BY ORDER OF THE SECRETARY OF THE AIR FORCE

Air Force Instruction 11-2AC-130, Volume 3

9 JUNE 2010

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Flying Operations

AC-130 OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements Air Force Instruction 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure,* and references Air Force Instruction (AFI) 11-202, Volume 3, General Flight Rules, as well as Air Force Tactics Techniques and Procedures (AFTTP) 3-3.AC-130, Combat Aircraft Fundamentals – AC-130. It provides policies and procedures for the operation of all AC-130 aircraft under most circumstances but should not replace sound judgment. This instruction does not apply to Air Force Reserve Command (AFRC) and Air National Guard (ANG) units. This publication requires the collection and or maintenance of information protected by the Privacy Act (PA) of 1947. The authorities to collect and maintain the records prescribed in this publication are Title 10 United States Code, Chapter 857 and Executive Order 9397, Numbering System for Federal Accounts Relating to Individual Persons, 30 November 1943, as amended by Executive Order 13478, Amendments to Executive Order 9397 Relating to Federal Agency Use of Social Security Numbers, November 18, 2008. Forms affected by the PA have an appropriate PA statement. System of records notice F011 AF/XO-A, Aviation Resource Management System (ARMS) applies. 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. Refer to Attachment 1 for a Glossary of references, abbreviations and terms. Send comments and suggested improvements electronically on Air Force (AF) Form 847, *Recommendation for Change of Publication*, through channels, to Headquarters (HQ) Air Force Special Operations Command (AFSOC)/Standardization/Evaluation (A3V), 100 Bartley Street, Suite 141W, Hurlburt Field, FL 32544-1015. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN)

33-363, Management of Records, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at **https://www.my.af.mil/afrims/afrims/afrims/rims.cfg**.

SUMMARY OF CHANGES

This interim change corrects multiple paragraphs and update errors; updates Chapter 2 command and control guidance; updates crew complement for special missions aviation crew members (**3.2** and **Table 3.1**); updates AFSOC alert aircraft (**3.9.4**); updates guidance for landing gear malfunctions (**4.3.6**); updates taxi obstruction clearance criteria (**5.18.4**); updates takeoff and landing obstruction clearance criteria (**5.21**); updates helmet requirements (**6.2.10.1**); updates electronic mission kits (**6.6**); updates aircraft preflight (**6.17.3**); deletes 6.20; updates aircraft refueling (**6.21.1**.), adds thunderstorm avoidance (**6.62**); updates mission fuel planning (**11.3.4, Table 11.2, 11.3**, and **11.4**); updates AF Form 4139 Fuel Planning (**11.6**); updates flight engineer fuel management (**12.4.4**); updates aircraft performance (**12.8**); amends loadmaster procedures (**13.1**); updates **Chapter 15** Aerial Gunner procedures; updates AC-130H/U round jettison procedures (**18.7.1**) and hot gun procedures (**18.7.2.1.2.1**); adds AC-130U 25mm inadvertent firing procedures (**18.7.2.2.5**); removes specific Danger Close distances (**18.20.3** and **Table A6.1**); updates tweak and live fire operations (**18.20**). A margin bar indicates newly revised material.

Chapter 1

GENERAL INFORMATION

1.1. General. This AFI provides guidelines and restrictions for AC-130 operations and applies to AC-130 aircrews at all management levels concerned with operation of the AC-130. It is a compilation of information from aircraft flight manuals, Flight Information Publications (FLIP) and other Air Force directives, and is an original source document for many areas. This instruction supersedes all guidance in AFTTPs. It is written for normal and contingency operations to reduce procedural changes at the onset of contingencies. Training procedures are included. When guidance in this AFI conflicts with another basic/source document, that document takes precedence. For matters where this AFI is the source document, waiver authority is IAW paragraph 1.4. For matters where this AFI repeats information in another document, follow waiver authority outlined in the basic/source document. HQ AFSOC Standardization/Evaluation (HQ AFSOC/A3V) has overall responsibility for the administration of this instruction.

1.2. Applicability. This AFI is applicable to all crewmembers operating the AC-130H/U. Copies should be made available to all aircrew members operating the AC-130.

1.3. Key Definitions:

1.3.1. "Will" and "Shall" indicate a mandatory requirement.

1.3.2. "Should" indicates a preferred, but not mandatory, method of accomplishment.

1.3.3. "May" indicates an acceptable or suggested means of accomplishment.

1.3.4. "***WARNING***" indicates operating procedures, techniques, etc., which may result in personal injury or loss of life if not carefully followed.

