIO procedures for the following:

3.4.1.1. If safety of flight is a factor.

3.4.1.1.1. A dangerous situation is developing.

3.4.1.1.2. An unbriefed or unscheduled flight enters the working area and is detrimental to the safe conduct of the mission.

3.4.1.1.3. Weather below minimums required to safely conduct the scenario.

3.4.1.1.4. Aircraft malfunctions affecting safety of flight.

3.4.1.1.5. Loss of SA.

3.4.1.2. When Desired Learning Objectives (DLOs) either are met or are unattainable for an entire scenario**.**

3.4.1.3. Scenario may be restarted with a “FIGHT’S ON” call.

3.4.2. Once a "KNOCK-IT-OFF" is called, all participating aircraft will:

3.4.2.1. Acknowledge with call sign in roll call fashion. **(T-2)**

3.4.2.1.1. If participating in a Large Force Exercise (LFE) flight leads will acknowledge KIO on the primary frequency. **(T-2)** Flight members will acknowledge the call on the interflight frequency. **(T-2)**

3.4.2.1.2. If not executing an LFE, all aircraft will respond in a roll call fashion on the primary frequency. **(T-2)**

3.4.2.2. Cease tactical maneuvering and end the scenario. **(T-2)**

3.4.2.3. Deconflict flight paths and climb/descend to a safe altitude, block, or as briefed. **(T-2)**

3.4.2.4. Address any problems/issues and obtain verbal clearance from the flight lead/mission commander/exercise director/representative before resuming/resetting the scenario. **(T-2)**

3.4.3. TERMINATE procedures. A TERMINATE ceases all tactical maneuvering with the terminating aircraft or within a specific portion of a larger scenario.

3.4.3.1. Use TERMINATE procedures when safety of flight is not a factor, and in the following cases:

3.4.3.1.1. DLOs are met or are unattainable for a local engagement within a larger scenario. **(T-2)**

3.4.3.1.2. Training rules or other limits met (e.g., 180-degrees turn). **(T-2)**

3.4.3.1.3. Exceeding area boundaries. **(T-2)**

3.4.3.1.4. Below minimum altitude or within minimum range, but when safety is not compromised. **(T-2)**

3.4.3.1.5. Below 5,000 feet above ground level (AGL), airspeed is below MDS minimum, and within visual range (defined as < 5 nautical miles [NM]) of adversary. **(T-2)**

3.4.3.2. Initiate TERMINATE procedures with a wing rock or transmit "TERMINATE" when conditions are not appropriate for a wing rock (night/weather, own-ship parameters will not allow, etc.). **(T-2)** When calling “TERMINATE” anchor position geographically or with a bullseye reference ("(Callsign), TERMINATE south fight" or "(Callsign), TERMINATE fight, BULLSEYE 180/10)”. **(T-2)** Use amplifying information if necessary (altitude, type aircraft, and geographical feature). **(T-2)**

3.4.3.3. If TERMINATE is called within a large scenario, radio acknowledgments (in roll call fashion) are not required; however, all affected element leads must ensure compliance. All participating aircraft within visual range (defined as < 5 NM) of a terminated fight, whether passed via a radio call or wing rock will:

3.4.3.3.1. Cease tactical maneuvering with the terminating aircraft, group of aircraft, or as specified in the terminate call. **(T-2)**

3.4.3.3.2. Deconflict flight paths and climb/descend to a safe altitude, blocks or as briefed. **(T-2)**

3.5. Communications Jamming Procedures.

3.5.1. All Electromagnetic Attack (EA) procedures will be properly coordinated IAW CJCSM 3212.02E, *Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises*. **(T-0)**

3.5.2. Exercise directors will brief restricted frequencies to include taboo, protected and guarded frequencies to all personnel directly associated with communication jamming missions (aircrew, ABMs/WDs, EWOs, jammers, JTAC) with emphasis placed on safety frequencies. **(T-2)** Accomplish communication jamming only in tactical training areas. **(T-2)**

3.5.3. Preface all transmissions required for safety (e.g., weather changes, airspace advisories), with "SAFETY, SAFETY." Upon hearing this call all jammers on the frequency(s) will cease jamming to allow the transmission. **(T-2)**

3.5.4. Transmit "KNOCK-IT-OFF" when situations develop that meet **paragraph 3.4.1** as a result of communication jamming. **(T-2)**

3.5.5. Any person employing communications spoofing will not use terms with safety implications (e.g., "KNOCK-IT-OFF," "CHATTERMARK," or "SAFETY") as communication jamming tactics. **(T-2)**

3.5.6. Do not conduct communication jamming on Guard or any pre-designated safety frequency. **(T-0)**

3.5.7. In training, do not conduct communication jamming that would affect the following activities:

3.5.7.1. Air-to-Air refueling. **(T-2)**

3.5.7.2. Actual personnel or cargo air drops. **(T-2)**

3.5.7.3. Aircraft in distress. **(T-2)**

3.5.7.4. Actual ordnance delivery missions. **(T-2)**

3.6. Chaff, Flare, and Smokey Devil Procedures.

3.6.1. Arm chaff, flare, and Smokey Devil systems only in an approved airspace. **(T-2)**

3.6.2. Smokey Devil or Flare Employment.

3.6.2.1. Aircrew may employ flares or Value Engineering Change Proposal Smokey Devils (VECP SD) when operating over government-owned-or-controlled property (including over-water warning areas). Aircrew will make every attempt to verify current fire conditions prior to employment. **(T-2)** If unable to verify current fire conditions, aircrew will adhere to the most restrictive fire hazard procedures until a less restrictive update is received. **(T-2)** Use the following minimum altitudes:

3.6.2.1.1. No fire hazard: Aircrew may employ down to their minimum altitude unless a higher altitude is specified in range regulations. **(T-2)**

3.6.2.1.2. Fire hazard: According to applicable AFMAN 11-2MDSV3 directives or range regulations, whichever is most restrictive. Smokey Devils employment is limited to 500 feet AGL. **(T-2)**

3.6.2.2. VECP SD minimum altitude for employment is 300 feet. **(T-2)**

3.6.2.3. Aircrew may employ flares and VECP SD in a non-government owned or controlled training area (e.g., Military Operations Areas (MOA), Military Training Routes) only if the training area has an approved AF Form 813, *Request for Environment Impact Analysis*. Aircrew must contact the local airspace manager for information. **(T-1)** In training areas over non-government-owned or -controlled property, minimum flare employment altitude is 2,000 feet AGL unless specified otherwise in governing regulations. **(T-1)** Outside the United States (US) refer to host nation rules governing the employment of flares. **(T-0)**

3.6.3. When employing chaff in the US and Canada, refer to CJCSM 3212.02E; FAA Handbook; and AFMAN 13-212 Volume 1, *Range Planning and Operations*. Outside the US and Canada, refer to host nation rules governing the employment of chaff. **(T-0)**

3.7. Low Altitude Training Rules.

3.7.1. Maneuvering transition to low altitude. (not applicable (N/A) for helicopters) Maximum dive angle during maneuvering flight below 5,000 feet AGL is the lesser of 45 degrees or one percent of AGL altitude (e.g., 40 degrees nose low at 4,000 feet AGL, 30 degrees nose low at 3,000 feet AGL). **(T-2)** Reduce dives starting above 5,000 feet AGL to 45 degrees or less before passing 5,000 feet AGL. **(T-2)**

3.7.2. Consult the applicable AFMAN 11-2MDS,V3 for MDS-specific low altitude guidance.

3.7.3. Formal Training Unit (FTU) HC/MC-130Js will adhere with the following minimum altitude restrictions when a student pilot is in either seat: Day Threat Penetrations – 200’ AGL, Night Threat Penetrations – 300’ AGL. **(T-2)**

3.8. Night Training Rules. This section adds additional night TRs applicable to both Air-to-Air and Air-to-Surface night training.

3.8.1. Day, Night, and Civil Twilight Procedures. Use day rules and procedures (training) during civil twilight (defined in the air almanac or flight weather briefing). **(T-2)** Use night or weather procedures when adverse conditions exist during civil twilight. **(T-2)**

3.8.2. Night Lighting and Illumination.

3.8.2.1. Aircraft Lighting Category Definitions. (**Note:** These definitions do not relieve aircrew from complying with AFMAN 11-202 Volume 3, *Flight Operations,* aircraft lighting requirements).

3.8.2.1.1. Full-up: Normal aircraft lighting IAW AFMAN 11-202V3, and any applicable waivers. **(T-2)**

3.8.2.1.2. Reduced: any lighting configuration other than full-up, normal lighting.

3.8.2.1.2.1. Covert: Night lighting visible through Night Vision Devices (NVDs) but not visible to the naked eye.

3.8.2.1.2.2. Lights-out: All external lights off.

3.8.2.2. Comply with the appropriate syllabus limitations for student training. **(T-2)** In addition, units must:

3.8.2.2.1. Brief all participants. **(T-3)**

3.8.2.2.2. Operate only within authorized areas (per agreement with local airspace controlling agencies). **(T-0)**

3.8.2.2.3. Advise the appropriate airspace controlling agencies before commencing lights out activities to ensure passing of advisories to nonparticipating aircraft. **(T-0)** **Note:** This is not required for operations below 500 feet above ground level.

3.8.2.2.4. Establish procedures to halt reduced or light-out operations when a potential conflict or emergency occurs. **(T-0)**

3.8.2.3. Illumination Levels.

3.8.2.3.1. High Illumination (HI) is defined as illumination, derived from natural or artificial sources, of 2.2 millilux or greater, unless defined otherwise in the applicable AFMAN 11-2MDSV3 instructions.

3.8.2.3.2. Low Illumination (LI) is defined as less than 2.2 millilux, unless defined otherwise in the applicable AFMAN 11-2MDSV3 instructions.

3.8.2.3.3. In aircraft not equipped with in-flight illumination measuring devices, the flight lead or individual pilot is the final determining authority to assess actual illumination for a particular mission element based on visibility and terrain features/resolution. Missions planned for HI may transition to LI TRs in flight depending upon weather, moon rise/set, artificial illumination, etc. Missions may not transition from LI mission to HI TRs unless the actual conditions permit (i.e., greater than 2.2 millilux), and the HI mission was both planned for and briefed. **(T-2)**

3.8.3. Minimum Altitude. The minimum altitude at night is Minimum Safe Altitude (MSA), Terrain Following/Terrain Avoidance (TF/TA), or NVD minimum altitude as appropriate. MQ-9/Special Operations/Airlift/Rescue aircraft may operate below the MSA according to the applicable AFMAN 11-2MDSV3.

3.8.3.1. NVD minimum altitude.

3.8.3.1.1. With HI, the minimum altitude for NVD (non -TF/TA) operations is 1,000 feet AGL. **(T-2)**

3.8.3.1.2. With LI, the minimum altitude for NVD operations is the MSA. **(T-2)**

3.8.3.2. Aircraft conducting TF/TA operations with NVDs may use the lower of the two minimum altitudes.

3.8.4. NVD Mission Planning and Considerations.

3.8.4.1. Mission Planning.

3.8.4.1.1. NVD pre-mission planning will be accomplished using a DoD-approved light level-planning program. **(T-2)**

3.8.4.1.2. If ambient illumination is low and artificial illumination is planned to enhance the mission, a "no flares/artificial illumination" back-up option will be briefed. **(T-2)**

3.8.4.1.3. **{N/A for helicopters}** All flights will plan LI and no-NVD back-up options. **(T-2)**

3.8.4.1.4. Brief factors affecting NVD use to include current and forecasted weather, illumination, terrain, and physiological considerations. **(T-2)**

3.8.4.2. Considerations.

3.8.4.2.1. When only portions of participating aircraft are NVD-equipped, inter-flight deconfliction will be accomplished using visible lighting or positive altitude/area deconfliction. All aircraft will halt any reduced (covert or lights-out) lighting operations when a "KNOCK-IT-OFF" occurs until positive separation of aircraft is achieved. **(T-2)**

3.8.4.2.2. Failure of any portion of the NVDs requires an immediate transfer to instruments and establishment of non-NVD procedures. Resume NVD operations only after correcting the NVD malfunction. **(T-2)**

3.9. RPA Training Rules.

3.9.1. Deconfliction. Prior to establishing radio/radar/data link/visual contact, manned aircraft will maintain a minimum of 1,000 feet vertical or 5 NM lateral separation from RPA's expected altitude block or orbit point. **(T-2)**

3.9.1.1. After contact has been established, aircraft will maintain 1,000 feet vertical separation and may reduce lateral separation to 2 NM. **(T-2)**

3.9.1.2. When maintaining both radio and visual contact, aircraft may reduce separation to a 1,000 feet bubble.

3.9.1.3. RPA may reduce vertical separation with other RPA to 500 feet provided they are able to maintain positive two-way communications with the other aircraft.

3.9.2. Lost Link.

3.9.2.1. Manned aircraft will assume RPA Lost Link when previously established communications are lost. **(T-2)**

3.9.2.2. Upon notification of RPA Lost Link or communication is lost with RPA, manned aircraft will increase separation based upon monitoring systems available and associated deconfliction described in **paragraph 3.9.1**. **(T-2)**

3.9.2.3. RPA crew will notify the controlling agency that they are "LOST LINK." **(T-2)**

3.9.2.4. Controlling agency will notify all applicable players of RPA "LOST LINK." **(T-2)**

3.9.3. Multi-Flight attacks. Aircraft run-in heading and egress will be planned to maintain separation from RPA IAW **paragraph 3.9.1**. **(T-2)**

3.10. General Instrument Meteorological Conditions (IMC) Training.

3.10.1. IMC Operations. These maneuvering limitations are for all aspects of training (air-to-air and air-to-ground). Reference **paragraph 4.2.9** and **paragraph 5.4.1** for additional IMC training rules.

3.10.2. If IMC training is a possibility, aircrew will include IMC maneuvering restrictions during the brief. **(T-2)**

3.10.3. Aircrew will only conduct IMC training above 5,000 feet AGL over water or the MSA over land. **(T-2)**

3.10.3.1. **Exception:** Air Force Special Operations Command (AFSOC), units under AFSOC oversight, or AFSOC-gained aircraft conducting IMC intercept training above 3,000 feet AGL may maneuver up to the limitations specified for the LIMITED maneuvering category. When conducting IMC intercept training below 3,000 feet AGL, AFSOC, units under AFSOC oversight, or AFSOC-gained aircraft are limited to the RESTRICTED maneuvering category. **(T-2)**

3.10.3.2. **Exception:** Mobility Air Forces (MAF), units under MAF oversight, or MAF-gained aircraft will follow guidance in AFMAN 11-2MDSV3. **(T-2)**

3.10.4. If unable to maintain the weather requirement for VMC operations, aircrew will adhere to the IMC restrictions outlined below. **(T-2)** If the bank/pitch limits are inadvertently exceeded, pilots will TERMINATE tactical maneuvering in their aircraft and recover to within the prescribed limits. **(T-2)** Once back within limits, tactical maneuvering may resume.

3.10.5. Experienced Aircrew Restrictions:

3.10.5.1. Aircrew will use a maximum of 90 degrees of bank and 30 degrees of pitch during all phases of training, with the following **Exceptions: (T-2)**

3.10.5.1.1. When executing Outs, Aborts, and Exits (normal Air-to-Air and Surface-to-Air timeline maneuvers), aircrew will use a maximum of 135 degrees of bank and 60 degrees of pitch for no more than 180 degrees of turn (based on the heading at the initiation of the maneuver). **(T-3)**

3.10.5.1.2. When executing Air-to-Air or Surface-to-Air threat reactions, aircrew will use a maximum of 135 degrees of bank and 30 degrees of pitch. Additionally, aircrew will use a maximum of three heading reversals not to exceed ±90 degrees from the heading at the initiation of the threat reaction. **(T-3)**

3.10.5.1.3. Upon completion of the maneuver, and prior to any further maneuvering, aircrew will return to a 0 degrees pitch / 0 degrees bank (wings level attitude) in order to reorient themselves with the horizon. **(T-3)**

3.10.5.1.4. **Note:** Air-to-Air RESTRICTED maneuvering limitations take precedence over this section (see **paragraph 4.2.6.4**).

3.10.6. Non-Experienced Aircrew Restrictions.

3.10.6.1. Aircrew will use a maximum of 90 degrees of bank and 15 degrees of pitch during all phases of training. **(T-2)**

3.10.6.2. FTU students will use a maximum of 60 degrees of bank and 15 degrees of pitch during all phases of training. **(T-2)**

3.11. DEWLTE (Directed Energy Weapon Laser Threat Emitter) Procedures.

3.11.1. Emitter operators will have tunable radios that allow for constant monitoring of safety of flight or LFE frequencies used by engaged aircraft. **(T-2)**

3.11.2. If laser effects compromise safety of flight, crews will make a “DAZZLE OFF” call. Upon receipt of this call, all emitters will cease operations. Emitter operators will cease operations for all KIO or TERMINATE calls. **(T-2)**

3.11.3. Maximum engagement time will not exceed 3 seconds against manned aircraft. **(T-2)**

3.11.4. Engagements are prohibited against the following:

3.11.4.1. Any aircraft within 1 NM of emitter. **(T-2)**

3.11.4.2. Fixed-wing aircraft below 10,000 feet AGL. **(T-2)**

3.11.4.3. Rotary-wing aircraft below 1,000 feet AGL. **(T-2)**

3.11.4.4. Aircraft delivering live or inert weapons. **(T-2)**

3.11.4.5. Red and Blue aircraft within 10 NM of one another. **(T-2)**

3.11.4.6. Blue aircraft within 5 NM while converging. **(T-2)**

3.11.4.7. Within 5 NM of active Airland or Airdrop operations. **(T-2)**

3.11.4.8. Any aircraft specified as exempt. **(T-2)**

Chapter 4

AIR-TO-AIR TRAINING RULES

4.1. Introduction. This chapter provides rules that apply to all maneuvering categories of Air-to-Air training unless otherwise specified.

4.2. General Air-to-Air Training Rules.

4.2.1. Airspace. Conduct training within designated airspace. Both aircrew and ABM/WDs share joint responsibility for avoiding lateral spill-outs. **(T-2)** It is the aircrew responsibility to avoid vertical spill-outs. Accomplish supersonic flight only in designated areas and ensure it is documented IAW DAFMAN 13-201, *Airspace Management*. **(T-2)** Units will develop and publish local procedures to ensure an airspace buffer exists between concurrent, vertically separated missions (such as low altitude training occurring below air combat training). **(T-2)**

4.2.2. Communications. Basic procedures are in **Chapter 2** and **Chapter 3**. The following additional procedures apply to Air-to-Air training:

4.2.2.1. Aircrew will acknowledge all ABM/WD airspace and safety related calls. **(T-2)**

4.2.2.2. ABM/WD procedures:

4.2.2.2.1. Advise aircrew of the bearing, range, heading, and altitude (if available) of previously unreported aircraft within 10 nautical miles that are a potential hazard. **(T-2)**

4.2.2.2.2. Advise aircrew when the controlling agency cannot support a minimum of broadcast control. In this situation only continue an engagement if the aircrew can provide safe separation. **(T-2)**

4.2.2.2.3. Advise aircrew when they approach airspace boundaries (3 NM for fighters and 5 NM for non-fighters) or as directed by the ATC agency. **(T-2)**

4.2.2.2.4. Provide other pertinent information (e.g., airspace changes, weather in working area, system degradation). **(T-2)**

4.2.2.3. If using separate frequencies for opposing forces, ABMs, WDs, and/or RTOs must have simultaneous monitor and broadcast capability on each working frequency. **(T-2)** ABMs/WDs and/or RTOs will immediately pass all "KNOCK-IT-OFFs," "TERMINATEs" and safety of flight information to all participating aircraft. **(T-2)**

4.2.3. Live Air-to-Air Missile Carriage.

4.2.3.1. Do not fly with live Air-to-Air missiles in peacetime, except under the following circumstances:

4.2.3.1.1. Air defense alert aircraft, to include changeover sorties. **(T-2)**

4.2.3.1.2. Weapon System Evaluation Program (WSEP) and Operational Test and Evaluation programs (reference **Attachment 5**). **(T-2)**

4.2.3.1.3. Aircraft flown following generation exercises. **(T-2)**

4.2.3.1.4. As authorized by MAJCOM/A3 (or equivalent), service directives, or OPLAN tasking. **(T-2) Note:** Waiver for non-United States Air Force (USAF) service directives is. **(T-0)**

4.2.3.2. The following requirements apply to authorized carriage of live Air-to-Air missiles for other than WSEP firings:

4.2.3.2.1. Aircrew will make a "WEAPONS SAFE" call upon initial check-in and before each setup following a KIO or terminate. **(T-2)** Check the master arm switch in the SAFE, SIM/TRAIN, OFF, or equivalent position, and use the weapons panel or Heads Up Display (HUD) to verify Weapons Safe. **(T-2)**

4.2.3.2.2. Do not simulate weapons employment, squeeze trigger or depress the pickle button. **(T-2)**

4.2.3.2.3. Maximum maneuvering category is LIMITED. **(T-2)**

4.2.3.2.4. Do not use the terms “HOSTILE” or “KILL” at any time unless acknowledging a kill call. **(T-2)**

4.2.4. Simulated Gun/Missile/Laser Employment.

4.2.4.1. To prevent inadvertent firings when simulating gun employment ensure the following:

4.2.4.1.1. Have no ammunition loaded or safe the gun according to the applicable –34 Series Technical Orders (TOs), or comply with the applicable AFMAN 11-2MDSV3 guidance. **(T-0)** Only A-10 aircraft may simulate gun employment with a gun that is not safe. **(T-0)** Adhere to procedures outlined in AFMAN 11-2A-10C Volume 3, *A-10C - Operations Procedures*. **(T-0)**

4.2.4.1.2. Perform a trigger check (trigger squeeze) before simulated gun employment. **(T-2)**

4.2.4.2. To train or simulate missile employment with a gun that is not safe IAW –34 Series TOs, accomplish all of the following:

4.2.4.2.1. Load no live missiles. **(T-2)**

4.2.4.2.2. Place the master arm switch in the SAFE, SIM/TRAIN, OFF, or equivalent position. **(T-2)**

4.2.4.2.3. Verify the weapons panel or HUD display SAFE, SIM, OFF, or equivalent position. **(T-2)**

4.2.4.2.4. Do not squeeze the gun trigger. **(T-2)**

4.2.4.2.5. Do not conduct basic fighter maneuver training (A-10 exempt). **(T-2)**

4.2.4.3. Air-to-Air Laser Employment.

4.2.4.3.1. Combat Air-to-Air lasing above the horizon must be coordinated through the Joint Space Operations Center Laser Clearing House (JSpOC/LCH) (DSN 275-6565) IAW DoDI 3100.11, *Management of Laser Illumination of Objects in Space* and US Strategic Command (STRATCOM) Instruction (SI) 534-12, *Laser Deconfliction Process*. **(T-0)** At present time, there are no aircraft-mounted combat laser systems in

the inventory that have LCH approval or waiver for lasing above the horizon. The AN/AAQ-33 SNIPER Advanced Targeting Pod and the AN/AAQ-28 LITENING Advanced Targeting and Navigation Pod are approved to operate above the horizon in the eye safe training mode only.

4.2.4.3.2. Combat Laser Setting for Air-to-Air Employment. Laser-equipped aircraft are prohibited from using a combat laser setting during peacetime training missions unless the Operation Group (or equivalent) Commander specifically approves use for a training exercise, test, or WSEP. Unit will contact and abide by current guidelines established by the 711 Human Performance Wing Laser Safety Branch (711 HPW/RHDO). (For Air-to Ground Laser Employment see **paragraph 5.6**). **(T-2)**

4.2.5. Fuel Requirements.

4.2.5.1. Establish fuel minimums for each mission IAW the applicable AFMAN 11-2MDSV3 unless further restricted by local guidance. **(T-2) Note:** Waiver for non-USAF service directives is (T-0).

4.2.5.2. Perform operations checks prior to each engagement and/or periodically during the vulnerability period. **(T-2)**

4.2.6. Maneuvering Categories. This section provides maneuvering categories for aircraft during Air-to-Air training missions. This section also specifies the maximum maneuvering allowed during Air-to-Air training based on flight conditions (day, night, or weather) or altitude. If no war call is made, maintain cloud clearances IAW briefed maneuvering category. **(T-2) Note:** If maneuvering category is determined by non-USAF directives, policies or other sources the waiver level is (T-0). The rules of this publication, MAJCOM Supplement to AFH 11-203V2 or service directives (e.g., Army, Navy, Joint), or aircraft limitations apply, whichever is the more restrictive. **Note:** Waiver for non-USAF service directives is (T-0).

4.2.6.1. The engagement begins when opposing aircraft initiate visual maneuvers against each other. The altitude of the lowest participating aircraft at the first merge determines the maneuvering category. When in doubt, default to the more restrictive category. **(T-1)**

4.2.6.2. UNLIMITED. Provides Air-to-Air training with no limitations on maneuvering other than outlined in the applicable AFMAN 11-2MDSV3 and flight manual (e.g., applicable AFTTP 3-1, applicable TO 1-1M34s) aircraft limitations.

4.2.6.2.1. Minimum altitude is 5,000 feet AGL.

4.2.6.2.2. Weather Requirements for UNLIMITED Operations. Must maintain 2,000 feet vertical and 1 NM horizontal cloud clearance with 5 NM visibility and a discernible horizon. **(T-2)**

4.2.6.3. LIMITED. Provides for Air-to-Air training with the following limitations.

4.2.6.3.1. Offensive/Neutral aircraft have no maneuver restrictions pre-merge.

4.2.6.3.2. An engagement can continue until:

4.2.6.3.2.1. A “TERMINATE” or “KNOCK-IT-OFF” occurs.

4.2.6.3.2.2. A role reversal between two opposing aircraft.

4.2.6.3.2.3. A defender reaches 180 degree of turn at the start of the threat reaction.

(A defender is an aircraft visually reacting to defeat an adversary's attack aft of his 3/9 line. All maneuvers into and out of the notch are excluded.) **Exception:** When a fixed wing aircraft is engaging rotary wing or tiltrotor aircraft, the engagement may continue until a "TERMINATE" OR "KNOCK-IT-OFF" occurs.

4.2.6.3.2.4. If neither aircraft can be clearly identified as the defender, the engagement will be terminated after the first aircraft reaches 180 degrees of turn after 3/9 line passage. (A defender is an aircraft visually reacting to defeat an adversary's attack aft of his 3/9 line. All maneuvers into and out of the notch are excluded.) **(T-2)**

4.2.6.3.3. Weather Requirements for LIMITED Maneuvering: When operations cannot be maintain for the weather requirements outlined for unlimited maneuvering and IMC conditions can be avoided, then limited maneuvering may be utilized.

4.2.6.4. RESTRICTED. Provides for Air-to-Air training with heading changes of up to 90 degrees either side of course. This rule applies upon initiation of any defensive reaction (surface-to-air or Air-to-air). This does not apply to aircraft performing conversions versus RESTRICTED maneuvering targets. The heading change starts at the heading of the aircraft once inside 10 NM to a threat when making the decision to defensively react. Defensive reactions do not include out maneuvers executed in order to maintain a timeline (e.g., Skate and Short Skate flows).

4.2.6.5. NON-MANEUVERING. Provides for Air-to-Air training by maintaining constant heading, airspeed, and altitude. This does not apply to aircraft performing conversions versus NON-MANEUVERING targets.

4.2.6.6. CONTROLLED. Provides for Air-to-Air 1 v 1 night visual training conducted with NVDs. Maneuvers are fluid and continue beyond 180 degrees, but maneuvering options for the defensive fighter are predetermined and restricted to a maximum of 540 degrees of combined turn. Controlled maneuvering may only be conducted as authorized in applicable AFMAN 11-2MDSV3 guidance. Abide by the following restriction: Minimum altitude is 5000 feet AGL. **(T-2)**

4.2.7. Low Altitude (LOWAT). Applies to maneuvering below 5,000 feet AGL (fixed wing).

4.2.7.1. LIMITED is the maximum maneuvering category. **(T-2)**

4.2.7.2. Do not perform rolling or exaggerated vertical maneuvering. **(T-2)**

4.2.7.3. Defender's reactions must be level to climbing. **(T-2) Note:** AFSOC, units under AFSOC oversight, or AFSOC gained fixed wing aircraft may execute descending defensive reactions.

4.2.7.4. Minimum altitude for aircraft engaged in offensive and defensive Air-to-Air maneuvering is 300 feet AGL (250 feet for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance), pilot minimums, as directed by MDS-specific instructions, or range/airspace restrictions whichever is higher. **(T-2)**

4.2.7.5. Minimum altitude for aircraft engaged in offensive and defensive Air-to-Air maneuvering overwater is 1,000 feet AGL. **(T-2)**

4.2.7.6. Minimum altitude for aircraft not engaged in offensive or defensive maneuvering at low altitude is 100 ft AGL, pilot minimums, as directed by MDS-specific instructions or range/airspace restrictions whichever is higher. **(T-2)**

4.2.7.7. Upon completion of a defensive reaction at low altitude, do not perform additional reactions to follow-on attacks beyond visual range (defined as > 5 NM) until reestablishing minimum MDS-specific tactical airspeed. **(T-2)**

4.2.7.8. Determine minimum altitudes by referencing MAJCOM directives, service directives, and personal low altitude minimums, whichever is higher. **(T-2)**

4.2.8. Night.

4.2.8.1. LIMITED is the maximum maneuvering category unless flying CONTROLLED maneuvering exercises. **(T-2)**

4.2.8.2. Include frequent flight instrument cross-checks during all engagements. **(T-2)**

4.2.8.3. No visual-only intercepts for non-NVD equipped aircrew. **(T-2)**

4.2.8.4. For NVD-equipped aircrew, visual-only intercepts are authorized if a discernable horizon exists, target line-of-sight (LOS) rate is observed, and range/altitude to complete the intercept is perceived. If no target LOS rate is observed, or range/altitude to complete the intercept is not perceived using NVDs, another instrument or sensor must be used to complete the intercept. **(T-2)** If a discernable horizon is lost during the intercept, revert to non-NVD night operations and ensure safe separation of aircraft. **(T-2)** If unable to ensure safe separation discontinue the intercept. **(T-2)**

4.2.8.5. No air-to-air gun attacks except during Controlled Maneuvering. **(T-2)**

4.2.9. Instrument Meteorological Conditions (IMC) Intercepts. Conduct IMC intercepts in approved special use airspace under positive radar control of GCI/AWACS or radar monitoring by an RTO. **(T-2)** Positive radar control is defined as either Close, Tactical, or Broadcast Control as defined in **paragraph 2.4.2** and **Table 2.1** of this publication. RTO radar monitoring is defined as an RTO with access to a radar and Identification, Friend Foe (IFF) tactical display. RTOs will be certified by the unit commander in the use of the tactical display prior to monitoring IMC intercepts. **(T-2)** Without GCI/AWACS positive control or RTO monitoring, IMC intercepts are approved in restricted areas, above 18,000 feet Mean Sea Level (MSL) in warning areas and Altitude Reservations (ALTRVs), in ATC protected airspace at OCONUS locations or in Air Traffic Control Assigned Airspace (ATCAA) unless prohibited by published range operating procedures or additional MDS-specific restrictions. **(T-2)**

4.2.9.1. IMC rules will apply when weather requirements for VMC Operations cannot be maintained. **(T-2)** If not previously briefed/coordinated, Flight Leads will designate training aids (e.g., adversary aircraft) and altitude blocks. **(T-2)** Additionally, unless previously briefed, the fight altimeter will be passed to all players prior to the commencement of tactical maneuvering. **(T-2)** Flight leads, GCI/AWACS, or RTO can pass the fight altimeter. **(T-2)**

4.2.9.2. With Control: GCI/AWACS and/or RTO tracking all players. When all aircraft are outside of 10 NM, aircrew may maneuver IAW IMC pitch / bank restrictions (**paragraph 3.10**). No later than (NLT) 10 NM, the RTO (primary) or GCI/AWACS (secondary), will make a "10 NM, check blocks" call. **(T-2)** Unless able to meet the

requirements for transitioning blocks outlined in **paragraph 4.2.10.6**, after the check blocks call, Blue air will be RESTRICTED maneuvering, training aids will be NON-MANEUVERING and all aircraft will maintain the pre-briefed altitude blocks. **(T-2)**

4.2.9.3. Without Control: Without GCI/AWACS and without an RTO or RTO is not tracking all players. Blue air will be RESTRICTED maneuvering, training aids will be NON-MANEUVERING and all aircraft will maintain the pre-briefed altitude blocks for the entirety of the mission. **(T-2)**

4.2.9.3.1. If the training aids are able to monitor all Blue players by means of datalink, aircrew may execute IAW the guidance in **paragraph 4.2.9.2** In this case, the training aids will be responsible for making the "10 NM, check blocks" call. Training aids must verbally confirm they are tracking all Blue aircraft prior to the start of tactical maneuvering for this to be applicable *("Devil 11, Satan is tracking all Blue players").* **(T-2)**

4.2.9.4. War Calls.

4.2.9.4.1. IMC Only Rule. When IMC conditions exist in the entirety of the operating airspace "IMC Only Rules" will apply to the entire engagement. In this category, aircrew will adhere to all IMC rules and restrictions even if they find themselves able to maintain VMC cloud clearances. **(T-2)**

4.2.9.4.2. IMC Rules/UNLIMITED or LIMITED clear of clouds. When IMC conditions are expected to affect the majority or portions of the airspace, "IMC Rules/UNLIMITED clear of clouds" or "IMC Rules/LIMITED clear of clouds" can be applied. This will allow a less scripted engagement and maximize training where weather allows. The War Call will be based on the weather call or pilot reports (PIREPs) and will be acknowledged. **(T-2)**

4.2.9.4.2.1. When not able to maintain VMC cloud clearances. All aircraft will adhere to the IMC Categories as well as the maneuvering limits when unable to maintain VMC cloud clearances. **(T-2)**

4.2.9.4.2.2. When able to maintain VMC cloud clearances. The maximum maneuvering category will be UNLIMITED or LIMITED, based on the briefing (or War Call) when operating with VMC cloud clearances. **(T-2)**

4.2.9.4.2.3. If an aircraft operating clear of clouds inadvertently enters IMC, they will immediately transition to instruments and execute a climb/descent to their assigned altitude block. **(T-2)** This block will be maintained until meeting the requirements for transitioning blocks outlined in **paragraph 4.2.10.6**. **(T-2)** Example war calls and illustrations are provided in **Attachment 6**. Cloud bases must be greater than 5,000 feet AGL to execute a transition from IMC to Unlimited or Limited below a deck. If maximum maneuvering category is unknown, execute IAW the most restrictive. **(T-2)**

4.2.10. Separation of Aircraft. Each participant must use "see and avoid" techniques to ensure a clear flight path, especially while entering and exiting engagements. **(T-2)** Aircrew must assume that adversaries do not see their aircraft and may maneuver in an unpredictable manner. **(T-2)** If loss of visual or tally occurs, establish positive separation until regaining visual

contact. Flight leads will ensure deconfliction for concurrent missions in the same airspace. **(T-2)**

4.2.10.1. Attackers losing sight will maneuver away from the defender's last known position and make a “NO JOY” call if in radio contact with target aircraft. **(T-2)**

4.2.10.2. Defenders losing sight and SA will maneuver predictably and make a “NO JOY” call if in radio contact with the attacking aircraft. **(T-2)**

4.2.10.3. If the attacker cannot ensure separation from trailers within a lead-trail formation, do not perform rear quarter attacks against the leaders. **(T-2)**

4.2.10.4. Minimum Separation. The minimum slant range between aircraft during Air-to-Air maneuvering is 500-feet unless; 1,000-feet for night, weather, bomber, tanker, airlift, AFSOC/Rescue fixed-wing, and FTU student Basic and Qualification training or as directed by syllabus, or 1,500-feet during CONTROLLED maneuvering exercises. **(T-2)** Aircrew will not penetrate a 1,000-feet vertically or 1,500 feet horizontally of the Joint Surveillance Target Attack Radar System (JSTARS) and AWACS. **(T-2)** (Exceptions to minimum slant ranges are outlined in **paragraph 4.9** for Low/Slow visual identification (VID) and **paragraph 4.7** for helicopter versus helicopter training). **(T-2)**

4.2.10.5. Altitude Blocks. Assign hard altitudes or altitude blocks to provide vertical separation for non-visual setups. **(T-2)** Aircrew cannot rely on altitude blocks to guarantee separation once any participant initiates visual maneuvering. **(T-2)**

4.2.10.5.1. A minimum of 1,000 feet vertical separation between altitude blocks is required at or above 5,000 feet AGL. **(T-2)**

4.2.10.5.2. A minimum of 500 feet vertical separation between altitude blocks is required below 5,000 feet AGL. **(T-2)** (100 feet between A-10s and helicopters during anti-helicopter training). **(T-2)**

4.2.10.5.3. Ensure deconfliction from friendly forces within 10 NM. Where visual deconfliction is not possible, utilize a minimum of 1,000 feet (500 if below 5,000 feet AGL) altitude separation or deconflict by geography, timing, onboard systems, or GCI/AWACS. **(T-2)**

4.2.10.5.4. For VMC war calls, a “10 miles, check blocks” call is only required if positive radar control by GCI/AWACS is unavailable. For IMC war calls, a “10 miles, check blocks” call is always required for aircraft to transition blocks. Any aircraft transiting blocks when the “check blocks” call is made will immediately cease tactical maneuvering until they are established within their block (unless requisite situational awareness has been established to depart their block IAW **paragraph 4.2.10.6**). **(T-2)**

4.2.10.5.4.1. If positive control by GCI/AWACS is unavailable, the RTO will make a “10 miles, check blocks” call anytime an aircraft enters within 10 NM of an opposing aircraft. **(T-2)**

4.2.10.5.4.2. If both positive control by GCI/AWACS and RTOs are not available, all players must be on a common frequency and a "10 miles, check blocks" call will be made by the first aircraft to recognize closure inside of 10 NM from an opposing aircraft. **(T-2)**

4.2.10.5.4.3. **Exception:** If ALL aircraft are provided with high fidelity SA on all opposing aircraft (e.g., datalink PPLI), then no "10 miles, check blocks" call needs to be made. This exception must be briefed by the Blue flight lead to the adversaries. **(T-1)**

4.2.10.6. Transitioning Blocks. Aircraft may not transit or enter the altitude or altitude block of any aircraft unless at least one of the following conditions applies: (**Note:** For helicopter versus helicopter see **paragraph 4.7**)

4.2.10.6.1. All adversaries are beyond 10 NM. **(T-2)**

4.2.10.6.2. Tally is established on all aircraft in the group of interest and no conflict with other groups within 10 NM exists. **(T-2)**

4.2.10.6.3. Not Tally with all adversaries within 10 NM but not a conflict (i.e., no collision potential) based on SA. **(T-2)**

4.2.10.6.4. Verbally confirm adversary's hard altitude and maintain required vertical separation. **(T-2)**

4.2.10.7. When two aircraft approach head-on, each will clear to the right unless maneuvering to do so would result in crossing flight paths. **(T-2)** Aircraft with the higher nose position will attempt to go above the opponent if energy state permits. **(T-2)**

4.2.10.8. Attackers will cease weapons employment under the following conditions: **(T-2)**

4.2.10.8.1. Pure pursuit, H-aspect missile attacks prior to 9,000 feet slant range (3,000 feet for helicopter versus helicopter). Maneuver aggressively to deconflict flight paths so as not to violate minimum range. **(T-2)**

4.2.10.8.2. Any gun attack exceeding 135 degrees aspect inside 9,000 feet slant range (except fighter vs. helicopter engagements where all participants remain in their blocks). **(T-2)**

4.2.10.8.3. Target aircraft begins an Air-to-Surface delivery maneuver below 5000 feet AGL or employing live ordnance. **(T-2)**

4.2.10.8.4. Target aircraft conducting helicopter air-to-air refueling. **(T-2)**

4.2.10.8.5. Any aircraft attacking F-22s will terminate weapons employment NLT 1000 feet slant range to avoid a 500-foot bubble. **(T-2)**

4.2.11. Single-Ship Operations. (N/A for helicopters) Combat Mission Ready (CMR) and Basic Mission Capable (BMC) Air-to-Air qualified pilots may fly single-ship Air-to-Air training missions. Initial Qualification Training (IQT)/Mission Qualification Training (MQT) aircrew require an instructor or squadron supervisor on board the aircraft. **(T-2)**

4.2.12. Visual Engagements. Flight leads will strictly enforce briefed training DLOs in all visual engagements, and will terminate maneuvering so as to prevent degradation in flight safety or mission/scenario conduct. **(T-2)**

4.2.12.1. No more than eight aircraft may participate in the same visual engagement. **(T-2)**

4.2.12.2. For multi-role aircraft a maximum of four similar MDSs may participate in an unlimited maneuvering visual engagement. **(T-2) Exception:** Multi-role aircraft participating in USAF Weapons School, Red Flag, Maple Flag, or other composite force training. **(T-2)**

4.2.12.2.1. A visual engagement is defined as merges occurring within 5 NM of each other.

4.2.13. Dissimilar fighters tasked with the same mission may employ in mixed elements.

4.2.14. 1 v 1 v 1 Basic Fighter Maneuvers (BFM) training scenarios shall not be conducted. **(T-2)** 1 v 1 v 1 BFM is defined as visual setups in which 3 or more separate roles/sides are engaged in visual maneuvering at one time.

4.3. Bomber Aircraft Training Rules. This section applies to all bomber aircraft echelons of participating commands, all agencies under the operational control of HQ ACC and HQ Air Force Global Strike Command (AFGSC), and those units under ACC or AFGSC oversight. In addition, these procedures also apply to other services and foreign services with joint training agreements. The information and TRs in this chapter apply with the following exceptions and additions:

4.3.1. Special Procedures. Only conduct Air-to-Air training with armed aircraft (bomber or fighter) if all participants group commanders (or equivalent) approve the training. **(T-2)**

4.3.2. Training Rules.

4.3.2.1. MQT fighter aircrew will only participate in bomber Air-to-Air training with a supervisor or instructor in the aircraft. **(T-2)**

4.3.2.2. The maximum maneuvering category for bomber aircraft during all fighter activity will be LIMITED, except when further restricted by **paragraph 4.2.6**. **(T-2)** During operations below 500 feet AGL bomber maximum bank angle is 30 degrees. **(T-2)**

4.3.3. EA Activity During Air Defense Exercises. The exercise includes both EA and Air-to-Air training, and may be conducted in conjunction with each other or individually within a designated Training Area (TA). All EA activity will be conducted IAW CJCSM 3212.02E, Air Combat Command Instruction (ACCI) 10-707, *Electromagnetic Warfare Procedures*; AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212; applicable range guides; local Flight Crew Information File (FCIF); Notice to Airmen (NOTAMs); exercise SPINS; and this publication. **(T-2) Note:** CJCSM 3212.02E waiver is (T-0).

4.3.3.1. With Air Defense Sector (ADS) coordination and approval, the bomber may employ maximum EA and chaff against air and ground based radars, communications, or AWACS covering a designated TA.

4.3.3.2. The radar facilities may employ any or all Electronic Protection (EP) techniques, fixes, and equipment to counter bomber EA activity.

4.3.3.3. Bomber aircrew will contact the ADS/AWACS/GCI controlling the TA at least 15 minutes before jam-on. **(T-2)** See **Attachment 2** for coordination information.