1.3.5. "***CAUTION***" indicates operating procedures, techniques, etc., which may result in damage to equipment if not carefully followed.

1.3.6. "***NOTE***" indicates operating procedures, techniques, etc., which are considered essential to emphasize.

1.3.7. See Attachment 1, Glossary of References and Supporting Information for additional terms.

1.4. Deviations and Waivers. Do not deviate from the policies and guidance in this AFI except when the situation demands immediate action to ensure safety.

1.4.1. Although this publication provides guidance for aircraft operations under most circumstances, it is not a substitute for sound judgment. When it is necessary to protect the crew and aircraft from a situation not covered by this instruction and when immediate action is required, the Pilot in Command (PIC) has ultimate authority and responsibility for the course of action to be taken. Report deviations, without waiver, through channels to HQ AFSOC/A3 within 48 hours, followed by a written report.

1.4.2. Unless otherwise indicated, HQ AFSOC/A3 is the waiver authority for operational procedure requirements contained in this volume. HQ AFSOC/A3 may delegate this authority to Commander Air Force Special Operations Forces (COMAFSOF) for

operationally assigned Special Operations Forces (SOF) during contingency operations. If the AFSOC/A3 chooses to delegate waiver authority, it will be done in writing and will specify which portions of this instruction may be waived by the COMAFSOF.

1.4.2.1. When waiver authority is delegated, HQ AFSOC/A3V will receive a copy of all approved waivers.

1.4.3. Crews requiring waivers or technical assistance should contact the controlling agency for proper coordination. The PIC must consider all factors (Crew Duty Time/Flight Duty Period (FDP), aircrew qualification levels, type mission and sortie duration, weather, Notices to Airmen, alternates) before requesting the waiver. It is highly recommended that the PIC contact squadron Top 3 (Squadron Commander (CC), Director of Operations & Assistant Director of Operations or Operations Group Standardization/Evaluation (OG/OGV) for any advice or assistance prior to waiver request (time permitting). Transmit mission data to the controlling command and control (C2) agency by any means available (i.e., Defense Switching Network (DSN), High-Frequency (HF) radio, Iridium phone and L-Band Satellite Communication (SATCOM), etc.).

1.5. Distribution. Limited: Distribute this instruction only as directed in applicable Flight Crew Information Summary Required Publication Tables.

1.6. Supplements. Major Commands (MAJCOM) may supplement this volume according to AFPD 11-2, *Aircraft Rules and Procedures.* These supplements will not duplicate, alter, amend or be less restrictive than the provisions of this instruction. Forward MAJCOM supplements to HQ AFSOC/A3V and HQ AFFSA/A3OF for approval before publication and provide HQ AFFSA/A3OF one copy after publication. File supplements according to AFI 33-360, Volume 1, *Publications Management Program.*

1.6.1. Local Operating Procedures Coordination Process. Units will send one copy of Chapter 10 (Local Operating Procedures) supplements to HQ AFSOC/A3V for validation.

1.7. Requisitioning Procedures. This AFI shall only be delivered electronically to the end user. Printing is at the discretion of the individual units.

1.8. Improvement Recommendations. Send comments and suggested improvements to this instruction on Air Force (AF) Form 847, *Recommendation for Change of Publication*, IAW AFI 11-202V2, Attachment 5.

1.9. Definitions. Find explanations or definitions of terms and abbreviations commonly used in the aviation community in Code of Federal Regulations Title 14, Part 1; *DoD FLIP General Planning*, Chapter 2; and Joint Pub 1-02, *The DoD Dictionary of Military and Associated Terms*. See **Attachment 1** for common terms used herein.

1.10. Aircrew Operational Reports. The reporting requirements in this instruction are exempt from licensing IAW AFI 33-324, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information.*

Chapter 2

COMMAND AND CONTROL

2.1. Operational Control (OPCON). AFSOC is designated as the controlling agency for United States Special Operations Command (USSOCOM)-assigned Air Force SOF aircraft, while Theater Special Operations Commands (TSOCs) have OPCON of theater-based assets. In practice, the Special Operations Wing or Group Commander routinely exercises delegated responsibility for planning and executing home-station AFSOC missions, off-station training missions, and missions transiting to/from other Areas of Responsibility (AORs). The Wing or Group Commander, in turn, normally exercises control of home-station missions through the command post supporting the wing or group. In the event that assigned forces undergo a Change in Operational Control (CHOP), responsibility for mission monitoring also passes to the gaining command. Changeover will be accomplished IAW the pertinent Operational Plan, Operational Order, or deployment or execution order.

2.1.1. Unless otherwise specified by OPLAN/CONPLAN, Wing or Group OPCON terminates when forces first land in the gaining TSOC/JSOAC AOR; Wings/Groups resume OPCON of redeploying forces when those forces first land outside the TSOC/JSOAC AOR.

2.2. Deleted.

2.3. Waiver and Approval Authorities.

2.3.1. The AFSOC/A3 is designated COMAFSOF for missions operating away from home-station, and not under control of another designated COMAFSOF. The AFSOC/A3 holds waiver/approval authority for items normally authorized above wing level, and for those items identified as COMAFSOF authorities.

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2.3.1.2. Delete.

2.3.2. Operational waivers will be coordinated through Stan/Eval channels. Waiver requests will normally be the responsibility of the C2 agency with the operational control of the mission.

2.4. Mission Commander. A mission commander will be designated when more than one aircraft or crew is deployed away from home station for training, exercises, or other operations. The mission commander should be a field grade officer. The mission or air mission commander will not be a primary crewmember for exercises, but may fly as a crewmember on non-exercise related missions. Mission commander duties may include, but are not limited to:

2.4.1. Briefing crews on local operating procedures.

2.4.2. Coordinating with Air Traffic Control (ATC), Combat Control Team (CCT), Special Tactics Squadron (STS), range control, users, and others that may have an impact on the mission.

2.4.3. Ensuring personnel have ample and adequate billeting, eating, and transportation arrangements.

2.4.4. Ensuring maintenance personnel know of aircraft and fuel requirements.

2.4.4.1. Unclassified Missions at Bases with an AMC C2 Facility**.** Mission commanders will ensure that the following information is relayed to the AMC C2 facility at least 30 minutes prior to landing: call signs, mission numbers, Estimated Time of Arrival (ETA), maintenance status, and additional service requirements. After landing, the mission commander will contact the C2 facility with ground handling requirements and departure information.

2.4.4.2. Unclassified Missions at Bases without an AMC C2 Facility. Mission commanders will report, as soon as possible, actual takeoff and landing times, maintenance status, projected takeoff times, and other pertinent data to the host wing command post, special operations control center, or AFSOC Command Center. Methods of communicating this information include HF phone patch, DSN, and commercial telephone.

2.4.4.3. J-coded AIMS Missions. When operating on J-coded missions, the mission commander will pass movement reports to the appropriate C2 facility. If necessary, the mission commander can call on an unclassified line and report. For example, "Loaded and ready to go at J-code 206 estimated time of departure (ETD) is 1400Z." ***NOTE:*** For missions requiring special handling above and beyond basic J-code procedures, C2 procedures will be outlined in the tasking directive.

2.4.4.4. Close-hold or Sensitive Missions. These missions may operate without AIMS setups. (See "NOTE" in paragraph 2.3.4.3.).

2.4.4.5. Regional Reporting Agencies. CONUS and outside normal operating area: AFSOC Air Operations Center, Hurlburt Field, FL, DSN 579-8901 or (850) 884-8901, Toll free 1-800-451-7705. For AFRC, 919 SOW Command Center, Duke Field, FL, DSN 875-6701 or (850) 883-6701, Toll free 1-800-437-8843 (Voicemail Box 101, after Midnight Central Time).

2.4.5. Submitting timely deployed status reports to the applicable C2 agency. Include, at a minimum, all actual takeoff and landing times, projected takeoff times, and other information related to aircraft movements.

2.5. Pilot in Command Responsibility and Authority. AF Form 4327A, *Crew Flight Authorization (FA),* designates a pilot in command for all flights. PICs are:

2.5.1. In command of all persons on board the aircraft.

2.5.2. Responsible for the welfare of their aircrew members, Mission Essential Personnel, and the safe accomplishment of the mission.

2.5.3. Vested with the authority necessary to manage their crew and safely accomplish the mission.

2.5.4. The final mission authority and will make decisions not specifically assigned to a higher authority.

2.5.5. The final authority for accepting a waiver affecting the crew or mission.

2.5.6. Charged with keeping the applicable commander informed of mission progress and difficulties.

2.5.7. Responsible for submitting timely deployed status reports in the absence of a mission commander (see **paragraph 2.4.5**).