4.4. Airlift Aircraft Training Rules. This section applies to all echelons of participating commands and to all agencies under the operational control of MAJCOMs with airlift aircraft. In addition, these procedures apply to joint training agreements with other services and foreign services. The provisions of this chapter apply with the following exceptions and additions:

4.4.1. Training Rules.

4.4.1.1. Weather Criteria and Maneuvering Limits.

4.4.1.1.1. Limit standard airlift formation flights to day/VMC conditions. **(T-2)** The maximum maneuvering category is LIMITED. Maximum bank angle is 60 degrees. **(T-2)**

4.4.1.1.2. Night. The maximum maneuvering category is RESTRICTED. Maximum bank angle is 45 degrees and no altitude changes are allowed. **(T-2)** Do not conduct night Air-to-Air training against airlift formation flights. **(T-2)**

4.4.1.1.3. IMC. Conduct Air-to-Air training in IMC only with Radar Warning Receiver (RWR) equipped airlift aircraft. **(T-2)** All aircraft must maintain continuous communications. **(T-2)** Limit evasive maneuvering to RESTRICTED maneuvers with a maximum of 45 degrees of bank and no altitude changes. **(T-2)** The minimum range for simulated ordnance delivery is 1 NM. **(T-2)**

4.4.2. Fighter aircrew will be CMR or BMC before conducting Air-to-Air training with airlift aircraft. **(T-2)**

4.5. Tanker Aircraft Training Rules. This section applies to all echelons of participating commands and to all agencies under the operational control of MAJCOMs with tanker aircraft. In addition, these procedures apply to joint training agreements with other services and foreign services. AFSOC assigned/gained aircraft and tanker aircraft operating under AFSOC lead command guidance will adhere to the procedures in **paragraph 4.6**. **(T-2)** The provisions of this chapter apply with the following exceptions and additions:

4.5.1. General.

4.5.1.1. Accomplish training within special activity airspace (e.g., ATCAA) or where ATC or Tac C2 (AWACS/GCI/ADS) provides radar coverage and can identify and provide separation from non-participating aircraft (e.g., MOA, restricted areas, warning areas, altitude reservation). **(T-2)**

4.5.1.2. Do not conduct Air-to-Air training against tanker aircraft during IMC conditions. **(T-2)**

4.5.1.3. Minimum altitude for tanker aircraft will be per guidance in applicable AFMAN 11-2MDSV3. Aircrew will compute a hard minimum MSL altitude using the above criteria. **(T-2)**

4.5.1.4. Tanker aircraft may operate in the UNLIMITED maneuvering category but will not exceed bank limitations specified in 11-2MDSV3 and applicable AFTTP 3-1 and 3-3. **(T-2)**

4.5.1.5. Fighter aircrew will be CMR or BMC before participating in Air-to-Air training with tanker aircraft. **(T-2)**

4.5.2. Composite Force Exercises and Large-Scale Training (e.g., Red Flag). The following rules apply to Air-to-Air training where more than 10 aircraft are operating in the assigned airspace. During exercises supervised by 509th Weapons Squadron (509 WS) the following requirements may be deleted at the discretion of 509th Weapons Squadron Commander (509 WS/CC).

4.5.2.1. Tanker aircraft will not depart assigned altitude blocks. **(T-2)**

4.5.2.2. Restrict maneuvering to level turns, with bank angle limits as specified in **paragraph 4.5.1.4**. **(T-2)**

4.5.2.3. Once turns are complete, tanker aircraft may descend within their assigned altitude block.

4.5.3. Small Scale Training (e. g., Composite Force Training Exercise, Dissimilar Air Combat Tactics training). The following rules apply to Air-to-Air training where a total of 10 or less aircraft are operating within the assigned airspace. During exercises supervised by 509 WS the following requirements may be deleted at the discretion of 509 WS/CC:

4.5.3.1. Restrict maneuvering to level turns, with bank angle limits as specified in **paragraph 4.5.1.4**. **(T-2)**

4.5.3.2. Once turns are complete, tanker aircraft may descend to no lower than the minimum altitudes specified in **paragraph 4.5.1.3**. **(T-2)**

4.6. Special Ops/Rescue Fixed-Wing Aircraft Training Rules. This section applies to all echelons of participating commands and to all other agencies under the operational control of MAJCOMs with Special Ops/Rescue fixed-wing aircraft. In addition, these procedures apply to training agreements with other services and foreign services.

4.6.1. Conduct Air-to-Air training in IMC only against AFSOC-assigned/gained aircraft and aircraft operated under AFSOC-lead command guidance with operational RWR. **(T-1)** All aircraft must maintain continuous communications. **(T-1)** Limit evasive maneuvering to RESTRICTED maneuvers with no altitude change. **(T-1)** Maintain 1000 feet altitude separation between participating aircraft. **(T-2)**

4.6.2. AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance equipped with a fully functional Terrain Following Radar (TFR) may conduct IMC intercepts in airspace approved for IMC TF down to TF system limits per guidance found in AFMAN 11-2MDSV3. Otherwise, conduct IMC intercept training no lower than the MSA for the area. **(T-2)**

4.7. Helicopter Training Rules. This paragraph applies to all echelons of participating commands and to all agencies under the operational control of MAJCOMs with rotary wing aircraft when at least one helicopter is participating in Air-to-Air training. In addition, these procedures apply to other services and foreign services with joint training agreements.

4.7.1. Training Rules.

4.7.1.1. Helicopters will maintain 200 feet vertical separation when “NO JOY”. **(T-2)**

4.7.1.2. Helicopter minimum separation for pre-briefed tail chase maneuvers during basic helicopter maneuver sorties is 200 feet. **(T-2)**

4.7.1.3. Helicopters may not enter or transition the altitude or block of an adversary unless one of the following conditions applies:

4.7.1.3.1. All adversaries are beyond 5 NM. **(T-2)**

4.7.1.3.2. “TALLY/VISUAL” is established on all aircraft in the group of interest and no conflict with other groups within 5 NM exists. **(T-2)**

4.7.2. Maneuvering Categories.

4.7.2.1. UNLIMITED. IAW **paragraph 4.2.6.2** with the following exceptions:

4.7.2.1.1. Minimum altitude is based on MDS-specific guidance.

4.7.2.1.2. Helicopter versus helicopter weather minimums are 1,000 feet vertical and 1 NM horizontal cloud clearance, 3 NM visibility, and discernible horizon.

4.7.2.2. LIMITED. IAW **paragraph 4.2.6.3**. **Exception:** During helicopter versus helicopter engagements, if neither aircraft can be clearly identified as the defender, the engagement will be terminated after the first aircraft reaches 360 degrees of turn post 3/9 passage. **(T-2)**

4.7.3. Additional Limitations.

4.7.3.1. Night. All night defensive maneuvering training will be LIMITED maneuver category and will comply with the appropriate AFMAN 11-2MDSV3 weather and altitude minimums. **(T-2)**

4.7.3.2. Fighter aircraft will remain subsonic during training conducted with helicopters. **(T-2)**

4.7.3.3. IMC intercepts will not be conducted on helicopters. **(T-2)**

4.8. Remotely Piloted Aircraft (RPA) Training Rules. This section applies to all agencies of participating commands and to all agencies under the operational control of MAJCOMs with RPA aircraft. The provisions of this chapter apply with the following exceptions and additions:

4.8.1. Fighter aircrew will be CMR/BMC, or MQT with an instructor or squadron supervisor in the aircraft, before conducting air-to-air training with RPAs. **(T-2)**

4.8.2. Maximum maneuvering category for RPAs is UNLIMITED as long as they remain within assigned altitude blocks. **(T-2)**

4.9. Air Defense and Low/Slow Visual Identification (VID) Procedures. This section provides guidance for Air Defense Tasking (All Altitudes) and MDS Low/Slow VID ready aircrew program (RAP) training specific events.

4.9.1. Fighter and trainer aircraft acting as training aids will:

4.9.1.1. Be NON-MANEUVERING**. (T-2)**

4.9.1.2. Fly no lower than 500 feet AGL. **(T-2)**

4.9.1.3. Abide by the airspeeds in **paragraph 4.9.3.6**. **(T-2)**

4.9.2. Vertical Separation. Aircrew will maintain a minimum of 1,000 feet vertical separation throughout the VID when directed to conduct a beam or front conversion. **(T-2)** Aircrew will use all available means to determine target altitude. **(T-2)** If unable to positively determine vertical separation by 10 NM, convert the intercept to stern geometry. **(T-2)**

4.9.3. Intercept Procedures. Apply the separation and airspeed minimums in this section after the intercept is complete and closure is under control. **(T-2)** Fighters performing a stern aspect intercept and rendezvous to VID will adhere to the following:

4.9.3.1. Maintain a minimum of 1,000 feet vertical separation between the fighter and target aircraft until positive radar or visual contact in the stern aspect of the target. **(T-2)**

4.9.3.2. If co-altitude, proceed no closer than 3 NM without visual contact unless positive radar contact provides target range, azimuth, and elevation. **(T-2)**

4.9.3.3. Proceed no closer than 1 NM without positive radar lock-on providing target range, azimuth, elevation, and closure rate. **(T-2) Exception:** the fighter may proceed inside 1 NM with a visual contact on the target during daylight conditions or at night with NVDs IAW **paragraph 4.2.8.4**.

4.9.3.4. Proceed no closer than 500 feet slant range without a visual contact or the minimum slant range specified in AFMAN 11-2MDSV3, whichever is greater. **(T-2)**

4.9.3.4.1. The fighter may move inside 500 feet slant range to the target if flight safety is not jeopardized and it is necessary to accomplish the mission (e.g., aiding an aircraft in distress or intelligence collection). In this case, the mission will dictate the maximum closure and minimum slant ranges required. **(T-2)**

4.9.3.5. Without a visual contact, do not proceed inside of 1 NM until attaining an approximate co-speed (a maximum of 50 knots closure) condition. **(T-2)**

4.9.3.6. Fighters will use the following limits below 5,000 feet AGL:

4.9.3.6.1. F-15: 22 units Angle of Attack (AOA). **(T-2)**

4.9.3.6.2. F-22: 12 degrees AOA. **(T-2)**

4.9.3.6.3. F-16 CAT I: 13 degrees AOA. **(T-2)**

4.9.3.6.4. F-16 CAT III: 200 Knots Indicated Airspeed (KIAS) or 13 degrees AOA when in takeoff and landing gains. **(T-2)**

4.9.3.6.5. F-35A: per AFMAN 11-2F-35A Volume 3, *F-35A—Operations Procedures*. **(T-2)**

4.9.3.7. Execute an immediate breakaway from the target if any of the following occurs:

4.9.3.7.1. Radar contact is lost with no visual contact and inside 3 NM. **(T-2)**

4.9.3.7.2. TALLY is lost and inside minimum range. **(T-2)**

Chapter 5

AIR-TO-SURFACE TRAINING

5.1. Introduction. This chapter describes procedures for tactical Air-to-Surface training. Use the procedures in this chapter along with operational command directives, ATC regulations, and letters of agreement. These weapons employment procedures provide aircrew and JTACs typical procedures for weapons employment under fixed conditions. For additional FTU or MQT restrictions and termination rules see **paragraph 5.4.8** Find further procedures for formal course training in the applicable syllabi. During joint and coalition air operations, AF aircrew will thoroughly brief other participants on the differences between their operating procedures and this publication. **(T-2)** For more information regarding ranges/definitions, refer to AFMAN 13-212V1.

5.2. Air-to-Surface Training Missions.

5.2.1. Perform all delivery passes (including jettison passes), whether hot or dry, using live ordnance delivery parameters to include fuse arming, safe escape, safe separation, and flight deconfliction considerations. **(T-2)**

5.2.2. Avoid populated areas to the maximum extent possible when carrying externally loaded inert or externally/internally loaded live ordnance. **(T-2)** For the purpose of this publication, AC-130 munitions in the ammunitions storage-and-handling systems and weapons carried by helicopters are not considered live ordnance.

5.2.3. Prior to first release when carrying expendable ordnance (live, inert, or training), final switch configuration for weapon release will not be accomplished until the aircraft is in such a position that any accidental release will be contained within the range. **(T-2)** MAJCOMs or theater Commander of Air Force Forces will develop specific guidance for armament system configurations for multiple passes. **(T-2)** Refer to aircraft specific AFMAN 11-2MDSV3 series operating procedures, AFMAN 13-212V1, MAJCOM and local range supplements to AFMAN 13-212V1, and applicable range guides for additional guidance.

5.2.4. Do not conduct simulated attacks against off-range or manned targets with internally/externally loaded live or inert ordnance. **(T-2)** This restriction does not apply to 20/25/30mm ammunition, BDU-33s, 2.75 inch TP / SP / WP / illumination rockets, illumination flares (e.g., LUU-2/19 and LUU-1/5/6), or non-expendable training assets (e.g., captive air-to-air and air-to-ground missiles, GBU-15 captive flight trainer, MQ-9 hard-wired inert GBU-38). Simulated attacks against off-range targets or manned targets are permitted with expendable training ordnance loaded on the aircraft only IAW applicable AFMAN 11-2MDSV3; AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212; applicable range guides; local FCIF; and NOTAMs. **(T-2)** For specific cockpit configurations and switch settings/actuations, reference AFMAN 11-2MDSV3. Simulated attacks off-range or against manned targets are prohibited if guidance is insufficient or a reasonable possibility exists that inadvertent/unintentional release may cause injury, death, or destruction of property. **(T-2)**

5.2.5. The use of “combat” laser mode of a laser designator is restricted to laser certified ranges. A listing of laser certified ranges can be obtained from Air Force Research Laboratory (AFRL) 711th HPW/RHDO. All air-to-surface laser operations on-range will be IAW AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212V1; applicable

AFMAN 11-2MDSV3; applicable range guides; local FCIF; and NOTAMs. **(T-2) Exception:** Off-range laser emissions are authorized if the system is in training mode and the training mode has been certified as "retinal-safe." Off-range laser emissions in non-training modes are authorized IAW the minimum slant range in **paragraph 5.6.3.1** Reference **paragraph 4.2.4.3** for further guidance on Air-to-Air Laser Employment.

5.2.5.1. When working with ground personnel, aircrew will inform them prior to employing lasers in the combat mode. **(T-2)** Upon acknowledgement, ground personnel will ensure proper eye protection is in place. **(T-2)**

5.2.6. Aircraft employing Inertially Aided Munitions (IAMs) in bomb-on-coordinate mode or aircraft employing any ordnance in a system delivery mode on coordinates only will adhere to the following prior to release:

5.2.6.1. Aircrew will confirm the accuracy of the aircraft navigation and weapon delivery systems IAW MDS specific publications. **(T-2)** A process must be implemented to ensure correct weapon targeting has been verified by at least three independent checks "Triple Check" prior to weapon release. **(T-2)**

5.2.6.2. Aircrew will ensure accurate receipt and entry of target coordinates and confirm they come from a valid target source. **(T-2)** These coordinates will be verified via read-back from target data entry displays or will be cross-checked with mission planning data, range guides, or visual/sensor confirmation of target with a valid target source. **(T-2)** Aircrew will verify correct data is selected prior to the "IN" call. **(T-2)** Examples of valid target sources include but are not limited to Range Control Officers (RCOs); JTACs; MAJCOM and local supplements to AFMAN 13-212V1; applicable range guides; local FCIF; NOTAMs; or FAC(A) qualified aircrew, or the coordinates may be generated on-board the aircraft and then entered into the weapon/steer point/waypoint (as appropriate per weapon and platform).

5.2.6.3. Aircrew will use all means available to verify accuracy of target coordinates/elevation, and that the coordinates are within the anticipated target area. **(T-2)** Examples of available means include but are not limited to; Targeting Pod (TGP), Forward Looking Infrared (FLIR), radar, Synthetic Aperture Radar map, HUD cueing, other aircraft sensors, terrain pointers, map plots, data links, radio communications, talk-on with JTACs, RCOs, other aircrew members, etc.

5.2.6.4. Aircrew will confirm and adhere to published range operating procedures and restrictions (e.g., Local Instruction 11-250 series; local supplements to AFMAN 13-212V1; local FCIF; NOTAMs), including any additional MDS-specific weapons delivery requirements (e.g., applicable AFTTP 3-1; applicable TO 1-1M34s; applicable AFMAN 11-2MDSV3). **(T-2)**

5.2.7. When ordnance is employed, minimum safe distances for personnel from all targets will comply with Weapon Danger Zone (WDZ) footprints as described in AFMAN 13-212V1 or local directives (e.g., Local Instruction 11-250 series; MAJCOM and local supplements to AFMAN 13-212V1; applicable range guides; local FCIF; NOTAMs), whichever are more restrictive. **(T-2)** Air Combat Command Airspace Ranges and Airfield Operations (ACC/A3A) is the USAF executive agent for procuring and modifying WDZ weapon safety footprints.

5.2.7.1. CAS/Air-to-Ground **Exception:** If training requires personnel to be inside Hazard Area or Impact Area, Tactical Air Control Parties (TACP), JTACs, aircrew, or other briefed participants in CAS/air-to-ground training may use the Minimum Safe Distances (MSDs) for Ground Parties (Training Use Only: Live Fire) provided in AFTTP 3-2.6 *JFIRE: Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Firepower* (available at the ALSA Web site (**www.alsa.mil**)). If unable to comply with MSD assumptions outlined in JFIRE, personnel will then use WDZ distances as outlined above. **(T-2)**

5.2.7.2. Do not mistake MSDs with Risk Estimate Distances (REDs) defined in Joint Publication 3-09.3, *Close Air Support* and listed in AFTTP 3-2.6, REDs are for combat use only. **(T-2)**

5.2.8. For missions falling under the Joint Live Fire Exercise definition, refer to **Attachment 4** for additional guidance.

5.3. Authorized Employment Patterns.

5.3.1. Class A Range. Aircraft within a flight will fly the same delivery pattern (rectangular, pop attacks, etc.); however, aircrew may mix events or delivery modes when using the same target, same type delivery, and if approved by the RCO. Fly radio-silent attacks, random attacks, element tactics, split pop-up attacks, etc., only if allowed by range procedures (e.g., local Instruction 11-250 series; AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212V1; applicable range guides; local FCIF; NOTAMs), if prebriefed, and if approved by the RCO. **(T-2)**

5.3.2. Class B/C Range. Aircraft are not required to execute any specific pattern. Refer to local range procedures (e.g., local Instruction 11-250 series; AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212V1; local FCIF; NOTAMs) for any further guidance.

5.4. Air-to-Surface Training Rules. See **paragraph 5.7** for additional night rules.

5.4.1. Weather Minimums. (USAF helicopters follow the applicable AFMAN 11-2MDSV3 and the applicable MAJCOM supplement):

5.4.1.1. For VMC operations below the weather, the ceiling must be 1,500 feet AGL, or at least 500 feet above the highest portion of the weapons delivery pattern, whichever is higher. **(T-2)** (N/A for fixed wing level deliveries above 5,000 feet AGL). For VMC operations above the weather, maintain VMC. For rotary wing operations the ceiling must be 800 feet AGL or at least 500 feet above the highest portion of the weapons delivery pattern, whichever is higher. **(T-2)**

5.4.1.1.1. Visibility will be at least 3 NM for fixed-wing and 2 NM for helicopters (USAFE 5 Kilometer (KM) for fixed-wing and 3.5 KM for helicopters). **(T-2)**

5.4.1.1.2. Daylight weapons delivery events on over water ranges require a discernible horizon unless TF/TA equipped. **(T-2)**

5.4.1.2. For IMC deliveries, level deliveries above 5,000 feet AGL and/or TF/TA operations, the ceiling and visibility must be IAW applicable AFMAN 11-2MDSV3; AFMAN 13-212V1; MAJCOM and local range supplements to AFMAN 13-212V1; applicable range guides; local FCIF; and NOTAMs. **(T-2)**

5.4.2. Range Entry.

5.4.2.1. Before weapons delivery on Class B/C ranges, positively identify the authorized target and confirm the target area is clear of unauthorized persons or vessels (with on board or remote sensors, or via reports from authorized sources). **(T-2)** Range personnel, to include those who directly observe or use remote scoring cameras, FAC(A)/JTAC, Inspector General (IG) chase aircraft, departing flights or other aircraft sharing the range are authorized sources that may be used to ensure the target area is clear. If the target area cannot be cleared by these means, perform a dry clearing pass/dry First Run Attack (FRA) before weapons delivery. **(T-2)**

5.4.2.2. If planning a weapons delivery requiring visual acquisition of the target (e.g., visual delivery, TGP, FLIR delivery), accomplish a dry familiarization pass when an aircrew has not been on that range for more than 1 year. **(T-2)** Aircrew will familiarize themselves with range boundaries, target locations, and friendly locations on the range. **(T-2)** If the familiarization pass is flown as a dry FRA, aircrew must familiarize themselves with the range and the range must still be cleared as stated above prior to expending ordnance. **(T-2)** See **paragraph 5.7** for additional night restrictions and **Attachment 4** for additional joint live fire exercise restrictions. Units participating in a scheduled and monitored air-to-ground Weapons System Evaluation Program (WSEP) are exempt from this paragraph. **(T-2)**

5.4.3. Conventional range pattern operations. Conventional range pattern operations are limited to a maximum of four attacking aircraft at any one time.

5.4.4. Single-Ship Operations. (N/A for RPA/helicopters).

5.4.4.1. Qualified FAC(A)s and CMR/BMC flight leads may perform:

5.4.4.1.1. Full mission profiles while single-ship per guidance in applicable AFMAN 11-2MDSV3 procedures.

5.4.4.1.2. Low altitude tactical navigation (LATN) to their minimum altitude certification.

5.4.4.2. CMR/BMC aircrew that don't qualify for **paragraph 5.4.4.1** May perform:

5.4.4.2.1. On Class A Ranges, deliveries for which they are certified.

5.4.4.2.2. On Class B/C Ranges:

5.4.4.2.2.1. Aircrew must have instructor supervision for deliveries in which that aircrew is not certified. **(T-3)**

5.4.4.2.2.2. Under control of a JTAC/FAC(A), may execute deliveries for which aircrew are certified.

5.4.4.2.2.3. Without a JTAC/FAC(A), may execute deliveries which aircrew are certified, with a minimum recovery altitude of 1,000 feet AGL. **(T-3)**

5.4.4.3. MQT/IQT aircrew may perform:

5.4.4.3.1. Conventional and nuclear deliveries only if there is an instructor or squadron supervisor in the aircraft. For multi-specialty crewed aircraft (e.g., B-1, B-52, F-15E) weapons-qualified non-specialty instructors may supervise a live or inert weapons

delivery provided the MQT/IQT crewmember has previously completed training requirements for that specific weapon with an instructor of like specialty.