2.5.7.1. Maintenance Delays Away from Home Station. PICs will coordinate with local/organic maintenance for available support, and then report to AFSOC Logistics Readiness Center (LRC): DSN 579-8925, (850)-884-8925 or 1-800-451-7705. When reporting, describe the problem, the assistance available (if any) and assistance required. Any time the aircraft experiences more than two hours of maintenance delays the PIC will report to AFSOC LRC as soon as practical (regardless of the support being received from the deployed location).

2.6. Airborne Mission Commander (AMC). The individual responsible for the overall employment of all air assets assigned to the mission. Required for multi-element, multi-event formations, and/or where mission complexity dictates. The AMC will be rated, and should be a field grade officer. The AMC will not be a primary crewmember and should be on headset.

2.7. Deputy Mission Commander (DMC). Assumes command if conditions prevent the AMC from controlling the mission. A DMC is required on all missions employing a dedicated AMC, on all multi-element formation missions, and on all single-element formations of three aircraft or more. The DMC may be a primary crewmember, and is usually the Formation Commander on AMC controlled missions. The DMC should not be on the same aircraft as the AMC.

2.7.1. Briefing crews on local operating procedures.

2.7.2. Coordinating with Air Traffic Control (ATC), Combat Control Team (CCT), Special Tactics Squadron (STS), range control, users, and others that may have an impact on the mission.

2.7.3. Ensuring personnel have ample and adequate billeting, eating, and transportation arrangements.

2.7.4. Ensuring maintenance personnel know of aircraft and fuel requirements.

2.7.5. Submitting timely reports on aircraft movements (see paragraph 2.3.4.).

2.8. Mission Clearance Decision. The final decision to delay a mission may be made either by the agency with OPCON or the PIC when, in the opinion of either, conditions are not safe to start or continue a mission. Final responsibility for the safe conduct of the mission rests with the PIC. If the PIC refuses a mission, it will not depart until the conditions have been corrected or improved so that the mission can operate safely. Another PIC and aircrew will not be alerted to take the same mission under the same conditions.

2.8.1. Diverting or rerouting a mission must be authorized by the commander with OPCON, except in an emergency or when required by en route or terminal weather conditions or facilities. In the event of an emergency or weather related divert or reroute, the mission commander/PIC must notify the controlling authority as soon as possible.

2.8.1.1. The controlling agency directing the diversion or rerouting is responsible for ensuring destination requirements or facilities are adequate for the aircraft and aircrew.

2.8.1.2. The PIC will notify the controlling agency of any aircraft or aircrew limitations that may preclude diverting or rerouting the mission.

2.8.2. When directing an aircraft to an alternate airfield, the controlling agency will ensure the PIC is provided existing and forecasted weather for the alternate. If the planned alternate is unsuitable upon arrival at destination, the controlling agency will advise the PIC of other suitable alternates.

2.8.3. The PIC is vested with the authority necessary to manage their crew and safely accomplish the mission.

2.8.4. The PIC is the final mission authority and will make decisions not specifically assigned to a higher authority.

2.8.5. The PIC is the final authority for accepting a waiver affecting the crew or mission.

2.8.6. The PIC is charged with keeping the applicable commander informed of mission progress and difficulties.

2.8.7. The PIC is responsible for the timely reporting of aircraft movements in the absence of a mission commander (see **paragraph 2.4**).

2.8.7.1. Maintenance Delays Away from Home Station. PICs will coordinate with local maintenance for available support, and then report to AFSOC Logistics Readiness Center (LRC): DSN 579-8925, (850)-884-8925 or 1-800-451-7705. When reporting, describe the problem, the assistance available (if any) and assistance required. Any time the aircraft experiences over a 2-hour maintenance delay the PIC will report to AFSOC LRC as soon as practical (regardless of the support being received from the deployed location).

2.9. Support to Civilian Law Enforcement Agencies. It is the policy of the Department of Defense to cooperate with civilian law enforcement officials to the maximum extent practicable. AFI 10-801, Assistance to Civilian Law Enforcement Agencies, incorporates the appropriate directive and provides uniform policies and procedures service members must follow when supporting federal, state, and local civilian law Enforcement agencies. It establishes specific limitations and restrictions on the use of Air Force personnel, equipment, facilities, and services by civilian law enforcement organizations. Report all requests for assistance and coordinate all requests from civilian law enforcement authorities through the appropriate C2 channels.

2.10. AFSOC C2 agencies. Refer to **Table 2.1** through **Table 2.4** for specific contact information.

Table 2.1. AFSOC Operations Center.