5.4.4.3.2. May fly a single-ship mission to an appropriate range and release ordnance on one, non-tactical pass above the fragmentation envelope derived from Conventional Weapons Delivery Software (CWDS) to preclude landing with live or inert ordnance.

5.4.5. Switch Changes. Range restrictions permitting, cockpit switch changes that are accomplished by the pilot flying the aircraft will be made prior to the final attack heading unless normally required for system-aided deliveries or tactics (N/A for Hands on Throttle and Stick). **(T-2)**

5.4.6. Minimum Altitudes. See **paragraph 5.7** for additional night minimums.

5.4.6.1. Determine minimum release and recovery altitudes by using established applicable AFTTP 3-1. series for procedures, fuzing and fragmentation envelopes, and the weapon delivery minimum altitudes established by applicable AFMAN 11-2MDSV3 series guidance; TO 1-1M-34, *Aircrew Weapons Delivery Manual (Nonnuclear)*; AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212V1; CWDS; local supplements to 11-250 series; applicable range guides; local FCIF; NOTAMs; and this publication, whichever are higher. **(T-3)**

5.4.6.2. In addition to the minimum altitudes established in the applicable AFMAN 11-2MDSV1 guidance, apply the following minimum altitudes:

5.4.6.2.1. Level Deliveries: 200 feet AGL (50 feet AGL for helicopters, N/A for hover fire). **(T-3)**

5.4.6.2.2. Low Angle High Drag (LAHD): 300 feet AGL on a Class B/C. **(T-3)**

5.4.6.2.3. Nuclear and Radar Events: 200 feet AGL. **(T-3)**

5.4.6.2.4. Low Angle Strafe/Long Range Strafe/Two Target Strafe (LAS/LRS/TTS): 75 feet AGL (50 feet AGL for helicopters). **(T-3)**

5.4.6.3. Pilots will not descend below their designated low-level category at any time (for example, conventional downwind, approach to a pop-up point) unless on final for low angle bombing, low angle rockets, level bombing, and LAS/LRS/TTS attacks. **(T-2)**

5.4.6.4. For nuclear weapons delivery patterns, use a minimum of 1,000 feet AGL on downwind except when operating with a TF/TA system. **(T-3)**

5.4.7. Abort Criteria. Along with the general criteria set in **paragraph 3.4** (KIO and Terminate Procedures), cease-fire, and/or abort the pass and do not release if any of the following situations occur:

5.4.7.1. If friendly troops and/or JTAC position near target area is inside minimum distance restrictions or friendly position cannot be confirmed. (See **paragraph 5.2.7**) **(T-0)**

5.4.7.2. If over water and the discernible horizon or the land-water contrast is lost (N/A for AC-130s, helicopters, or aircraft with a TF/TA system). **(T-2)**

5.4.7.3. If unable to positively identify the target or confirm correct target coordinates for Inertially-Aided Munitions (IAM) deliveries or system deliveries in coordinate only mode.

Reference appropriate AFMAN 11-2MDSV3 for positive identification and/or target coordinate confirmation criteria. **(T-0)**

5.4.7.4. If at any point in the delivery, the aircrew maneuvers the aircraft in a manner that invalidates the available abort cues. **(T-3)**

5.4.7.5. For A-10 aircraft, if aircraft is within 3,000 feet slant range from a hard target during LRS/LAS/TTS. **(T-2) Note:** Aircraft will not approach within 500 feet or cross the 3-9 line of any hard target being shot during aircraft recovery. **(T-2)**

5.4.8. FTU and MQT Restrictions and Termination Rules (N/A for helicopters).

5.4.8.1. Students will not change targets once initiating roll-in to final except during TTS. **(T-2)**

5.4.8.2. Pop-up Restrictions:

5.4.8.2.1. Terminate a pop-up attack if the actual pull-up point is inside the planned pull-up point. **(T-3)**

5.4.8.2.2. Do not perform pop-up attacks from fighting wing or closer position. **(T-3)**

5.4.8.2.3. Terminate the pass if the roll-in will require less than 15 degrees or more than 90 degrees of turn. **(T-2)**

5.4.8.3. Low-Altitude Navigation and Targeting Infrared for Night students will fly direct pop-up attacks only when engaged in syllabus directed training missions. **(T-2)**

5.4.9. Weapons Delivery Spacing.

5.4.9.1. For actual or simulated tactical deliveries, aircrew must ensure minimum spacing and attack geometry meet TO 1-1M-34 deconfliction requirements (e.g., aircraft to aircraft, aircraft to weapons); local Instruction 11-250 series; AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212V1; applicable range guides; local FCIF; and NOTAMs; whichever is more restrictive. **(T-2)** Use TO 1-1M-34 or CWDS to determine minimum spacing when employing ordnance. **(T-3)**

5.4.9.2. Use the following minimum spacing on final during level or climbing deliveries with training ordnance in a basic surface attack conventional or radar pattern:

5.4.9.2.1. Level/Diving - Minimum formation deconfliction spacing time for the ordnance simulated or 15 seconds, whichever is greater. **(T-3)**

5.4.9.2.2. Climbing/Loft/Toss - 30 seconds. **(T-3)**

5.4.9.2.3. When subsequent aircraft conduct a delivery that requires target over flight following a climbing delivery by a preceding aircraft, use bomb time-of-fall from release plus 30 seconds to ensure the subsequent aircraft crosses the target after bomb impact. **(T-3)**

5.4.10. Fouls.

5.4.10.1. Assess a foul for any of the following reasons:

5.4.10.1.1. Violation of flight or range safety. **(T-3)**

5.4.10.1.2. If an aircraft passes below the minimum recovery cue/altitude as established in the applicable AFMAN 11-2MDSV3 or this publication for the event being flown. **(T-3)**

5.4.10.1.3. An unintentional double-firing burst versus a single target or strafing past the foul line. **(T-3)**

5.4.10.1.4. A lazy recovery from a LAS/LRS/TTS pass resulting in the aircraft descending below 75 feet. **(T-3)**

5.4.10.1.5. Aircraft expending on wrong target. **(T-3)**

5.4.10.1.6. Aircraft expending ordnance without clearance. **(T-3)**

5.4.10.2. Aircrew will not perform further deliveries after receiving a second foul on the range or a single dangerous foul, or as determined by the RCO or flight lead. **(T-2)**

5.4.11. Last Strafe Pass Procedure. (N/A for helicopters) The last strafe pass will be dry unless each aircraft accomplishes an escape maneuver and an immediate turn after recovery. **(T-2)** If performing a dry pass, check switches in SAFE, SIM, OFF, or equivalent position before initiating the last pass. **(T-2)**

5.4.12. Armament Safety Procedures.

5.4.12.1. After completing weapon deliveries, flight leads will reform their flights, ensure an armament safety check has been accomplished by each flight member, and perform a battle damage check. **(T-2)** Check the master arm switch in the SAFE, SIM, OFF, or equivalent position, and use the weapons panel or Head Up Display (HUD) to verify the Weapons Safe position. **(T-2)** Flight leads will ensure that each flight member verbally confirms switches are safe. **(T-2)** Battle damage checks are not required at night or in IMC.

5.4.12.2. If unable to confirm ordnance expenditure on the range, perform a visual bomb check. The aircrew, RCO, JTAC, B-1 Stores Management System, B-2 Mission Management System, B-52 Stores Management Overlay for MIL-STD-1760 weapons, or another flight member can all confirm ordnance expenditure. If visual confirmation is not feasible (for example, night), follow hung ordnance or unconfirmed hung ordnance procedures. **(T-2)**

5.4.13. Recovery From Delivery. Execute recoveries from weapons deliveries according to safe escape maneuvers described in the applicable TO series 1-34-1-1 aircraft-specific TOs. Recoveries will observe minimum altitudes consistent with safe escape, fuse arming, and the weapon delivery minimum altitudes established by the applicable AFMAN 11-2MDSV3 guidance; TO 1-1M-34; AFMAN 13-212V1; MAJCOM and local supplements to AFMAN 13-212V1; CWDS; local Instruction 11-250 series; applicable range guides; local FCIF; NOTAMs; and this publication, whichever are higher. Turning maneuver safe escapes resulting in a descending turn are not authorized. **(T-2)**

5.4.14. Flight Composition. A tactical unit possessing dissimilar fighters with integrated missions (e.g., Suppression of Enemy Air Defenses (SEAD) aircraft, buddy lasing) may employ as mixed elements when tactically sound.

5.4.15. Release Authority. Only a fully qualified RCO or a JTAC/FAC(A)/flight lead when approved by an RCO or applicable range order are authorized to allow ordnance release on a Class A/B/C range. **(T-2)**

5.5. Range Radio Procedures.

5.5.1. Radio Contact. Do not expend ordnance on a Class A or Class B/C manned range without two-way radio contact with the RCO or JTAC on duty. **(T-2)** Aircrew will acknowledge all applicable transmissions by the RCO or JTAC. **(T-2)**

5.5.2. Range Entry. Before weapons delivery on a Class A range (or when using scoring on a Class B range), flight leads will confirm the lineup and events. **(T-2)** The RCO will confirm range, traffic pattern (when applicable), altimeter setting, and strafe panel (when applicable). **(T-2)** The flight lead will read back the applicable range, traffic pattern, altimeter setting, and strafe panel. **(T-2)** Flight members acknowledge with call sign. **(T-2)**

5.5.3. Class A Range Standard Radio Calls.

5.5.3.1. Day Conventional.

5.5.3.1.1. "Call Sign, BASE."

5.5.3.1.2. "Call Sign, UP" (pop-up patterns only).

5.5.3.1.3. "Call Sign, IN" and add "DRY" if appropriate. Abort the pass without clearance to drop ordnance. (Day Conventional passes do not require an “OFF HOT” call). “IN DRY” radio calls should be used anytime a dry pass is intended with releasable munitions loaded on the aircraft, to include approved off range training.

5.5.3.1.4. "Call Sign, OFF, DRY" if intent was to release but no weapon was released.

5.5.3.2. Nuclear patterns and conventional bomber racetrack patterns:

5.5.3.2.1. "Call Sign, BASE."

5.5.3.2.2. "Call Sign, FINAL (Event) and add “DRY" if appropriate.”

5.5.3.2.3. "Call Sign, OFF HOT or DRY."

5.5.4. Modify radio calls on a Class B or C ranges to suit the tactical situation (for example, communications jamming). **(T-2)**

5.5.5. In addition to the clearance procedures in JP 3-09.3, the following clearance calls will be used by FAC(A)/JTAC/RCO and CMR/BMC flight leads during dry employment:

5.5.5.1. “CONTINUE DRY” used to provide clearance to aircraft for dry employment during a type 1 or type 2 control. **(T-2)**

5.5.5.2. “TYPE 3, CONTINUE DRY” used to provide clearance to aircraft for dry employment within the parameters imposed by the FAC(A)/JTAC during a type 3 control. **(T-2)**

5.5.5.3. The word "CLEARED", in conjunction with any ground attack commencement communication, will only be used when ordnance is actually to be delivered. **(T-2)** This will minimize the chances of dropping ordnance on dry passes. Non-standard calls must be avoided at all times. **(T-2)**

5.5.5.4. The word “DRY” will be added to communication as a confirmatory measure if aircraft is loaded with releasable ordnance. **(T-2)** This applies to “Commencing engagement [DRY]” (for type 3) and “IN [DRY]” (for type 1/2). **(T-2)**

5.6. Air to Ground Laser Employment.

5.6.1. Laser employment. Any reference to “Infrared (IR) pointer” is a reference to “IR Pointers,” “IR Markers,” “Laser Target Markers (LTM),” and “Illuminators.” Similarly, laser range finder/designator (LRD) will be used for LRD specific guidance. Some LRD have a combat mode and a training mode. The overarching term “laser operations” will be used for both IR pointer and LRD employment.

5.6.2. Aircrew Laser Eye Protection (ALEP) use. ALEP with side protection and appropriate for laser wavelength and Ocular Density (OD) must be worn when employing a Laser Command Pointer (LCP) in the cockpit, where a reflection hazard exists, or during a ground test. Aircrew must only use LEP listed in the Authorized Protective Eyewear List (APEL). **(T-1)**

5.6.2.1. Put on ALEP (when required) prior to removing the LCP safety cap. **(T-2)**

5.6.2.2. Aircraft commanders/flight leads will confirm LCP employing aircrew/flight members are wearing ALEP prior to anyone employing an LCP. **(T-2)**

5.6.2.3. Remove and stow ALEP prior to take-off, air-to-air refueling, and landing. (N/A for aircrew performing in-flight monitor duties.) **(T-2)**

5.6.2.4. Fixed-wing aircraft will separate themselves from IR pointer employing aircraft by the minimum Non-Ocular Hazard Distance (NOHD) in their MDS TOs (or guidance in **paragraph 5.6.3.1**), unless wearing ALEP with sufficient optical density for that laser. **(T-2)** ALEP optical density required for each laser is listed in its safety approval memo, available from AF Safety Center as well or the table referenced in **paragraph 5.6.3.1**.

5.6.2.5. Flight leads will ensure that each flight member verbally confirms IR pointers are safe when IR pointer use is terminated for the mission and the safety cap (handheld LCP only) is in place. **(T-2)**

5.6.3. Ground Party Safety.

5.6.3.1. Minimum Slant Range. Minimum laser employment slant range must be greater than the safety distances in the applicable TOs (such as the MDS specific TO 1-1M-34) or the range certification report’s **Attachment 1** tables, whichever is greater, unless ground personnel are confirmed to be wearing LEP approved for the laser in use. The Optical Radiation Safety office publishes updated tables for both USAF and US Navy certified lasers for each range certification (**Attachment 1** of every range certification report). These published tables may be used in place of applicable MDS TO guidance. Email the 711 Human Performance Wing United States Air Force Laser Safety Branch (711 HPW/RHDO) at **711HPW.RHDO.USAFLaserSafety@us.af.mil** to access the most updated table. This table lists the minimum NOHD for unaided viewing (no image magnification) and 7x50 binocular aided NOHD. Additionally, the table lists data to determine proper ALEP (wavelength, OD).

5.6.3.2. Personnel in the area. For IR pointers and LRDs, the area is defined as the area within the footprint of the IR pointer. Account for the elliptical shape downrange of the

laser. Every authorized laser system has a buffer angle accepted by the Directed Energy Safety Board (DESB). For aircraft mounted laser systems, this is typically 5 milliradians and can be greater for handheld LCPs.

5.6.3.2.1. If ground parties are equipped with LEP, laser operations are allowed above 1,000 feet AGL for fixed-wing aircraft. In this case, there is no minimum altitude for rotary-wing aircraft LCP employment provided the LCP is not pointed toward any aircraft, person or reflective surface. LEP must be rated to the specifications of the laser (defined in the "**Attachment 1**" table referenced in **paragraph 5.6.3.1**) in use. **(T-2)** Aircrew will notify ground personnel and other aircraft in the working area prior to employing a laser. **(T-2)** For specific missions that require minimal/no external comm, pre-mission coordination (when/where lasers will be used) satisfies this notification requirement. When required, ground personnel will ensure proper eye protection is in place. **(T-2)**

5.6.3.2.2. If ground parties do not have LEP (or LEP use is unknown), laser use is allowed when aircraft is greater than the NOHD. If ground parties can be confirmed (through radio communication or observation) that no image magnification devices are in use (e.g., binoculars), then use the "unaided NOHD" column. If image magnification is unknown or in use, then use the "7x50 binocular NOHD" column. LRD use on personnel in the area, even when greater than the minimum slant range, should be avoided unless the laser is in a "training" mode (if equipped).

5.6.3.3. Personnel not in the area. There are no minimum slant range or AGL restrictions for laser use, provided no risk exists of ground personnel entering the employment area.

5.7. Night Surface Attack Procedures. (USAF helicopters follow lead command guidance in aircraft specific AFMAN 11-2MDSV3 and associated MAJCOM supplements) See **paragraph 3.8** for additional guidance.

5.7.1. Night Weapons Deliveries. At night observe the following additional requirements (USAF helicopters follow lead command guidance in the applicable AFMAN 11-2MDSV3 and the applicable MAJCOM supplement):

5.7.1.1. Aircraft lighting will be full-up IAW **paragraph 3.8.2** unless operating in airspace designated for reduced, covert, or lights-out settings. **(T-2)** Aircraft operating in designated airspace may use lighting options IAW AFMAN 11-202V3, and any applicable waivers. **(T-2)**

5.7.1.2. If conducting training with an RCO/JTAC, the RCO/JTAC must have an illumination device to make his/her position readily discernible to NVD-equipped aircraft. **(T-2)** NVD aircraft will use external lighting that allows the RCO or JTAC to observe the aircraft in the pattern. **(T-2)** If aircraft are employing covertly or with lights out, the RCO/JTAC will be properly equipped and trained with NVDs. **(T-2)**

5.7.1.3. Minimum in-flight visibility for visual attacks is 5 NM (3 NM for helicopters). **(T-3)**

5.7.1.4. For visual deliveries, illuminate the target area with airborne flares or ground marking devices unless expending on a lighted target (Class A range). **(T-2)** Night radar

bombing, TGP, FLIR, Pave Penny, IR Maverick attacks, NVD, or B-52 aircraft do not require artificial illumination of the target (see **paragraph 5.7.2**).

5.7.1.5. Night Class B/C Dry Clearing Pass. Aircrew may perform a combination dry FRA, range clearing pass only during a level delivery at an altitude that will allow for positive clearing of the range, but no lower than outlined in **paragraph 3.8.3**. **(T-2)**

5.7.1.6. Operate no more than three aircraft, (or four FLIR or NVD-equipped aircraft) using Air-Air Tactical Air Navigation System (TACAN), Air-Air radar, or data-links in the same conventional pattern. **(T-2)** All conventional patterns will provide adequate spacing to allow aircrew to focus primarily on aircraft control vice aircraft deconfliction. **(T-2)**

5.7.1.7. Aircrew will not attempt to air score own-ship deliveries. **(T-2)**

5.7.2. Night Visual Weapons Delivery Pattern: (N/A for RPA, AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance and helicopters)

5.7.2.1. Maximum planned dive angle is 45 degrees. **(T-2)**

5.7.2.2. Minimum downwind altitudes will be 1,500 feet AGL or according to **paragraph 3.8.3**. **(T-2)**

5.7.2.3. Aircrew not utilizing TFR will begin their recoveries to ensure that their aircraft does not go below the following minimum altitudes:

5.7.2.3.1. NVD Equipped Aircraft:

5.7.2.3.1.1. 1,000 feet AGL for planned dive angles up to 45 degrees (HI). **(T-2)**

5.7.2.3.1.2. 1,000 feet AGL or MSA, whichever is higher for planned dive angles up to 45 degrees (LI). **(T-2)**

5.7.2.3.1.3. During LI conditions the use of artificial illumination devices (e.g., LUU-2, LUU-19, illumination rockets), may allow for use of HI recovery altitudes. The flight lead will make this determination based on the ability to identify terrain features and/or obstacles in the target area. **(T-2)**

5.7.2.3.2. Non-NVD Equipped Aircraft:

5.7.2.3.2.1. 2,000 feet AGL or MSA, whichever is higher for planned dive angles greater than 20 degrees up to 45 degrees. **(T-2)**

5.7.2.3.2.2. 1,000 feet AGL or MSA, whichever is higher for dive angles of 20 degrees or less. **(T-2)**

5.7.3. Night System Weapons Delivery Pattern. A "Night System" is a device that allows the aircrew to identify the target when normal visual acquisition is not possible.

5.7.3.1. RPA and aircraft equipped with TGP, FLIR, ground mapping radar, or NVD may fly events on class A, B or C ranges.

5.7.3.2. Minimum altitude on downwind is 1,500 feet AGL or MSA, whichever is higher. **(T-3)** Descend to release altitude when established on final. Range operations permitting, TF/TA equipped aircraft may operate at the applicable AFMAN 11-2MDSV3 limits.

5.7.3.3. Minimum spacing between deliveries is 60 seconds. **(T-3)** Bomber aircraft, TGP, FLIR or NVD equipped aircraft may use daylight rules of minimum spacing when operating with an Air-Air TACAN or Air-Air radar.

5.7.3.4. Maximum angle of bank during TGP recovery maneuvers from a loft or climbing safe escape is 135 degrees. **(T-3)** Descend no lower than MSA until within TF limits. **(T-3)**

5.7.4. Night Illumination Flare Procedures.

5.7.4.1. Computations. Plan the minimum altitude for flare release to ensure illumination flare burnout before ground impact. **(T-2)**

5.7.4.2. Class B and C Range radio procedures are same as day (see **paragraph 5.5**).

5.7.4.3. Dud Flare Procedures. If a dud flare is suspected, cease range operations until the flare is no longer a hazard. **(T-2)**

5.7.4.4. Determining Flare Release Points. Determine the release point by using a FAC(A)/JTAC, GPS/Internal Navigation System (INS) coordinates, radar vector, dead reckoning, computed systems Continuously Computer Release Point or by the RCO. **(T-2)** If position is uncertain, do not attempt a flare release. **(T-2)**

5.7.4.5. Flare Patterns. Flare patterns and procedures are variable. Timing during the flight break-up must position the first delivery aircraft on the downwind leg as the flare ship releases flares. Make flare drop and ordnance deliveries in any sequence that provides continuous illumination of the target area.

5.7.4.6. Flare Support Aircraft Coordination. Establish positive coordination between flare support aircraft, weapons delivery aircraft, and RCOs to ensure a mutual understanding and knowledge of the overall operation. **(T-2)** Specific briefing items will include:

5.7.4.6.1. Range entry, exit, and deconfliction procedures. **(T-2)**

5.7.4.6.2. Pattern altitude and direction. **(T-2)**

5.7.4.6.3. Expected number of flares dropped on each pass for each different event. **(T-2)**

5.7.4.6.4. Dud flare procedures. **(T-2)**

5.8. Live Ordnance Procedures.

5.8.1. Do not select live ordnance stations until within range boundaries and ready for delivery. **(T-3)** Do not arm delivery systems unless there is intent to expend and according to range procedures (e.g., .local Instruction 11-250 series, local supplements to AFMAN 13-212V1, local FCIF, NOTAMs). **(T-3)**

5.8.2. Weapons safety footprints and minimum safe distances for personnel from targets will be IAW **paragraph 5.2.7**. **(T-2)**

5.8.3. Following all live ordnance deliveries accomplish a bomb check and battle damage check at the earliest opportunity. **(T-2)**

5.8.4. For laser guided munitions, follow the procedures in **paragraph 5.6**. **(T-1)**

5.8.5. AGM-65 and AGM-114 Employment.

5.8.5.1. If multiple elements are in the formation, non-firing elements will maintain a position clear of the firing element and/or stacked high. **(T-2)**

5.8.5.2. If missile launch has not occurred before reaching minimum range, abort the pass. **(T-3)**

5.8.6. For missions falling under the Joint Live Fire Exercise definition in **Attachment 4**, refer to that attachment for additional guidance.