Telephone	DSN	312-579-3290
	Commercial	850-884-3290
	Toll-Free	800-451-7705
	RSDN	579-0212

FAX	DSN	312-579-5171
	Commercial	850-884-5171
E-mail	hq.afsoc.sdo@hurlburt.af.mil	
Secure E-mail	sdo@afsoc.af.smil.mil	

Table 2.2. AFSOC Command Center.

Telephone	DSN	312-579-8900
	Commercial	850-884-8900
	Toll-free	800-451-7705
E-mail	afsoc.cmd.ctr@hurlburt.af.mil	
Secure E-mail	afsoc.cmd.ctr@afsoc.af.smil.mil	

Table 2.3. 1 SOW.

Telephone	DSN	312-579-8100
	Commercial	850-884-8100
	Toll-free	800-346-6679
	RSDN	579-3601
FAX	DSN	312-579-6778
	Commercial	850-884-6778
E-mail	1SOW.CP.DL@hurlburt.af.mil	
Secure E-mail	1SOW.COMMANDPOST@AFSOC.AF.SMIL.MIL	

Table 2.4. 27 SOW.

Telephone	DSN	312-681-2253
	Commercial	505-784-2253
	Toll-Free	800-346-6679
	RSDN	299-5653
FAX	DSN	312-681-6406
	Commercial	505-784-6406
E-mail	27SOWCP@cannon.af.mil	
Secure E-mail	27SOW.CP.DL@AFSOC.AF.SMIL.MIL	

2.11. DELETED.

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Chapter 3

CREW COMPLEMENT AND MANAGEMENT

3.1. Aircrew Qualification. Each person assigned as a primary crewmember must be qualified or in training for qualification in that crew position, mission, and Mission Design Series (MDS) aircraft.

3.1.1. Basic proficiency crewmembers may perform primary crew duties on any non-mission sortie and on missions (including unilateral training, joint training and exercises) when receiving mission qualification training or evaluations under the supervision of a qualified instructor or flight examiner in their respective crew position.

3.1.2. Basic mission capable crewmembers may perform primary crew duties on any unilateral training mission. For other missions, the unit commander must determine the readiness of each basic mission capable crewmember to perform primary crew duties.

3.1.3. Non-current (NC) or Unqualified (UNQ) pilots may perform crew duties only on designated training or evaluation missions under the supervision of a qualified instructor or flight examiner pilot. Both pilots must be fully qualified unless exempted by AFI 11-401, *Aviation Management*.

3.1.4. Other NC or UNQ crewmembers may perform duties in their primary crew position on any mission when under direct supervision of a qualified instructor or flight examiner in their respective crew position. In this case, the student crewmember and the instructor or flight examiner fulfills the requirement for one primary position as specified in Table 3.1. ***NOTE:*** Dual qualified instructor navigator/fire control officers may perform crew duties in one seat while instructing a NC, not an UNQ navigator or fire control officer in the other seat. ***NOTE:*** Instructor sensor operators may perform crew duties in one seat while instructing a NC, not a UNQ sensor operator in the other seat.

3.1.5. For the purpose of aircraft/mission familiarization, the Group Commander, or COMAFSOF may authorize unqualified personnel to perform duties in non-pilot crew positions during flight under direct instructor/flight examiner supervision. The purpose of this familiarization training is to enhance crew esprit and to enable the individual to gain a better understanding of the crew concept. This training will only be conducted in permissive environments, and only when mission accomplishment is not impacted. Comply with AFI 11-401, *Aviation Management.*

3.1.6. Unqualified personnel attending the SOF Weapons Instructor Course (WIC), may perform duties during non-critical phases of flight in all crew positions on WIC syllabus-approved training sorties when under the direct supervision of an MDS-qualified WIC instructor in that crew position.

3.2. Crew Complement. Minimum crew complement will be as specified in the flight manual and **Table 3.1**. The group commander or COMAFSOF is the waiver authority for all other crew positions above the minimum specified by the flight manual.

Table 3.1. Crew Qualification Complement.