5.8.7. For employment of live IAMs during CAS, refer to **paragraph 5.2.6** for further guidance.

5.9. Operations with Naval Ships. The following additional rules apply during maritime training when not covered by published joint exercise SPINS.

5.9.1. The following restrictions govern flight in the proximity of non-participating ships:

5.9.1.1. Do not penetrate a 1 NM bubble vertically or horizontally. **(T-1)**

5.9.1.2. Do not fly more than two aircraft in the immediate vicinity. **(T-1)**

5.9.1.3. Do not perform any provocative or aggressive acts, or any acts which could be reasonably perceived as provocative or aggressive. **(T-1)**

5.9.1.4. Do not expend ordnance within 10 NM. **(T-1)**

5.9.1.5. Limit use of non-participating surface ships to navigation practice setups only. Do not use nonparticipating surface ships with ordnance on-board. **(T-1)**

5.9.2. Rules during training with participating ships must be IAW pre-briefed naval SPINS for the ships concerned. **(T-2)** In no case will aircraft penetrate a 500-foot bubble around exercise ships. **(T-2)**

5.9.3. During multiple sector attacks, maintain a 1,000 feet minimum altitude differential between converging single aircraft. **(T-2)** Maintain a 2,000 feet differential between converging elements. **(T-2)**

5.9.4. A maximum of two aircraft will engage in near simultaneous attacks (10 seconds minimum spacing) on the same target. **(T-2)** The second aircraft must maintain visual contact. **(T-2)**

5.9.5. A maximum of four aircraft can attack a single target with a minimum of 20 seconds between elements. **(T-3)**

5.9.6. A maximum number of eight aircraft can attack a simulated Surface Action Group of two or more targets simultaneously. **(T-3)**

5.9.7. The minimum distance between simulated Surface Action Groups targets is 1 NM for simultaneous attacks. **(T-3)**

5.9.8. Aircrew will not attack targets outside their pre-briefed attack quadrant. **(T-2)**

5.9.9. Aircrew will not attack into reflected sunlight. **(T-2)**

5.10. Air Strike Control Procedures.

5.10.1. Air strikes during CAS operations will be conducted IAW JP 3-09.3 and must be controlled by a qualified FAC(A)/JTAC. **(T-0)** Personnel receiving formal FAC(A)/JTAC

upgrade training or receiving CAS familiarization training require supervision from a qualified FAC(A)/JTAC instructor while controlling air strikes in CAS training. **(T-2)** All non-JTAC qualified personnel (such as a Joint Fires Officer [JFO]) are required to identify themselves as non-JTAC qualified to aircrew during initial check-in (e.g., "Hog 01, this is Grunt 69, I am a JFO. I am not JTAC qualified."). **(T-2)** AC-130s and rotary wing aircraft do not require FAC(A)/JTAC control when conducting call for fire (CFF) training, however the event must be pre-briefed with all applicable players IAW the CAS coordination and briefing guide in **Attachment 3**. **(T-2)**

5.10.1.1. JTAC upgrade students controlling CAS assets under the direct supervision of JTAC-I are not required to transmit "I am not JTAC qualified" providing aircrew are briefed prior to the mission that upgrade student training is taking place.

5.10.1.2. Partner Nation JTAC/FACs that control air strikes will adhere to JP 3-09.3 CAS procedures and must be Certified and Qualified IAW the JTAC Memorandum of Agreement. **(T-0)** Any JTAC/FAC that does not have this qualification must be under the direct supervision of a US JTAC instructor to control air strikes in CAS training. **(T-2)**

5.10.2. Troop and target identification is critical. All available means (map plot, aircraft systems, target mark, target talk-on, etc.) will be utilized to positively identify the target. **(T-2)** Aircrew and JTACs will ensure the position(s) of friendly forces are deconflicted from ordnance footprints before expending IAW **paragraph 5.2.7**. **(T-2)** Aircrew must positively identify the location of friendly forces when they are located within the WDZ. **(T-2)**

5.10.3. JTACs shall wear protective gear IAW AFI 13-112 Volume1, *Joint Terminal Attack Controller (JTAC) Training Program*. **(T-2)**

5.10.4. Aircraft Deconfliction.

5.10.4.1. When using altitude deconfliction, the following guidance will apply:

5.10.4.1.1. A minimum of 1,000 feet vertical separation between altitude blocks is required at or above 5000 feet AGL. **(T-2)**

5.10.4.1.2. A minimum of 500 feet vertical separation between altitude blocks is required below 5,000 feet AGL. **(T-2)**

5.10.4.1.3. Aircraft will verbally confirm all altitude restrictions. **(T-2)**

5.10.4.2. Aircraft will not transit or exit the assigned altitude, altitude block, or deconfliction sector, and will not employ weapons unless cleared or acknowledged by FAC(A)/JTAC. **(T-2)**

5.10.4.3. If timing is used for deconfliction, aircrew will inform the JTAC/FAC(A) if planned timing will not be met. **(T-2)**

5.10.4.4. {N/A for RPA} In addition to on-board systems and the established deconfliction plan, each participant must use "see and avoid" techniques. **(T-2)**

5.10.4.5. Aircrew will initiate a "TERMINATE" or "KNOCK IT OFF" IAW **paragraph 3.4** criteria if deconfliction is in question. **(T-2)**

5.10.5. JTACs own the final release clearance authority. If JTACs choose to relinquish the final release clearance authority (e.g., to FAC(A)), JTACs must ensure that a clear, concise, and positive handoff occurs with a current and qualified air/ground controller. **(T-0)**

5.10.6. All players have the authority and responsibility to call "KNOCK-IT-OFF" or abort the pass if they deem safety to ground crews or other airborne aircraft is in jeopardy.

5.11. Operations with JSTARS. The following additional procedures apply during Air-to-Surface missions with JSTARS: (**Note:** In the absence of JSTARS or other applicable agencies, AWACS/Control and Reporting Center (CRC) may conduct C2 of CAS)

5.11.1. JSTARS has no inherent identification capability. All target identification requires off-board cross-cueing.

5.11.2. JSTARS does not provide positive-radar control of aircraft. JSTARS provides procedural control of aircraft using time, altitude, geographic (lateral) separation, and data links for aircraft deconfliction. The deconfliction method may be delineated in the ACO, SPINS, AFTTP 3-3, *Integrated Planning and Execution*, or real-time tactical briefs.

5.11.3. JSTARS will not provide airspace monitoring. Maintaining airspace confines is an aircrew responsibility. **(T-2)**

CHARLES S. CORCORAN, Maj Gen, USAF
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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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AF Form 813, *Request for Environment Impact Analysis*

DAF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

A/A—Air to Air

A/S—Air to Surface

ABM—Air Battle Manager

ACC—Air Combat Command

ACCI—Air Combat Command Instruction

ACM—Airspace Control Measure

ACA—Airspace Coordination Area

ACO—Airspace Control Order

ACP—Airspace Control Plan

ADS—Air Defense Sector

AF—Air Force

AFGSC—Air Force Global Strike Command

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AFRL—Air Force Research Laboratory

AFSOC—Air Force Special Operations Command

AFTTP—Air Force Tactics, Techniques, and Procedures

AGL—Above Ground Level

AGTS—Aerial Gunnery Target System

ALEP—Aircrew Laser Eye Protection

ALO—Air Liaison Officer

ALSA—Air, Land, Sea, Application Center

ALTRV—Altitude Reservation

ANG—Air National Guard

AOA—Angle of Attack

ATC—Air Traffic Control

ATCAA—Air Traffic Control Assigned Airspace

ATM—Air Training Missile

ATP—Allied Tactical Publication

AWACS—Airborne Warning and Control System

BFM—Basic Fighter Maneuvers

BMC—Basic Mission Capable

C2—Command and Control

CAS—Close Air Support

CATM—Captive Air Training Missile

CATS—Combat Air Training Services

CFF—Call for Fire

CMR—Combat Mission Ready

CRC—Control and Reporting Center

CWDS—Conventional Weapons Delivery Software

DAFI—Department of the Air Force Instruction

DEWLTE—Directed Energy Weapon Laser Threat Emitter

DLO—Desired Learning Objective

DoDI—Department of Defense Instruction

EA—Electromagnetic Attack

EMCON—Emission Control

EP—Electromagnetic Protection

FAA—Federal Aviation Administration

FAC(A)—Forward Air Controller-Airborne

FCIF—Flight Crew Information File

FEBA—Forward Edge of the Battle Area

FLIR—Forward Looking Infrared

FOD—Foreign Object Debris

FRA—First Run Attack

FTU—Formal Training Unit

G—Gravity (Units compared to earth's gravitational force)

GCI—Ground Controlled Intercept

GLO—Ground Liaison Officer

GPS—Global Positioning System

HI—High Illumination

HUD—Heads-Up Display

IAM—Inertially-Aided Munitions

ICAO—International Civil Aviation Organization

IFF—Identification, Friend or Foe

IG—Inspector General

IMC—Instrument Meteorological Conditions

INS—Inertial Navigation System

IQT—Initial Qualification Training

IR—Infrared

JAAT—Joint Air Attack Team

JFO—Joint Fires Officer

JSTARS—E-8, Joint Surveillance Target Attack Radar System

JTAC—Joint Terminal Attack Controller

JTIDS—Joint Tactical Information Distribution System

JU—Joint Tactical Information Distribution System/Multifunctional Information Distribution System Unit

KIAS—Knots Indicated Airspeed

KIO—Knock-It-Off

KM—Kilometer

LAHD—Low Angle High Drag

LAS—Low Angle Strafe

LATN—Low Altitude Tactical Navigation

LCP—Laser Command Pointer

LFE—Large Force Exercise

LI—Low Illumination

LOS—Line of Sight

LRD—Laser Range Finder/Designator

LRS—Long Range Strafe

LTM—Laser Target Marker

MAJCOM—Major Command

MDS—Mission Design Series

MIDS—Multifunctional Information Distribution System

MOA—Military Operations Area

MQT—Mission Qualification Training

MSA—Minimum Safe Altitude

MSD—Minimum Safe Distance

MSL—Mean Sea Level

N/A—Not Applicable

NFA—No-Fire Area

NLT—No Later Than

NM—Nautical Mile

NOHD—Non-Ocular Hazard Distance

NOTAM—Notice to Airmen

NVD—Night Vision Device

OD—Ocular Density

OPLAN—Operation Plan

OPORD—Operation Order

OPR—Office of Primary Responsibility

PACAF—Pacific Air Forces

PIREP—Pilot Weather Report

POM—Plane of Motion

PTM—Pilot Training Missile

RAP—Ready Aircrew Program

RCO—Range Control Officer

RED—Risk Estimate Distance

ROE—Rules of Engagement

ROVER—Remotely Operated Video-Enhanced Receiver

RPA—Remotely Piloted Aircraft

RTO—Range Training Officer

RWR—Radar Warning Receiver

SA—Situational Awareness

SARDOT—Search and Rescue Dot

SEAD—Suppression of Enemy Air Defenses

SIF—Selective Identification Feature

SPINS—Special Instructions

STRATCOM—Strategic Command

TA—Training Area

TA—Terrain Avoidance

TACAN—Tactical Air Navigation System

TACP—Tactical Air Control Party

TACS—Theater Air Control System

TF—Terrain Following

TFR—Terrain Following Radar

TGP—Targeting Pod

TO—Technical Order

TPT—Target Practice Tracer

TR—Training Rule

TTS—Two Target Strafe

US—United States

USA—United States Army

USAF—United States Air Force

USAFE—United States Air Forces in Europe

USN—United States Navy

VECP SD—Value Engineering Change Proposal Smokey Devil

VFR—Visual Flight Rules

VID—Visual Identification

VMC—Visual Meteorological Conditions

WD—Weapons Director

WDZ—Weapon Danger Zone

WSEP—Weapons System Evaluation Program

Office Symbols

509 WS/CC—509thWeapons School Commander

711 HPW/RHDO—Human Performance Wing United States Air Force Laser Safety Branch

ACC/A3—Air Combat Command Directorate of Operations

ACC/A3A—Air Combat Command Airspace Ranges and Airfield Operations

ACC/A3T—Air Combat Command Flight Operations and Training Division

ACC/A3TW—Air Combat Command Weapons and Tactics Branch

AF/A3T—Air Force Training and Readiness Directorate

JSpOC/LCH—Joint Space Operations Center Laser Clearing House

Terms

Adversary—An aircrew or aircraft flying as an opponent during Air-to-Air training.

Air Combat Tactics—Training in the application of BFM and Airspace Control Measure (ACM) skills to achieve a tactical Air-to-Air objective.

Air Combat Training (ACT)—A general term that includes Dissimilar BFM, Dissimilar ACM, and Dissimilar ACT.

Attacker—Air-to-Air: An aircraft simulating carrying Air-to-Air ordnance engaged in offensive maneuvering. Air-to-Surface: An aircraft in the process of delivering Air-to-Surface ordnance.

Bomb on Coordinate—Air-to-Ground: A method of attack in which aircraft/aircrew will employ weapons on specified coordinates such as those passed in a CAS brief. (JP 3-09.3)

Bomb on Target—Air-to-Ground: A method of attack in which aircraft/aircrew will acquire the target or intended aimpoint using the best method available. (JP 3-09.3)

Class A Range—A manned range as defined in AFMAN 13-212V1, providing a ground-scoring and/or electronic warfare capability with a range control officer present and controlling surface activities and air-to-ground operations.

Class B Range—A manned or unmanned range with scoring and/or electronic warfare capability, but either no range control officer is present or a remotely-sited range operation center monitors air and ground operations and provides scoring feedback.

Class C Range—An unmanned range with no scoring, electronic warfare, or control capability.

Class D Range—An instrumented range supporting operations monitored by a Range Training Officer.

Class T Range—A manned or unmanned range or test site intended for test activities and explosives/weapons detonations and controlled by the range operating authority.

Close Air Support (CAS)—Air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. Also called CAS. (*Department of Defense Dictionary of Military and Associated Terms*)

Communications Jam/Jamming—Attempt to interrupt communication.

Composite Force—Multiple flights of the same or different MDS aircraft, each under the direction of its own flight leader performing the same or different roles.

Contract Air Training Services—Adversary Air, air services in support of JTAC/controller training, or any other services of contractor owned/operated airborne platform for the purpose of supporting USAF training.

Defender—Any type of aircraft attempting to defeat or deny an adversary's weapons employment.

Element—A flight of two aircraft.

Element Pop—up—A two ship pop-up attack where the wingman's only reference is the flight lead.

FIGHTS ON—To begin an engagement or war or to restart an engagement or war after a KNOCK-IT-OFF or TERMINATE.

Flag Exercises—Named major exercises (e.g., Red Flag, Maple Flag)

Forward Air Controller—An officer (aviator/pilot) member of the tactical air control party who, from forward ground or airborne position, controls aircraft in close air support of ground troops. Also called FAC. (*Department of Defense Dictionary of Military and Associated Terms*)

Forward Air Controller (Airborne)—A specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support of ground troops. The forward air controller (airborne) is normally an airborne extension of the tactical air control party. Also called FAC(A). (*Department of Defense Dictionary of Military and Associated Terms*)

High Illumination—A minimum of 2.2 millilux illumination derived from natural or artificial sources (unless defined otherwise in aircraft specific AFMAN 11-2MDS series instructions).

Hung Ordnance—Any item attached to the aircraft for the purpose of dropping or firing which has malfunctioned or failed to release. In addition, hung ordnance includes the following items: (1) External fuel tanks after unsuccessful jettison attempt; (2) Remaining ordnance after an inadvertent release; (3) 20/25/30 millimeter ammunition after a gun malfunction (no fire, unplanned cease fire, runaway gun, or gun unsafe indication); (4) Any stores determined to be in an unsafe condition.

Intercept—The phase of an Air-to-Air mission between the commit and the engagement when the fighter executes a series of maneuvers using ground controlled intercept, Airborne Warning and Control System, on board systems, or dead reckoning, to place the aircraft or flight in a position to employ Air-to-Air ordnance, make a visual identification, or initiate a visual engagement.

Inadvertent Release—Uncommanded fired or dropped ordnance. If commanding a single release, do not consider a double bomb release as an inadvertent release if the releases occur from a practice bomb dispenser.

Inert Ordnance—Ordnance with no explosive or incendiary material, including full-scale practice bombs (e.g., BDU-50, BDU-56). This does not include sub-scale practice munitions (e.g., BDU-33).

Jettison—The selective release of stores from an aircraft for other than a normal attack.

Joint Live Fire Exercise—Defined CAS or FAC(A) sorties flown in support of maneuver units that involved aircraft dropping, firing, and/or expending objects/projectiles. These exercises will involve members of more than one service.

Joint Terminal Attack Controller (JTAC)—A qualified (certified) service member who, from a forward position, directs the action of combat aircraft engaged in close air support and other offensive air operations. A qualified and current JTAC will be recognized across the Department of Defense and Joint Partners that meet qualification and certification requirements as capable and authorized to perform terminal attack control.

Live Ordnance—Combat type ordnance incorporating explosive or incendiary material. Do not consider self-protection flares, night illumination flares and spotting charges as live ordnance.

Lost Link (RPA)—Aircraft is no longer under the control of a ground station pilot.

Lost Link Profile—Pre-programmed flight profile a RPA flies when Lost Link occurs.

Low Altitude—Below 5,000 feet AGL.

Low Altitude Tactical Navigation—Low altitude training using the fundamental aspects of dead reckoning and point-to-point low altitude navigation, with or without prior route planning.

Low—**Altitude Training—**Mission oriented operations in the low block altitude.

Low Illumination—Less than 2.2 millilux (unless defined otherwise in aircraft specific AFMAN 11-2MDSV3 instructions).

Minimum Safe Altitude (MSA)—An altitude that provides at least 1,000 feet of clearance above all obstacles within 4 NMs of the course to be flown in non-mountainous terrain, or 2,000 feet in mountainous terrain. (AFMAN 11-202V3).

Night—The time between the end of evening civil twilight and the beginning of morning civil twilight as published in the *American Air Almanac* (updated annually available at **https://aa.usno.navy.mil/publications/aira**), converted to local time.

Offensive Maneuvering—Maneuvers against an opponent to achieve weapons parameters.

Overwater Range—Range complex in which water immediately surrounds the target or desired mean point of impact and does not have sufficient land references to aid in determining the horizon during attack and safe escape maneuver.

Practice Ordnance—Ordnance specifically designed or modified for practice. BDU-33, BDU-38, BDU-48, MK-106, Air Training Missile (ATM), Captive Air Training Missile (CATM), Pilot Training Missile (PTM), and classify ball (or tracer – Target Practice Tracer [TPT]) gun ammunition as practice ordnance.

Range Control Officer—The person with primary responsibility for matters of range safety during aircraft operations, aircraft emergencies, and air and ground weapons fire activities occurring on the range.

Range Guide—A document that provides additional information that is unique to the range. It describes the ranges, targets, authorized ordnance and weapons delivery restrictions not found in either AFMAN 13-212V1 or its MAJCOM and local supplements.

Range Training Officer—The person responsible for monitoring Air-to-Air training on a Class D range to include; aircraft communication, shot/kill calls, airspace, and safety procedures.

Release—The intentional separation of a free-fall aircraft store, from its suspension equipment, for purposes of employment of the store.

Rules of Engagement (ROE)—Directives issued by competent military authority that delineate the circumstances and limitations under which US forces will initiate and/or continue combat engagement with other forces encountered.

Situational Awareness (SA)—The level the warfighter/aircrew is able to recognize, process, and react to both external and internal factors in a dynamic environment to increase lethality, survivability, and mission effectiveness.

Special Instructions (SPINS)—Restrictions, procedures, and scenario elements applicable to specific scenarios, missions, or exercise.

Tactical Formation—Formations, as defined by AFTTP 3-1 and AFTTP 3-3, that provides mutual support.

Training Ordnance—Ordnance used in conduct of training. This includes practice ordnance, inert ordnance, and live ordnance.

Training Rules (TR)—Peacetime rules, procedures, and standards governing Air-to-Air and Air-to-Surface training that, when violated, jeopardize flight safety.

Unintentional Release—Ordnance fired or dropped through pilot error.

War Call—A call based on the weather call that sets the type of maneuvering category to be used.

Weather Call—A PIREP or call that will be used by an Airboss, Mission Commander or Flight Lead to make a war call.

Attachment 2

GENERAL RED COORDINATION AND BRIEFING GUIDE (USE FOR FACE-TO-FACE, TELEPHONIC, OR IN-FLIGHT COORDINATION)

A2.1. Date/Time

A2.2. Participants

A2.2.1. Units

A2.2.2. Contact Phone Numbers and Frequencies

A2.2.3. Number and Type Aircraft

A2.2.4. Call Signs

A2.3. Mission Commander / Deputy Mission Commander

A2.4. Airspace

A2.4.1. Scheduled Times

A2.4.2. Routing and Entry/Exit points

A2.4.3. Horizontal Boundaries

A2.4.4. Vertical Limits

A2.4.5. Minimum Safe Altitudes (MSA)

A2.4.6. Restrictions and Clearances (EA, EP, Chaff, Flare, Laser, and Ordnance)

A2.4.7. Controlling Agencies

A2.4.8. Emergency Bases

A2.4.9. Weather

A2.4.10. NOTAMs

A2.4.11. Airspace Lighting (night)

A2.5. Scenario SPINS

A2.5.1. Objectives (Scenario, Mission, and Training)

A2.5.2. Situation, State, and Stage of Alert, if applicable

A2.5.3. Type Aircraft Simulated

A2.5.4. Specify Ordnance Simulated, Live or Inert (Number and Type)

A2.5.5. Maneuvering Categories

A2.5.6. Points, Target Locations, Kill Boxes, Defended Areas, Home bases

A2.5.7. Surface Threats, Forward Edge of the Battle Area (FEBA), Safe Areas

A2.5.8. Vulnerability Times

A2.5.9. ROE (Hostile Acts, ID Criteria, Employment Constraints)

A2.5.10. Kill Criteria, Kill Passage, and other required briefing items IAW AFTTP 3-1.Shot Kill

A2.5.11. Adversary threat replication IAW ATRG

A2.5.12. Squawks

A2.5.13. Blocks

A2.5.14. Bullseye, Search and Rescue Dot (SARDOT) locations

A2.6. Communication Plan

A2.6.1. Frequencies, Have Quick, Secure, Chattermark, and Code Words

A2.6.2. Tactical Data Links: Table, Crypto, Time, NTR, Fighter Channel, Mission Channel, Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS) Unit (JU)#, and Track Blocks

A2.6.3. Link Comm vs. Non-Link Comm

A2.7. Rendezvous Procedures (Location, Altitude, Time, Method)

A2.8. Training Rules

A2.8.1. Default War Call

A2.8.2. Non-Standard A/A and A/S Training Rules

A2.8.3. Night Training Rules (if applicable)

A2.8.4. IMC Restrictions (if IMC possible)

A2.8.5. Communications Jamming Rules (if applicable)

A2.9. Mission Contingencies

A2.9.1. Aircraft Fallout/Minimum Participants

A2.9.2. Single Frequency

A2.9.3. Single GCI/AWACS Scope, Degraded Radar (JSTARS)

A2.9.4. No GCI/ AWACS or JSTARS

A2.9.5. Weather

A2.9.6. Alternate Missions

A2.9.7. Stranger Traffic

A2.10. Recovery and Dissimilar Formation Procedures

A2.11. Emergency Procedures

A2.12. Special Subjects/Special Interest Items

A2.13. Debriefing (Time and Place)

A2.14. RPA Coordination

A2.14.1. RPA Lost Link

A2.14.1.1. RPA Lost Link Mission and Altitudes

A2.14.1.2. Assistance Required

A2.14.1.3. Lost Communication Procedures

Attachment 3

CAS COORDINATION AND BRIEFING GUIDE (USE FOR FACE-TO-FACE OR TELEPHONIC COORDINATION)

A3.1. Participants

A3.1.1. Units (Flying, Ground/Naval, Units Supported)

A3.1.2. Aircraft Types

A3.1.3. Call Signs/Mission Number/Ordnance/Playtime

A3.2. Weather

A3.2.1. Forecast / Local Observation

A3.2.2. Sunrise/Sunset/Moon Illumination/Lux data

A3.2.3. Weather Minimums

A3.3. Working / Training Area

A3.3.1. Airspace/Vulnerability Times

A3.3.2. Airspace Boundaries / Altitudes

A3.3.3. Terrain Features (Terrain Reference Point, Named Area of Interest, Target Area of Interest, etc.)

A3.3.4. Ground Obstructions / Hazards

A3.3.5. Entry Points, Exit Points, and Routing

A3.3.6. CPs, IPs, Hold Points, Ingress/Egress Routes

A3.3.7. Approved Targets and Ordnance

A3.3.8. Airspace Restrictions (Noise Sensitive Areas, No-Fly Areas, etc.)

A3.3.9. Established Control Measures (ACAs, NFAs, etc.)

A3.3.10. Rotary-wing Area(s) of Operation

A3.3.11. Aircraft Lighting

A3.4. Scenario

A3.4.1. Mission and Training Objectives

A3.4.2. Ground Order of Battle

A3.4.2.1. Forward Edge of Battle Area / Forward Line of Own Troops / Fire Support Coordination Line

A3.4.2.2. Unit Boundaries / Phase Lines

A3.4.2.3. Threats / Opposing Forces / Regeneration Points

A3.4.2.4. Target Priorities / Types

A3.4.2.5. Artillery Locations / Planned Fires

A3.4.2.6. Friendly Locations / Planned Movements / Planned Fires

A3.5. SPINS/Comm Plan

A3.5.1. ROE (ID Requirements, Employment Constraints, etc.)

A3.5.2. Controlling Agencies

A3.5.3. Enroute / Coordination / Strike Frequencies

A3.5.4. Base Numbers / Code Words

A3.5.5. Authentication Procedures

A3.5.6. HaveQuick and Secure Comm Procedures

A3.5.7. Tactical Data Links: Table, Crypto, Time, NTR, Fighter Channel, Mission Channel, JU#, and Track Blocks.

A3.5.8. Map Datum

A3.5.9. ROVER Procedures

A3.6. CAS Briefing

A3.6.1. Check-In Briefing (IAW JP 3-09.3)

A3.6.2. Nine-Line or Call For Fire Briefing (IAW JP 3-09.3)

A3.6.3. Expected Type of Control (Type I / II / III)

A3.6.4. In Flight Report Briefing (IAW JP 3-09.3)

A3.6.5. Aircraft Deconfliction (Altitude / Lateral / Timing Separation)

A3.6.6. Ordnance / Weapons Data

A3.6.6.1. Type and Fuzing

A3.6.6.2. IAM Procedures

A3.6.6.3. Min Safe Distances (for personnel IAW **paragraph 5.2.7** and **Attachment 6**)

A3.6.7. Target Marking

A3.6.7.1. Tactics

A3.6.7.2. Type

A3.6.7.3. Comm Procedures and Brevity Terms

A3.6.7.4. Laser Safety Cone

A3.6.8. Friendly Marking

A3.6.8.1. Type (LCP / Panel / Mirror / Pyrotechnics / etc.)

A3.6.8.2. Comm Procedures and Brevity Term

A3.6.9. Attack Tactics

A3.6.9.1. Planned Deliveries

A3.6.9.2. Planned Timing Attack Spacing and Re-attacks

A3.6.9.3. Abort Criteria and Procedures

A3.6.9.4. Review "Troops in Contact" and "Danger Close" Calls (peacetime safety criteria will not be compromised)

A3.7. Training Rules

A3.7.1. Knock-it-off / Terminate Criteria

A3.7.2. Live Ordnance Procedures

A3.8. Contingencies

A3.8.1. Alternate Missions / Targets

A3.8.2. Adverse Weather

A3.8.3. Emergencies

A3.8.3.1. Hung Ordnance/ Unintentional / Inadvertent Release

A3.8.3.2. Jettison Procedures / Areas

A3.8.3.3. Runaway Gun

A3.8.3.4. Radio Failure / No Contact

A3.8.3.5. Controlled Bailout Area

A3.8.3.6. Search and Rescue Procedures

A3.8.3.7. Medical Evacuation

A3.9. Debriefing

A3.9.1. Mission and Training Objectives

A3.9.2. Mission Execution and Tactics

A3.9.3. Lessons Learned

Attachment 4

AIR-TO-GROUND JOINT LIVE FIRE EXERCISE PROCEDURES

A4.1. Joint Live Fire Exercise Operations. This attachment outlines procedures pertinent to the execution of Joint Live Fire operations. For the purpose of this attachment, Joint Live Fire Exercise is defined below. Apply these procedures in addition to the procedures outlined in **Chapter 5**. **(T-2)** Joint Publication 3-09.3, *Close Air Support*, AFTTP 3-3.TACS, *Combat Fundamentals TACS*, and AFTTP 3-2.6 provide further guidance.

A4.1.1. General.

A4.1.1.1. Joint Live Fire Exercise. Defined as CAS/Joint Air Attack Team (JAAT) or FAC(A) sorties flown in support of ground or rotary wing maneuver units that involve aircraft dropping, firing, and/or expending objects/projectiles. These exercises will involve members of more than one service. **(T-2)**

A4.1.1.2. This attachment does not apply to aircraft under the control of a FAC(A)/JTAC supporting exercises involving ground or rotary wing aviation units firing from fixed positions into an impact area with no other maneuver units involved.

A4.1.1.3. This attachment also does not apply to aircraft flying under the control of a FAC(A)/ JTAC from the same or different service if there are no maneuver units involved.

A4.1.2. Mission Preparation.

A4.1.2.1. Detailed planning for Joint Live Fire Exercises will be accomplished by the common higher headquarters of all the participating units. **(T-2)** The Air Force representative (e.g., Aircrew, FAC(A)/JTAC/Air Liaison Officer (ALO)) will ensure that this planning is consistent with applicable Air Force publications and conforms to current Joint/Air Force doctrine. The senior aircrew/FAC(A)/JTAC/ALO will also be responsible for maintaining a high state of situational awareness on the locations of all ground troop positions/ movements involved in the exercise. **(T-2)**

A4.1.2.2. Aircrew/FAC(A)/JTAC/ALOs will be prepared to shift to alternate targets or abort ordnance delivery if troop location is uncertain or troop movement is within minimum safe separation distance from targets. **(T-2)**

A4.1.2.3. All aircrew will receive a comprehensive briefing on the training area. This briefing will include, but is not limited to the following:

A4.1.2.3.1. Expected target location. **(T-2)**

A4.1.2.3.2. Location and planned movement of troops and aircraft. **(T-2)**

A4.1.2.3.3. Approved alternate target locations. **(T-2)**

A4.1.2.3.4. Planned ground fire. **(T-2)**

A4.1.2.3.5. Airspace control measures (phase lines, restricted fire areas, etc.). **(T-2)**

A4.1.2.3.6. Abort procedures. **(T-2)**

A4.1.2.3.7. Emergency jettison procedures and areas. **(T-2)**

A4.1.2.3.8. Range restrictions. **(T-2)**

A4.1.2.3.9. Exercise operating procedures. **(T-2)**

A4.1.2.4. If assigned, units will use their Ground Liaison Officers (GLOs) in their mission briefings to provide service training objectives and tactical situation information. Units without GLOs will obtain tactical situation information from the participating service units' JTAC/ALO. **(T-2)**

A4.1.2.5. Refer to **Attachment 3**, "CAS Coordination and Briefing Guide."

A4.1.3. Procedures.

A4.1.3.1. Aircrew/JTAC/ALO Criteria.

A4.1.3.1.1. Only CMR/BMC mission-ready aircrew/JTAC/ALOs will participate in joint live fire operations. (No MQT Training.) (AFSOC CAS platform follow command guidance.) **(T-2)**

A4.1.3.1.2. Aircrew will be qualified in the weapons delivery events to be flown IAW AFMAN 11-2MDS Vs 1 and 2. **(T-2)**

A4.1.3.2. Minimum Altitudes.

A4.1.3.2.1. Minimum release and recovery altitudes will be IAW **paragraph 5.4.6**. **(T-2)**

A4.1.3.2.2. Minimum altitude over troops will be 200 feet AGL, minimum aircrew qualification, local directive minimums, or airspace coordination minimums, whichever is higher. **(T-2)**

A4.1.3.3. Communications and Control Procedures.

A4.1.3.3.1. The senior JTAC/ALO will ensure continuous communications are available between all parties involved in the joint live fire exercise. If two-way communication between any parties is lost, all ordnance delivery activities will cease until communications are re-established. **(T-2)**

A4.1.3.3.2. The JTAC/ALO will coordinate all fires with the appropriate maneuver and fire support unit prior to commencement of an air strike. **(T-2)**

A4.1.3.3.3. The FAC(A)/JTAC/ALO will be positioned to ensure the correct target is being attacked and watch for unplanned troop movements beyond planned control measures. **(T-2)**

A4.1.3.3.4. If terrain, weather, or other factors restrict the FAC(A)/JTAC/ALOs ability to observe and control the exercise, a safety observer will be required. **(T-2)**

A4.1.3.3.4.1. The safety observer will be a FAC(A)/JTAC/ALO with two-way radio communication who is in a position to observe the target. The safety observer maintains full abort authority and will ensure the correct target is attacked while maintaining the safety of ground personnel and equipment. **(T-2)**

A4.1.3.3.4.2. If the safety observer is unable to observe the target, an independent safety observer using a maneuver commander approved automated ground and air forces tracking system (e.g., Solaris) with two-way communication to all players fulfills this requirement.

A4.1.3.3.5. All air strikes will be controlled by a current and qualified FAC(A)/JTAC who has positive radio communications with each aircraft. **(T-2)** The FAC(A)/JTAC will exercise control IAW JP 3-09.3 and AFTTP (I) 3-2.6. **(T-2)**

A4.1.3.4. Troop and target identification is critical. All available means (map plot, aircraft systems, target mark, target talk-on, etc.) will be utilized to positively identify the target and its relation to friendly forces. **(T-2)**

A4.1.3.4.1. When within 5 KM (3 NM) of friendly ground troops, the target will be marked by a unique terrain feature, laser, or a conspicuous marking device (e.g., white phosphorus rocket, artillery round, smoke grenade, IR pointer). **(T-2)**

A4.1.3.4.2. Each flight member will acknowledge target identification and direction of attack prior to their initial live ordnance pass on the target. **(T-2)**

A4.1.3.4.3. Refer to **paragraph 5.2.6.1** for additional guidance on CAS operations with IAMs.

A4.1.3.4.4. {N/A for AFSOC} In order to ensure target/impact area recognition, all pilots will accomplish a dry pass using simulated ordnance release parameters prior to the actual expenditure of ordnance. This pass will be under the control of a FAC(A)/JTAC. Exercise rehearsals conducted up to 48 hours in advance may count as the initial pass provided all major participants and parameters remain the same. **(T-2)**

A4.1.3.4.5. If friendly maneuver forces are within 5 KM (3 NM) of the target, the elements closest to the target must be positively identified by the attacking aircraft prior to weapons expenditure.

A4.1.3.5. Air Delivered Ordnance Minimum Safe Distance Criteria. Aircrew and JTACs will ensure the position(s) of friendly forces are deconflicted from weapons footprints before expending IAW **paragraph 5.2.7**. **(T-2)**

A4.1.3.5.1. TACP/JTACs operating at the MSDs listed in AFTTP 3-2.6 are required to wear protective equipment (including eyewear) IAW **paragraph 5.10.3**. **(T-2)**

A4.1.3.5.2. Ground Maneuver units and other personnel in the vicinity of the target area will adhere to WDZ footprint distances in **paragraph 5.2.7**. **(T-2)**

A4.1.3.6. Weather Minimums. Weather minimums for Joint Live Fire Exercise operations will be 2,500 feet ceiling, and 5 miles visibility for aircraft employing visual weapons deliveries. For aircraft employing non-visual deliveries, weather minimums will be IAW applicable AFMAN 11-2MDS series instructions. **(T-2)**

A4.1.3.7. USAF personnel may use lasers on foreign and other US service ranges. Guidance may be found AFMAN 13-212V1.

Attachment 5

AIR-TO-AIR LIVE FIRE PROCEDURES

A5.1. Aerial Gunnery. The following rules apply to missions involved in live gun firings against towed targets.

A5.1.1. General.

A5.1.1.1. The TRs in this publication apply with the following additional restrictions:

A5.1.1.1.1. Implement procedures to ensure the range are clear of surface activity and other aircraft before firing over an undercast.

A5.1.1.1.2. Cease fire if sighting any surface activity or other aircraft in the bullet impact area.

A5.1.1.1.3. A RCO must be present during firing. After join-up with the tow aircraft, the engaging flight lead will become the RCO (if qualified). **(T-2)** A Tow pilot may perform RCO duties (if qualified) when an RCO flight lead is not present.

A5.1.1.2. The Flight Lead and Tow Pilot will:

A5.1.1.2.1. Ensure firing occurs within the range boundaries. **(T-2)**

A5.1.1.2.2. Ensure the range is clear of surface and other airborne traffic at all times during firing. **(T-2)**

A5.1.1.2.3. Ensure TR compliance. **(T-2)**

A5.1.1.2.4. Assess fouls. **(T-2)**

A5.1.1.3. The Tow Pilot will:

A5.1.1.3.1. If chased, make a warning call before deploying the AGTS. **(T-2)**

A5.1.1.3.2. Fly the pre-briefed pattern. **(T-2)**

A5.1.1.3.3. Initiate radio calls to control the firing sequence. **(T-2)**

A5.1.1.3.4. Establish a turn before issuing a "CLEARED TO FIRE" call. **(T-2)**

A5.1.1.3.5. Record hits for each pass. **(T-2)**

A5.1.1.4. The Shooter will:

A5.1.1.4.1. Monitor the AGTS deployment and notify the tow if any malfunctions occur. **(T-2)**

A5.1.1.4.2. Not fly directly below or astern the tow aircraft at any time. **(T-2)**

A5.1.1.4.3. Acknowledge all calls from the tow pilot. **(T-2)**

A5.1.1.4.4. Maintain safe separation from the target if the shooter air scores the target. **(T-2)**

A5.1.1.4.5. Not make firing passes on a target that rolls in a turn, is flying high on the tow, or flying in an erratic manner. **(T-2)**

A5.1.1.4.6. Maintain positive overtake and a minimum of 5 degrees angle-off to the inside of the target's turn while engaged. **(T-2)**

A5.1.1.4.7. Prepare to avoid target debris that will result from a hit. **(T-2)**

A5.1.1.4.8. Immediately after firing, perform a reposition to get out of the target's plane of motion (POM) and avoid a 5-degree cone aft of the target's POM. **(T-2)**

A5.1.1.4.9. Visually inspect all shooter aircraft with another aircraft to search for damage at the conclusion of gunnery operations. **(T-2)**

A5.1.1.5. If the shooter requires a chase aircraft, the chase will maneuver as necessary to observe the firing distance, effectiveness, and shooter position relative to the gun line of fire. The chase will fly a position to avoid target debris and the shooter during post-fire reposition maneuvers. **(T-2)**

A5.1.1.6. Fouls. Assess a foul to the aircrew for any of the following conditions:

A5.1.1.6.1. Firing without a clearance.

A5.1.1.6.2. Firing from outside the turn of the target.

A5.1.1.6.3. Firing within 1,000 feet of the target.

A5.1.1.6.4. Flying within 800 feet of the target.

A5.1.2. AGTS/BANNER Basic Patterns. The following section defines various setups available for aerial gunnery training. The pattern selected and the tactics employed should meet the training requirements for the individual unit. Ideally, shooters will engage the aerial target as a two-ship element if two aircraft are available.

A5.1.2.1. Combat Pattern (**Figure A5.1** & **Figure A5.2**):

A5.1.2.1.1. The tow will maintain 300 to 450 KIAS for AGTS and 200-250 KIAS for BANNER. The shooters will perform a two-ship front quarter tactical intercept using AFTTP 3-1 tactics. Prior to the merge, the RCO will call "Arm Hot" and the shooter(s) will arm hot. The altitude separation requirements in **paragraph 4.2.10** apply. **(T-2)**

A5.1.2.1.2. Clearance for the tow ship to maneuver occurs after one of the following is met.

A5.1.2.1.2.1. The tow ship has visual contact with one shooter aft of the tow's 3/9 line.

A5.1.2.1.2.2. The attacking flight leader directs the tow ship to maneuver with a "Merge, Merge" call.

A5.1.2.1.2.3. As briefed by the attacking flight lead.

A5.1.2.1.3. The tow pilot will issue "Cleared to Fire" after establishing the turn. **(T-2)**

A5.1.2.1.4. Shooter tactics should include simulated missile employment culminating in a gun attack on the target, using proper radio terminology and attack procedures. Continue attacks until finishing the engagement, time expires, reaching bingo fuel, WINCHESTER, or approaching minimums. At this time, initiate a "KIO, Arm Safe" call acknowledged by all players. The tow may not roll out of the turn until all players acknowledge the KIO.

A5.1.2.1.5. Each shooter will ensure that the other attacker is clear of the target before shooting. **(T-2)** If able, the old attacker should reposition high after firing to avoid conflict with the target and the new shooter's attack.

A5.1.2.2. Butterfly Pattern (**Figure A5.3** & **Figure A5.4**):

A5.1.2.2.1. Begin the setup with the shooter and the tow flying in a co-altitude, line abreast, tactical formation. After the shooter(s) and the tow are ready, the flight lead calls "check away," and the aircraft turn 45 degrees away from each other. For the BANNER, the tow will maintain 200-250 KIAS and check 30 degrees away; the shooters will check away 45 degrees and accelerate. **(T-2)**

A5.1.2.2.2. During the turn away, the RCO will call "Arm Hot" and the shooter(s) will arm hot. At the briefed range, the flight lead will call, "Turn in, Fights On." The tow will turn into the shooters and reference 90 degrees off of the original heading. The shooter(s) will maneuver to the merge with 2000 feet of horizontal and vertical separation from the tow until tally both the tow and the target. **(T-2)**

A5.1.2.2.3. After the shooter(s) pass the tow's 3/9 position and the tow begins turning, the tow pilot will call, "Cleared to Fire." **(T-2)**

A5.1.2.2.4. The tow will maintain a continuous turn into one of the shooters. If there are two shooters, the first shooter will maneuver to a high-angle tracking shot on the AGTS/BANNER and then reposition high and outside of the target flight path. The second shooter will maneuver to a lower aspect gun attack after the first shooter has repositioned clear of the fight. After the second shooter has attempted a gun attack, initiate a "KIO" or continue with sequential attacks. **(T-2)**

A5.1.2.3. Perch Pattern (**Figure A5.5**):

A5.1.2.3.1. Begin the setup with the shooter 6000 feet behind the tow with a radar lock on the AGTS/BANNER (4000 feet radar range) and 10 to 30 degrees of aspect. The wingman will be in spread formation with the flight lead. **(T-2)**

A5.1.2.3.2. When all aircraft are ready, the RCO will call “Arm Hot” and shooters will arm hot. The AGTS tow should make a "30 seconds" call indicating that the tow is accelerating to final towing airspeed and a "10 seconds" call will be made indicating that the tow is starting the turn. The tow will make a "Cleared to fire" call when established in the turn. **(T-2)**

A5.1.2.3.3. Once the setup begins, the fighters will perform sequential attacks against the AGTS/BANNER. **(T-2)**

A5.2. Live Missile Firing. This section applies to live missile-firing exercises. Pre-deployment and deployment briefings will cover specific procedures, requirements, and restrictions. **(T-2)**

A5.2.1. Terms Explained.