Crew Position	Basic	Augmented	Mission	Aug. MSN.
Pilot/Aircraft Commander	1	2	1	2
Copilot	1	1	1	1
Navigator	1[1]	2	1	2
Flight Engineer (FE)	1	2	1	2
Aerial Gunner (AG) and/or Loadmaster (LM)4	1[4]	2[4]	5[2/4/5]	5[2/4/5]
Fire Control Officer (FCO)	-	-	1[2]	1[2]
Electronic Warfare Officer (EWO)	-	-	1[2]	1[2]
TV Operator	-	-	1[2/3]	1[2/3]
IR Operator	-	-	1[2/3]	1[2/3]
Direct Support Operator (DSO)			1[6]	
Note 1: NAV – Unit commanders may authorize local non-mission flights without a NAV.				
Note 2: FCO/EWO/TV/IR/LM/AG – On local training flights unit commanders may adjust the crew complement for these crew positions based on specific mission requirements and/or aircraft systems availability. Dual qualified instructor NAV/FCOs may instruct two students when approved by the orders authenticating official.				
Note 3: TV/IR – Noncurrent or Unqualified TV/IR may satisfy crew complement requirements as long as there is no more than a 2:1 student to instructor ratio, and the student is under direct supervision of an instructor. Instructor TV/IRs may instruct two students when approved by the orders authenticating official.				
Note 4: AG/LM – Successful completion of cross-utilization training (CUT) will allow AGs and LMs to perform traditional AG or LM duties on AC-130 H/U aircraft. A minimum of one LM or CUT AG is required on all flights. Only one loadmaster (LM) or cross-utilization trained (CUT) aerial gunner (AG) is required on augmented basic crews if other crew members can periodically scan the cargo compartment.				
Note 5: AG/LM – In addition to basic crew requirements, a minimum of four AGs or CUT LMs are required on mission flights, including one lead gunner (LG) certified crew member. Mission requirements may dictate up to six total AG/LMs. Noncurrent or unqualified AG/LMs may satisfy crew complement (for training missions) as long as there is no more than 2:1 student to instructor ratio, the student is under the direct supervision of an instructor, and				

Crew Position	Basic	Augmented	Mission	Aug. MSN.
no less than four current and qualified AG/CUT LMs are on board. The orders authenticating official may authorize flights with four qualified AG/LMs for training missions.				
Note 6: DSO – Orders authenticating officials may authorize training missions without DSO. Mission commanders add to crew when required by specific mission requirements, based on aircrew availability.				

3.3. Additional Crewmembers (ACM). See AFI 11-401, *Aviation Management*, AFSOC Supplement.

3.4. Interfly. Interfly is the exchange and/or substitution of aircrew members and/or aircraft between MAJCOMs to accomplish flying missions. Normally, interfly should be limited to specific operations/tests, exercises, or special circumstances.

3.4.1. HQ AFSOC/A8PF maintains current Memorandum of Agreements (MOAs) between AFSOC, AFRC, Air Force Material Command (AFMC), Air Education Training Command (AETC), and Air Combat Command (ACC) for interfly using AFSOC-assigned aircraft. Unless specified in the MOA:

3.4.1.1. Aircraft ownership will not be transferred.

3.4.1.2. The operational squadron will prepare and sign AFSOC/AFRC/AETC flight orders.

3.4.1.3. As a minimum, crews will be qualified in the MDS-aircraft and model, as well as systems or configuration required to fly the aircraft and/or mission. If non-current, comply with paragraph 3.1.3. and 3.1.4.

3.4.1.4. Crewmember(s) will follow operational procedures defined in AFI 11-2AC-130 Vol 3, AFTTP 3-3.AC-130, and the applicable technical orders for the MDS.

3.4.1.5. AFSOC/AFRC/AETC will retain all flight and ground mishap reporting responsibility.

3.4.2. Waiver Authority.

3.4.2.1. With a valid MOA. Group commander or COMAFSOF is the approval authority for interfly on AFSOC aircraft under their control. In all cases, the crew will be qualified in the aircraft MDS.

3.4.2.2. No MOA/Expired MOA. HQ AFSOC/A3 is the approval authority for interfly on AFSOC aircraft.

3.4.2.3. Contingency operations must be approved by both HQ AFSOC/A3 and respective MAJCOM/A3.

3.4.3. Aircrew members assigned to the United States Air Force (USAF) Weapons School (USAFWS) are authorized to participate in orientation flights in AFSOC aircraft operated by crews from 14 Weapons School (WS).

3.4.4. Aircrew members assigned to the USAFWS are authorized to occupy duty positions on AFSOC aircraft operated by 14 WS. Crew member must be under instructor supervision if not current or qualified in the MDS.