A5.2.1.1. Range Safety Officer (RSO). The RSO is the individual responsible for monitoring all parameters of operations safety during live-fire missions. The RSO normally operates out of Range Control.

A5.2.1.2. Safety Chase. An aircrew member qualified to brief and control live missile firing missions. Acts as mission commander for firings.

A5.2.1.3. ABM/WD. A GCI or AWACS controller who provides mission support assistance as dictated by the profile.

A5.2.2. **General.** The TRs of this publication apply with the following additional restrictions and requirements:

A5.2.2.1. Dash-34 Checklist items. (Ground checks)

A5.2.2.2. Pre-range checks.

A5.2.2.3. Telemetry procedures.

A5.2.2.4. Range procedures.

A5.2.2.5. Firing procedures.

A5.2.2.6. Launch procedures and parameters.

A5.2.2.7. Debris areas and FOD potential.

A5.2.2.8. Emergency procedures.

A5.2.2.9. Conduct all missile firings in appropriate Air-to-Air ranges under positive radar control. The safety chase will fly a chase formation position with the firing aircraft (shooter(s)). **(T-2)** Safety chase qualified aircrew may act as safety chase for missiles fired from their own aircraft.

A5.2.2.10. Implement procedures to ensure the range is clear of surface activity and other aircraft before firing over an undercast.

A5.2.3. Arming and De-arming. Follow locally established arming and de-arming procedures for live missile firing missions.

A5.2.4. Firing Procedures.

A5.2.4.1. All members of the flight will clear the range area visually and check for surface activity while in the firing pattern (weather permitting). **(T-2)**

A5.2.4.2. Members of the flight not engaged in firing will fly a position as directed by the safety chase or GCI or AWACS director. Conduct the flight to preclude any aircraft from entering an area forward of the shooter's 3/9 line within the missile footprint when the Master Arm switch is in an armed position. Immediately safe the aircraft weapons systems anytime another aircraft moves forward of the shooter's 3/9 line within the missile footprint. **(T-2)**

A5.2.4.3. Conduct firings to ensure launch, impact, and missile fallout all occur within the range safety footprint.

A5.2.4.4. After firing a missile, the flight will maneuver as necessary to clear possible debris. **(T-2)**

A5.2.4.5. Drone Deconfliction. All mission aircraft own deconfliction responsibility on the drone at all times. Maintain 2,000 feet slant range from all drones during presentation. Shooters will change positions when cleared by the safety chase. **(T-2)**

A5.2.4.6. The safety chase will advise the ABM/WD upon completion of armament safety checks and on clearing the range (if required). **(T-2)**

A5.2.4.7. Even if observing a normal missile launch, visually inspect all shooter aircraft with another aircraft to search for damage.

A5.2.5. Communications. Exercise strict radio discipline to alleviate the risk of confusing transmissions. Normally only the ABM/WD, safety chase, shooter, or range safety officer will make transmissions. This is not to preclude anyone having knowledge of a dangerous situation from transmitting a KIO, cease fire or other appropriate warnings. Establish voice communications between the firing flight and range control facility before firing. Shooters must acknowledge all radio calls. Along with the radio calls prescribed elsewhere in this publication, use the following transmissions for Air-to-Air Weapons System Evaluation Program (Air-Air WSEP) missions:

A5.2.5.1. “CLEARED TO PAIR”: Call transmitted by the safety chase to GCI or AWACS director to indicate that the tactical lead has been given to the shooter. **(T-2)**

A5.2.5.2. "COMMIT": Call transmitted by the range safety officer, through GCI or AWACS director, to the shooter to intercept the target. This call allows the safety chase to issue clearance to arm after establishing formation criteria. **(T-2)**

A5.2.5.3. "ARM HOT": Call transmitted by the safety chase allowing the shooters to arm weapons systems. Shooters will not place the Master Arm switch to ARM until cleared. **(T-2)**

A5.2.5.4. "BANDIT, BANDIT": Call transmitted by the range safety officer, through GCI, to transfer range safety responsibility to the safety chase. The safety chase will clear shooters to fire when appropriate. **(T-2)**

A5.2.5.5. "HOSTILE, CLEARED TO FIRE": Call transmitted by the safety chase to the individual shooters after meeting all safety conditions and accomplishing all mandatory radio calls. This is the only transmission that allows shooters to fire their weapons. Clearance to fire is clearance to arm. **(T-2)**

A5.2.5.6. "ARM SAFE": Call transmitted by the safety chase or range control facility. This call cancels clearance to fire. Shooters will safe their weapon system but may continue to maneuver to launch parameters. **(T-2)**

A5.2.5.7. "CEASE FIRE": Call transmitted by the safety chase or range control facility. This call cancels clearance to fire. Shooter may remain armed and continue to maneuver to launch parameters. **(T-2)**

A5.2.5.8. "FOX": Call transmitted by the shooter at weapons launch. **(T-2)**

A5.2.5.9. “FOX, FOX”: Call transmitted by the safety chase to confirm missile launch. **(T-2)**

A5.2.5.10. "KNOCK IT OFF, ARM SAFE": Call transmitted by the safety chase to terminate the engagement and safe the weapons systems following missile flyout. The shooter will acknowledge this call, terminate the engagement and safe the weapons systems. **(T-2)**

A5.2.6. Abnormal Procedures.

A5.2.6.1. If required, missiles will be "safe jettisoned" in the range area according to locally established procedures. **(T-2)**

A5.2.6.2. Conduct jettison procedures to ensure both launch and missile fallout occurs within the range boundary.

A5.2.6.3. Hung ordnance and misfire procedures will be according to locally established procedures. **(T-2)**

Figure A5.1. Typical AGTS/BANNER Combat Pattern.

Communications for Mongo 1 as
Tow and RCO, Beeman 1&2 as Shooters

B1 - Beeman 1&2 Rdy South
M1 – Mongo 1 Rdy North
B1 – Beeman, Mongo Turn In
(Tow skulls directly at Beeman 1's point)
(Intercept Geometry at Flight Lead Discretion)
*M1 – Beeman 1&2 Arm Hot (Training PACS) / (Check Simulate)
B1 – Beeman 1 Arm Hot (Training PACS) / (Check Simulate)
B2 – Beeman 2 Arm Hot (Training PACS) / (Check Simulate)
M1 – Mongo 1 Tally One/Two
(Tow starts gunnery turn at 3/9 passage if Tally 2 or "Merge, Merge" call from Beeman 1)
B1 – Merge, Merge *(if required)*

M1 - Beeman 1&2 Cleared to Fire
B1 - Beeman 1 Cleared to Fire
B2 - Beeman 2 Cleared to Fire
B2 – Beeman 2's Engaged
B1 – Beeman 2 Press
B2 – Beeman 2 Off Hot/Cold/Dry
B1 – Beeman 1 Engaged Left 4 O'clock Low
(Clearance to fire continues until Cease Fire or Knock It Off, Arm Safe)
(If initial clearance was to "Arm Hot Training PACS" or "Check Simulate", RCO may issue "Arm Hot" for acknowledgement by shooters between attacks)
B2 – Beeman 1 Press
(Sequential Attacks may continue as briefed)
M1 - Beeman 1&2 Knock It Off, Arm Safe
B1 - Beeman 1 Knock It Off, Arm Safe
B2- Beeman 2 Knock It Off, Arm Safe

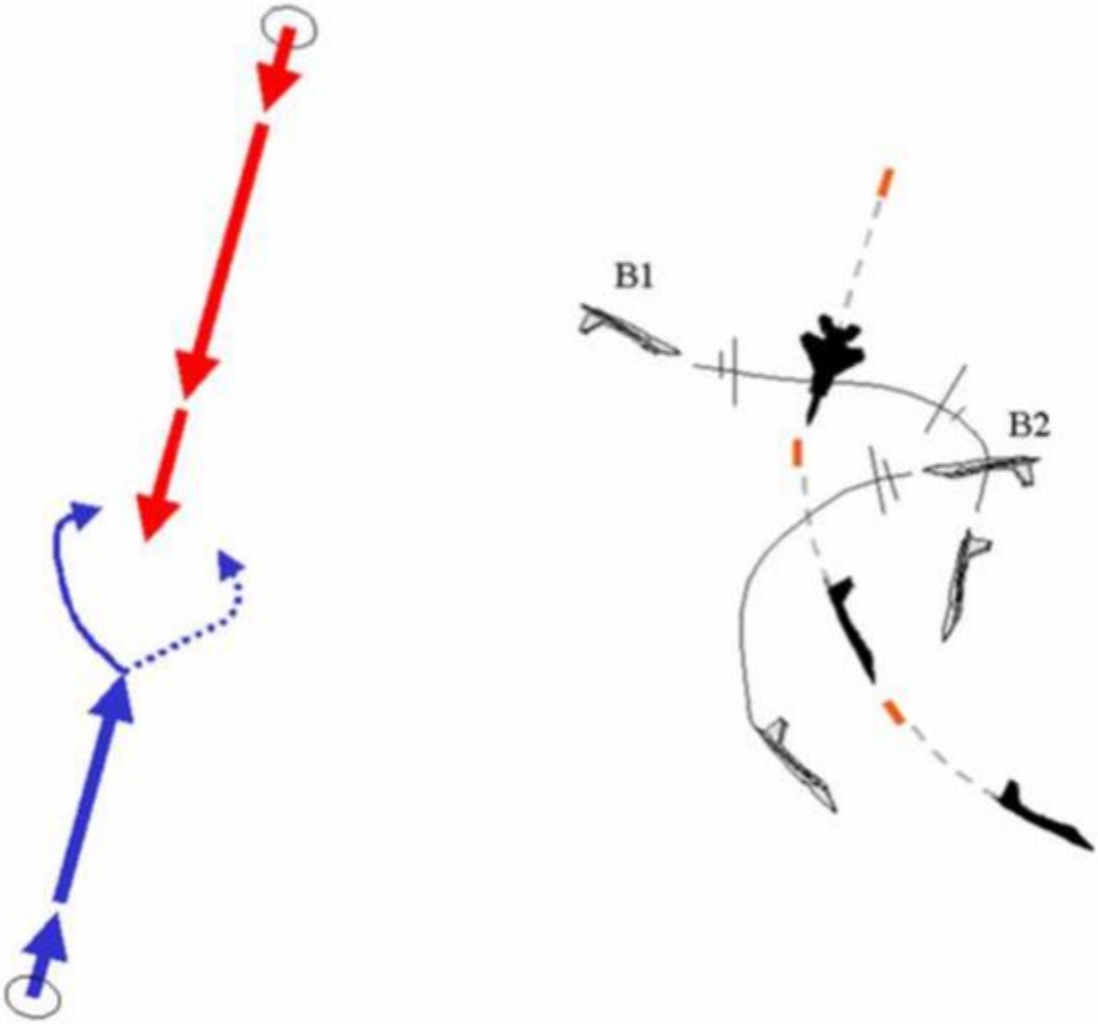
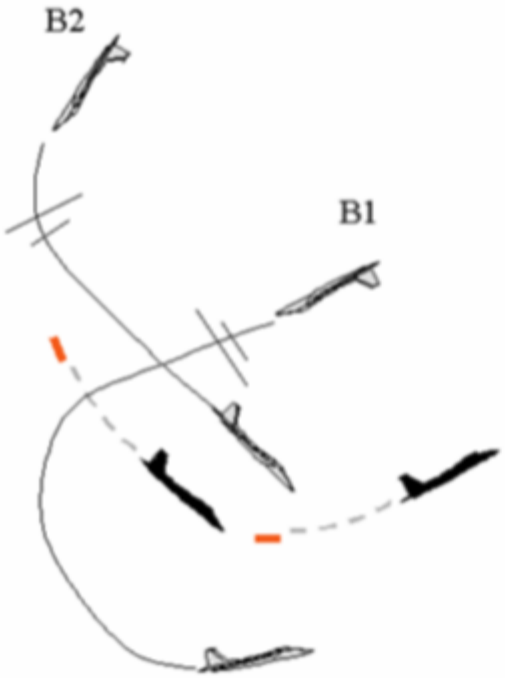


Figure A5.2. Typical AGTS/BANNER Combat Pattern (Continued).

B1- Beeman 1 Off Hot/Cold/Dry
B2 – Beeman 2 Engaged Left 7 O'clock Low
(*Clearance to fire continues until Cease Fire or Knock It Off, Arm Safe*)
(*If initial clearance was to "Arm Hot Training PACS" or "Check Simulate", RCO may issue "Arm Hot" for acknowledgement by shooters between attacks*)
B1 – Beeman 2 Press



B2 – Beeman 2 Off Hot/Cold/Dry
(*Sequential Attacks may continue*)
M1 - Beeman 1&2 Knock It Off, Arm Safe
B1 - Beeman 1 Knock It Off, Arm Safe
B2- Beeman 2 Knock It Off, Arm Safe

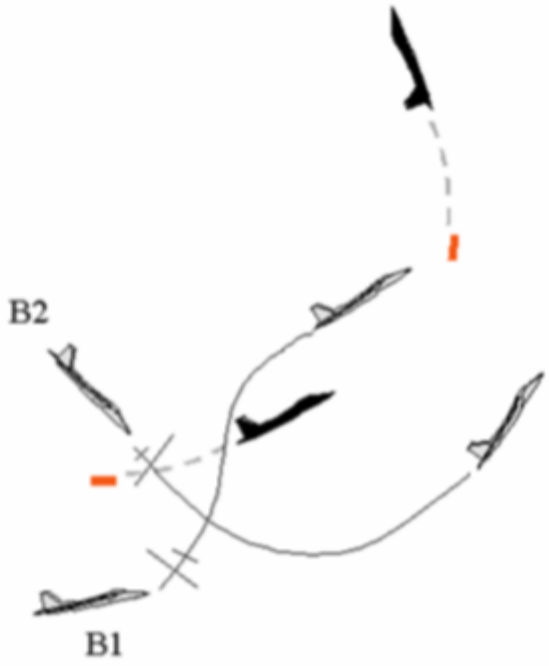


Figure A5.3. Typical AGTS/BANNER Butterfly Pattern.

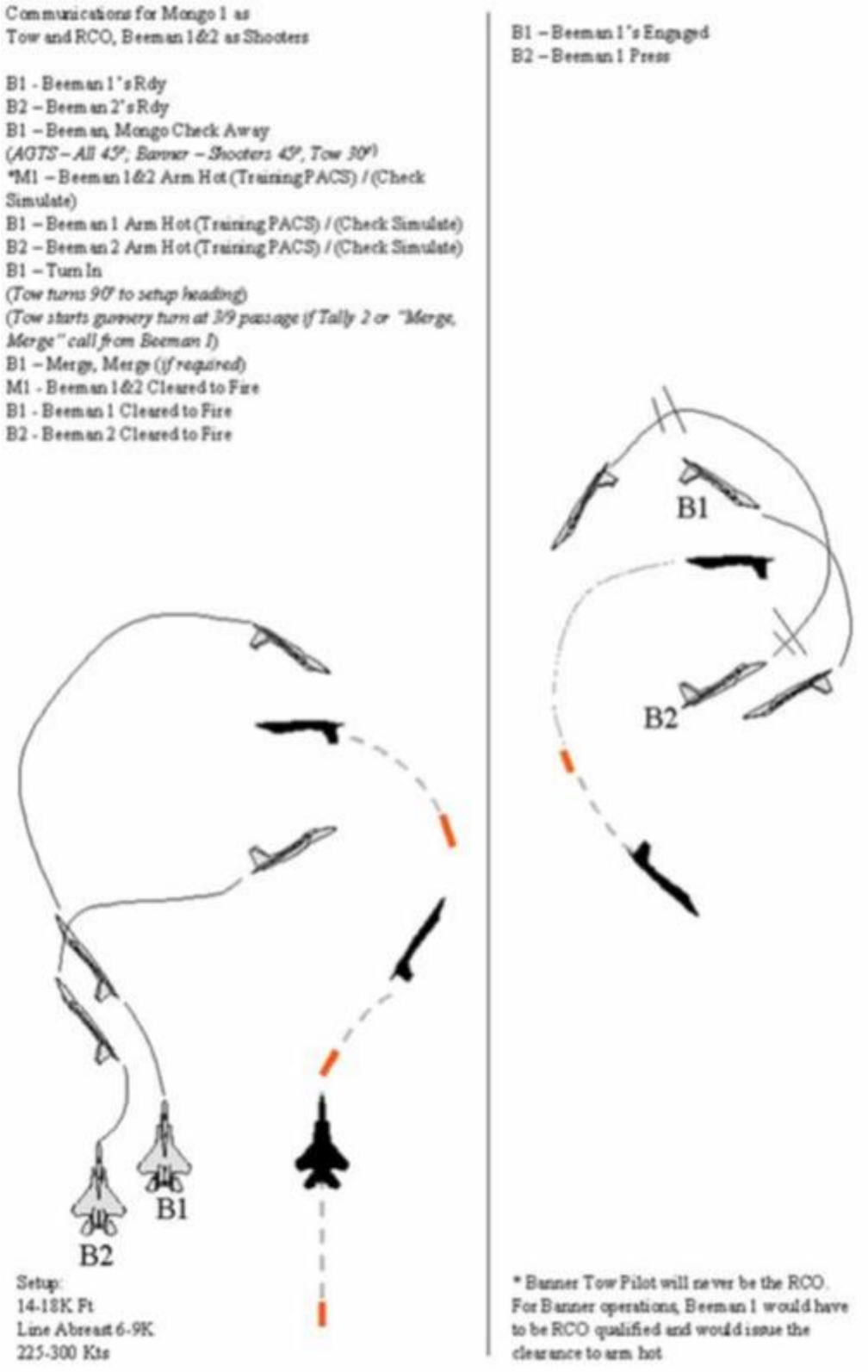
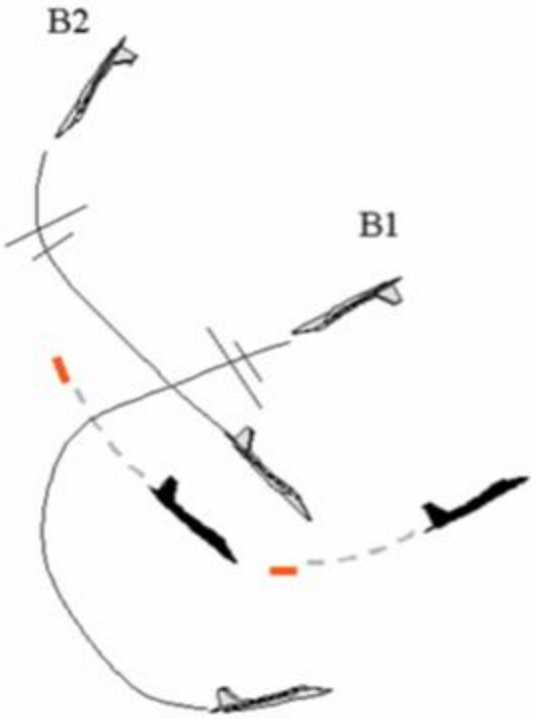


Figure A5.4. Typical AGTS/BANNER Butterfly Pattern (Continued).

B1- Beeman 1 Off Hot/Cold/Dry
B2 – Beeman 2 Engaged Left 7 O'clock Low
(*Clearance to fire continues until Cease Fire or Knock It Off, Arm Safe*)
(*If initial clearance was to "Arm Hot Training PACS" or "Check Simulate", RCO may issue "Arm Hot" for acknowledgement by shooters between attacks*)
B1 – Beeman 2 Press



B2 – Beeman 2 Off Hot/Cold/Dry
(*Sequential Attacks may continue*)
M1 - Beeman 1&2 Knock It Off, Arm Safe
B1 - Beeman 1 Knock It Off, Arm Safe
B2- Beeman 2 Knock It Off, Arm Safe

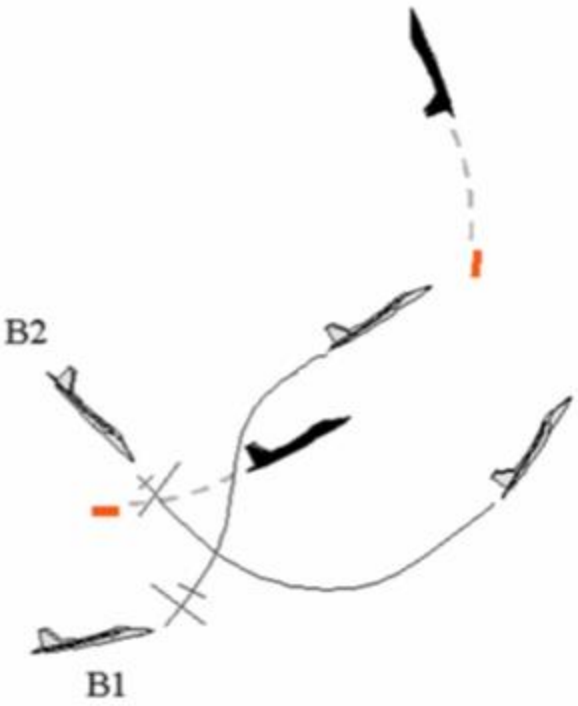
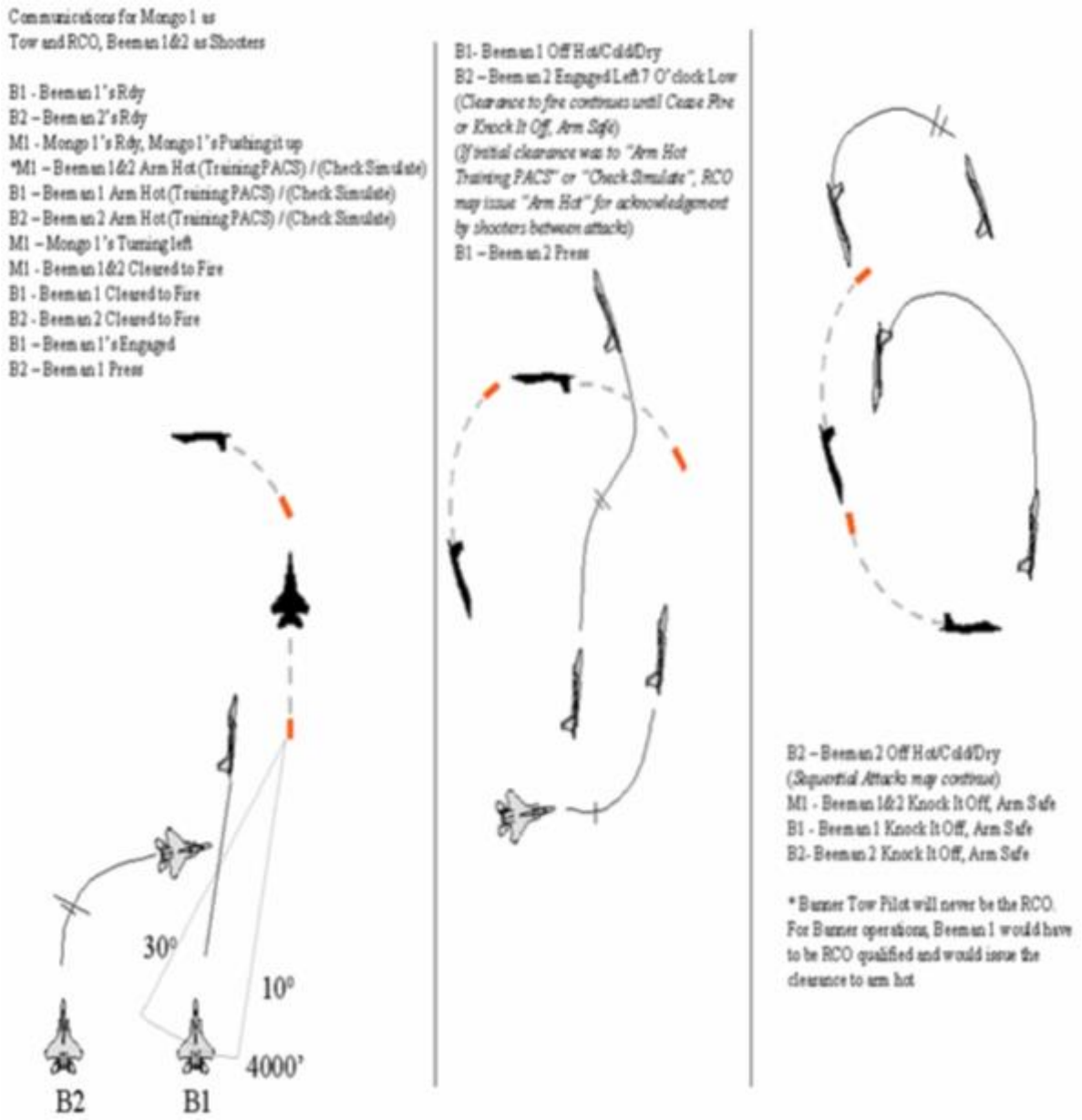


Figure A5.5. Typical AGTS/BANNER Perch Pattern.



Attachment 6

EXAMPLE IMC/VMC WAR CALLS

A6.1. Examples are not intended to be all-inclusive.

A6.1.1. Flight Lead, Mission Commander or Airboss makes War Call based on Red and/or Blue Air PIREPs.

A6.1.2. Takes effect at start of Vul Time or "FIGHTS ON" call.

Figure A6.1. "Blue 1, War Call is Unlimited Clear of Clouds".

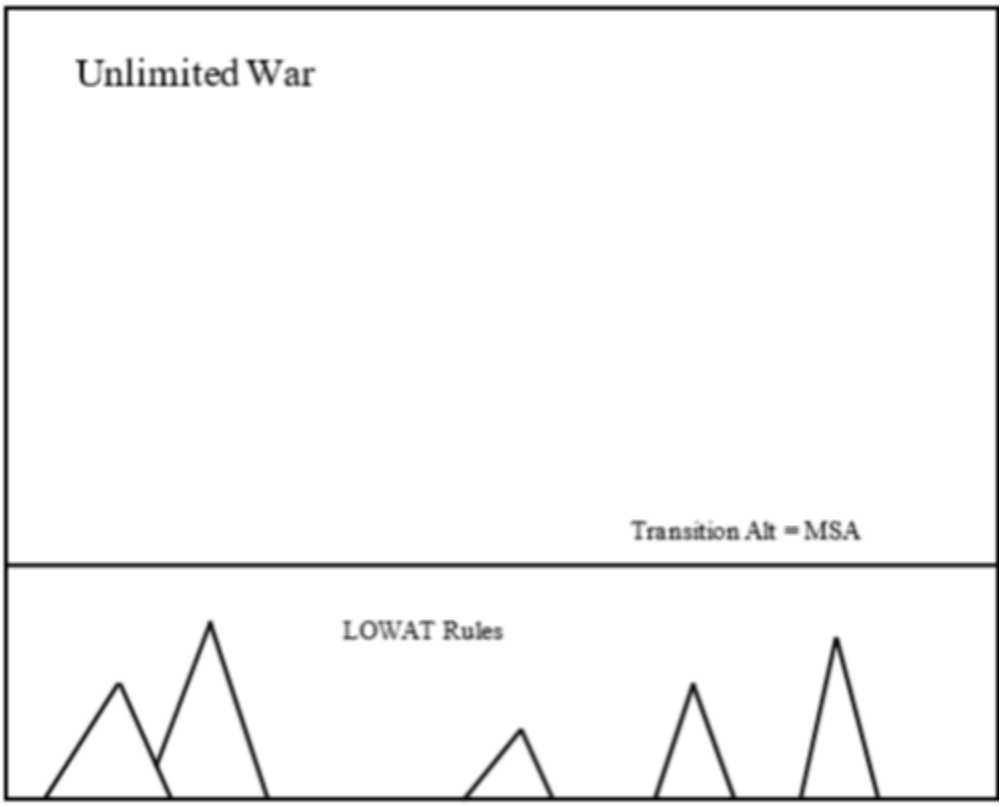


Figure A6.2. "Blue 1, War Call is High War 13,000 foot floor" If a high war is called without stating a floor due to uneven/sloping decks, all players are to execute IAW VFR cloud clearances.

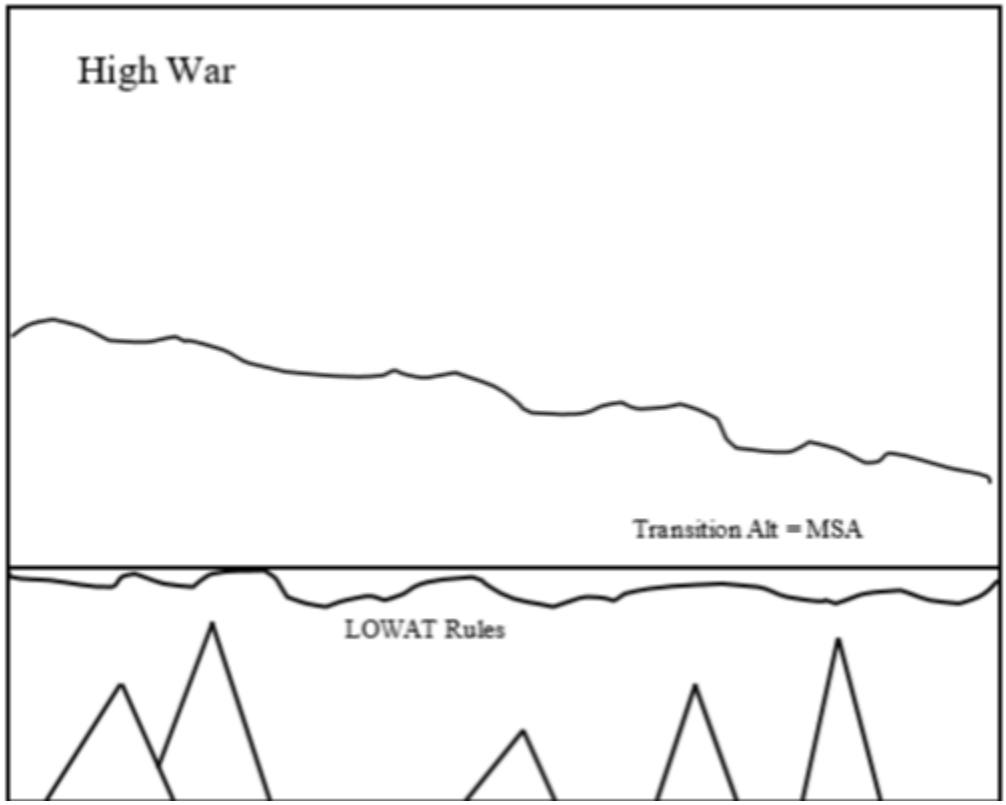


Figure A6.3. High clouds "Blue 1, Low War 28,000 foot ceiling".

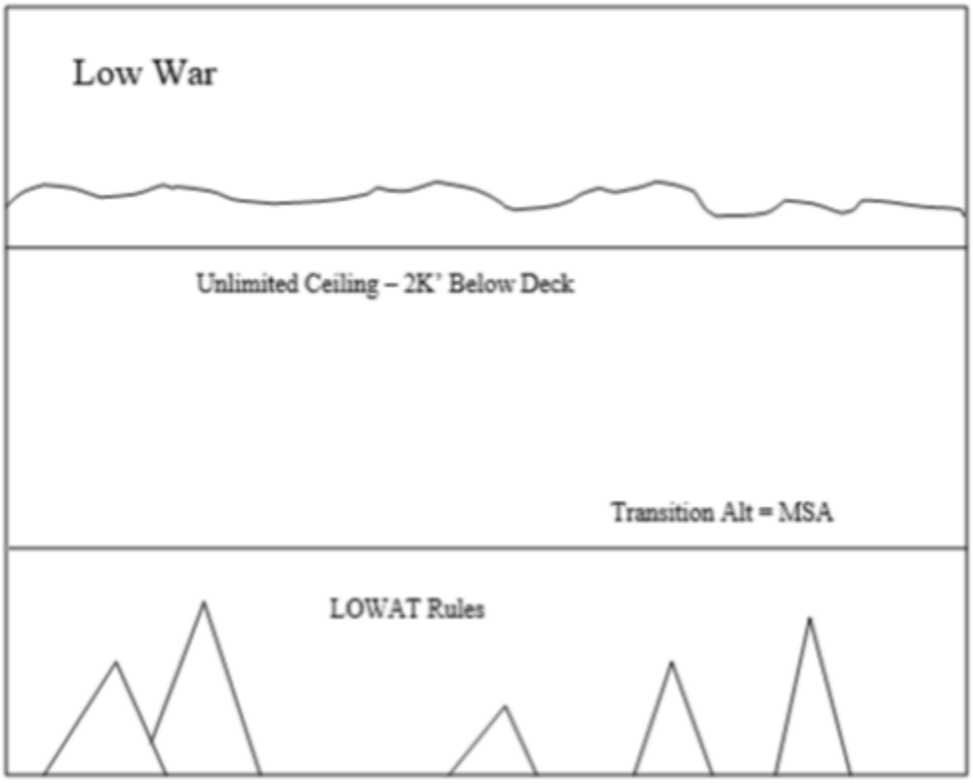


Figure A6.4. Clouds in western half of airspace "Blue 1, IMC Rules/Unlimited clear of clouds 28,000 foot floor and 13,000 foot ceiling in affected areas UNLIMITED clear of clouds in east.".

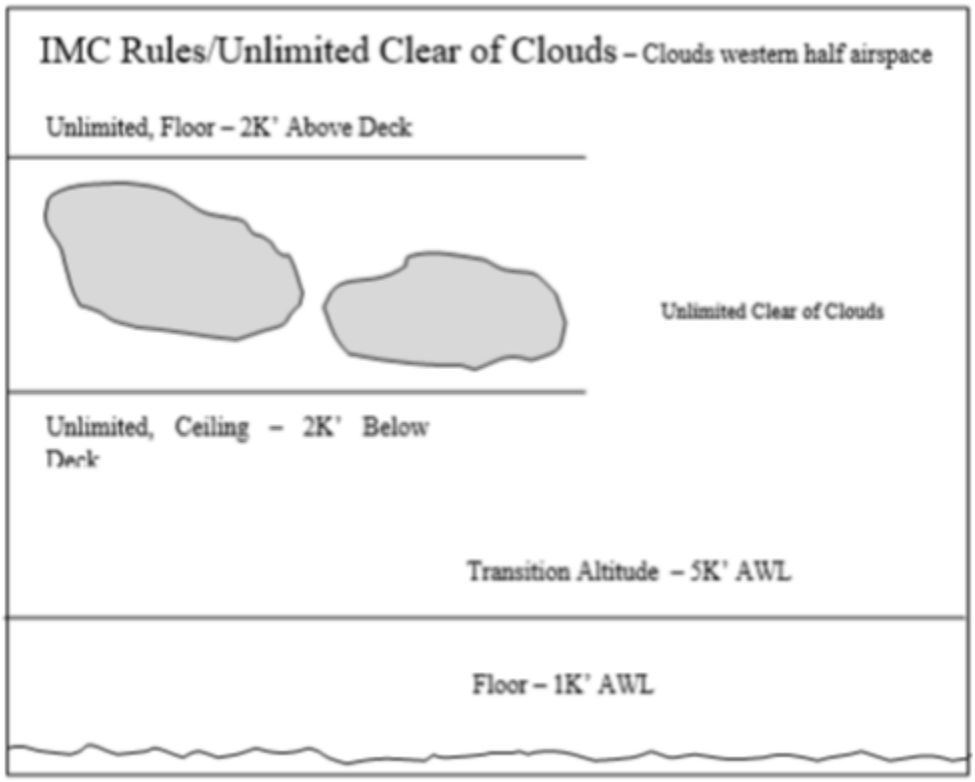


Figure A6.5. "Blue 1, IMC Rules/Unlimited clear of clouds 22,000 foot floor IMC Fight floor 12,000.".

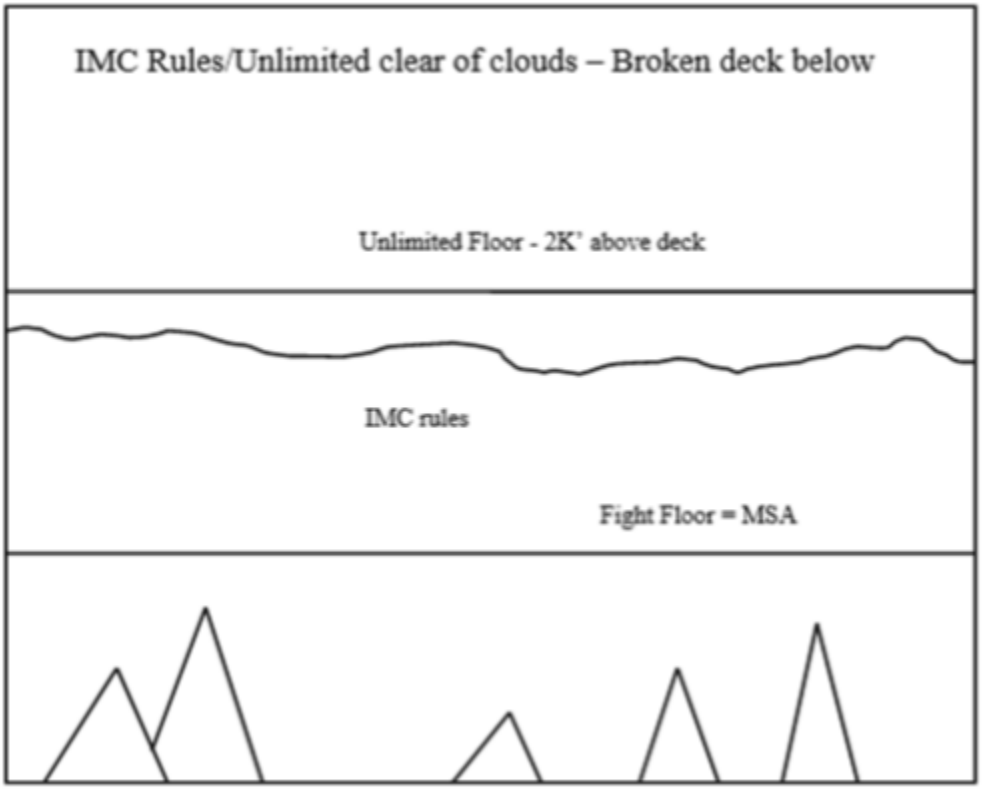


Figure A6.6. "Blue 1, IMC Rules/Limited Clear of clouds Ceiling 32,000, Floor 18000 feet IMC Fight floor 12,000".

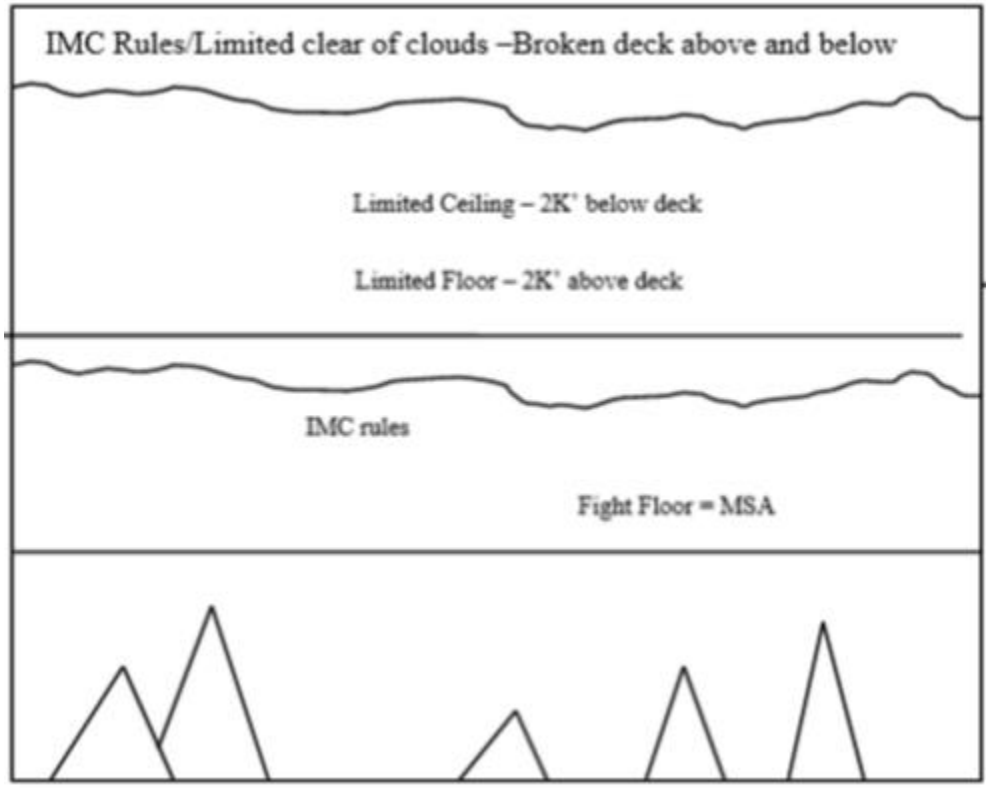


Figure A6.7. "Blue 1, Split War 28000 foot floor. 21000 foot ceiling".

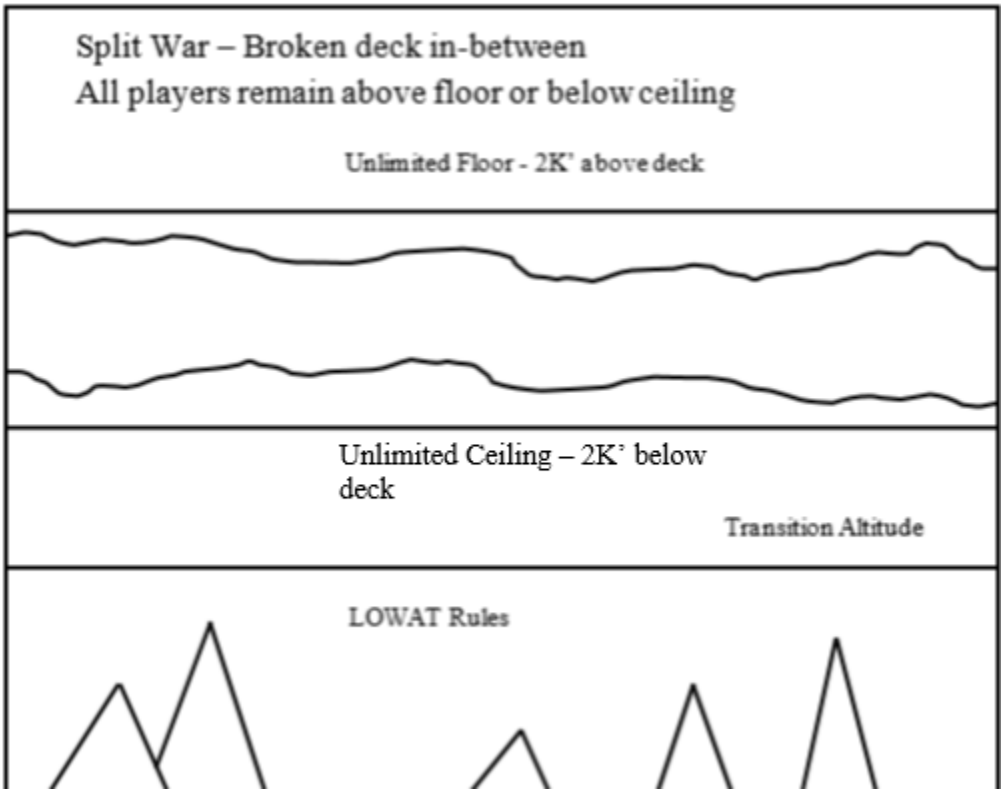


Figure A6.8. "Blue 1, Split War/Reduced Low 23,000 foot Floor. 13,000 ceiling. Conan 1-4 and Flanker 1-4 Low".