3.4.4.1. The above authorizations are extended to senior leadership in the USAFWS chain of command.

3.4.4.2. Flights conducted under the above provisions will be within the normal syllabi.

3.5. Alert Crew Procedures. See AFI 11-202V3 and AFSOC Supplement.

3.6. Flight Duty Period and Crew Rest Restrictions. See AFI 11-202V3 and AFSOC Supplement.

3.7. Scheduling Restrictions. Refer to AFI 11-202V3, Chapter 9, *General Flight Rules*, crewmembers will not be scheduled to fly nor will they perform crew duties:

3.7.1. When taking oral or injected medication, unless an individual medical waiver has been granted by HQ AFSOC/SG. Mild analgesics such as aspirin and aspirin substitute may be used without prescription when the underlying illness is not cause for grounding. Dexedrine or similar stimulant pep pills will not be used unless authorized by HQ AFSOC/SG.

3.8. Alert Procedures. Refer to AFI 11-202V3 AFSOC SUP 1 Chapter 9, for alert procedures.

3.9. AFSOC Alert Aircraft. Maintain aircraft on alert status IAW the following:

3.9.1. Park the aircraft in a designated alert parking area to expedite taxi and takeoff.

3.9.2. Whenever operationally feasible, have a crew other than the alert crew preflight the alert aircraft. It is the intent of this procedure to allow the alert period and aircraft preflight validity period to be aligned. This should prevent the need to update the preflight during the alert period.

3.9.3. The alert aircraft may be flown for purposes other than actual alert missions provided the following conditions are met:

3.9.3.1. Alert requirements can be met with sufficient fuel to meet mission requirements.

3.9.3.2. Communication contact is maintained with the primary controlling agency.

3.9.3.3. Controlling agencies are notified any time the alert aircraft departs the local area.

3.9.3.4. If maintenance actions are not required, the aircraft can be resealed for alert once the through flight inspection is completed. A new flight crew preflight is not required until the end (72 hours) of the initial preflight period.

3.9.4. A DD Form 365-4, *Weight and Balance Clearance Form F-Tactical*, will be prepared for the alert aircraft. Alert crews are authorized to prepare an AF Form 4064 card using the worst weather conditions expected for the alert period. Use the data for alert scrambles. If the alert aircraft is flown for other reasons, use AF Form 4064 for the existing weather conditions.

3.9.5. When preflighted alert aircraft changes or an alert crew change occurs and the same aircraft remains on alert, the oncoming crew will, as a minimum, apply power to the aircraft and check applicable items listed below:

3.9.5.1. Air Force Technical Order (AFTO) Form 781, AFORM Aircrew/Mission Flight Data Document.

3.9.5.2. Interior and exterior for proper configuration and special equipment.

3.9.5.3. Fuel quantity.

3.9.5.4. Survival and emergency equipment.

3.9.5.5. Navigation and communication equipment.

3.9.5.6. Liquid oxygen quantity (if applicable).

3.9.5.7. Hydraulic reservoirs, gearboxes (if applicable) and accumulator charges.

3.9.5.8. Publications.

3.9.6. Should the aircraft remain on alert for more than 72 hours, a complete aircrew preflight is then required.

3.9.7. Once the aircraft is accepted for alert, the flight engineer will ensure an entry is made in the AFTO Form 781 stating as a minimum the date and time the aircraft was preflighted.

3.9.8. Consider alert aircraft off-limits to all personnel except alert crewmembers. No maintenance may be performed on the aircraft without approval of the unit/mission commander. Upon being told to launch, the crew is required to check the area in which maintenance was performed, prior to flight.

Chapter 4

AIRCRAFT OPERATING GUIDELINES

4.1. Objectives. A fully mission capable aircraft is the ultimate objective of the logistics effort. The final responsibility regarding equipment required for a mission rests with the PIC. If one crew accepts an aircraft to operate a mission or mission segment without an item or system, this acceptance does not commit that crew, or a different crew, to accept subsequent operations with the same item or system inoperative. When the PIC considers an item essential, designate the component mission essential (ME) on the AFTO Form 781A, *Maintenance Discrepancy and Work Document*, and the item will be repaired or replaced prior to departure.

4.2. Policy. This chapter provides guidance on how to operate with degraded equipment. If the PIC elects to operate with degraded equipment or aircraft systems, coordinate mission requirements (i.e., revised departure times, fuel requirements, maintenance requirements, etc.) prior to flight with the mission control agency to ensure the decision does not adversely impact follow-on missions.

4.3. Aircraft Operating Guidelines:

4.3.1. Pressurization and Air Conditioning Systems: Pressurization and both air conditioning systems should be operational. If a system fails at an en route stop, the mission may continue to a destination with repair capability. Required en route stops are authorized. The aircrew will comply with aircraft flight manual avionics cooling requirements.

4.3.2. Electrical System: All engine Alternating Current (AC) generators will be operational prior to departure. If a generator fails at an en route stop, the mission may continue to a destination with repair capability. Required en route stops are authorized. If the aircraft is equipped with a failed bearing indicating system, the generator may be turned off and monitored in lieu of disconnecting the generator.

4.3.3. An operative Air Turbine Motor or Auxiliary Power Unit (APU) generator is required for unrestricted flight. If the system is inoperative, flight in daylight Visual Meteorological Conditions (VMC) within 100 nm of a suitable airfield is permissible provided no other electrical malfunction exists. An inoperative APU generator will be removed and padded prior to operating the APU.

4.3.4. Fuel System: The primary concern with inoperative fuel boost pumps or quantity indicators is fuel balance and wing loading. Degraded operation is permissible; however, flight crews must consider potentially trapped fuel and decreased range should further degradation occur. The following paragraphs provide guidelines for degraded fuel system operations under most circumstances.

4.3.4.1. One pump must be operable for each external tank containing fuel.

4.3.4.2. One main tank fuel indicator may be inoperative. Two main tank indicators may be inoperative provided they are not symmetrical tanks or on the same wing.

4.3.4.2.1. The tank with the inoperative indicator and its symmetrical tank quantity will be verified by use of a fuel tank dip stick.

4.3.4.2.2. At en route stops when engines are shut down, dip check the tank with the inoperative indicator and the symmetrically opposite tank.

4.3.4.2.3. Begin crossfeed operation when the symmetrically opposite quantity indicator has decreased to 1,500 pounds (inboards) and 2,500 pounds (outboards).

4.3.4.2.4. Engine out training using the engine corresponding to the inoperative indicator or it's symmetrically opposite will not be conducted during tank to engine operation.

4.3.4.2.5. Maintain symmetrical engine fuel flow.

4.3.4.2.6. Plan to terminate flights with a minimum of 8,000 pounds calculated main tank fuel.

4.3.4.3. One external fuel tank indicator may be inoperative provided both external fuel tanks are checked full or empty. Both external fuel tank indicators may be inoperative provided both external tanks are checked empty. When an external tank indicator is inoperative and the tank cannot be visually checked empty due to foam modification, comply with the following prior to flight:

4.3.4.3.1. Check pressure with each pump in the external tank. If no pressure is obtained, the tank is verified empty.

4.3.4.3.2. If pressure is obtained, ground-transfer the fuel from the external tank. Defuel the external tank if unable to ground transfer.

4.3.4.3.3. When unable to verify an external tank is empty prior to engine start, place the tank on cross feed until no pressure is obtained. This will be completed prior to takeoff.

4.3.4.4. Both auxiliary tank indicators may be inoperative provided auxiliary fuel quantity is verified by the tank sight gauge.

4.3.4.5. Both a main and external fuel tank indicator may be inoperative on the same wing provided steps in paragraphs 4.3.4.2. and 4.3.4.3. are followed.

4.3.4.6. For other than normal ground refueling/defueling operations and associated guidelines in this chapter, fuel will not be transferred into or out of a main or external fuel tank with an inoperative indicator or its symmetrical tank except the following:

4.3.4.6.1. Fuel transfer into a main or external tank with an inoperative indicator may be accomplished during contingency or emergency fuel need situations. All transfers, under these conditions, will be coordinated verbally and visually with the pilot/copilot as a backup for lateral wing balance. Compliance with paragraphs 4.3.4.2., 4.3.4.3 and sub-paragraphs still apply.

4.3.4.6.1.1. A reliable source of known quantity transferred must be available. This source can be either the internal aircraft operating fuel quantity indicators, the Tanker's Air Refueling System, or the fuel truck.

4.3.4.6.1.2. Maintain symmetrical tanks within 1,000 pounds at all times. Initiate fuel transfer by opening only the refuel valve corresponding to the inoperative fuel quantity indicator. Verify fuel is being transferred into the tank, and then

open the remaining refuel valves. When the symmetrical tank reaches the desired fuel level, close both refuel valves while verifying a pressure increase on the fuel pressure transmitter. Close the other refuel valves as appropriate. ***NOTE:*** To avoid an inadvertent pressure disconnect, coordinate with the tanker to use only one fuel transfer pump until all receiver refuel valves are open. ***NOTE:*** If the refuel valve corresponding to the inoperative fuel quantity indicator loses power during fuel transfer, the only indication will be an increase in the manifold fuel pressure. If this occurs, fuel transfer will be terminated until the failed refuel valve is identified and the other power source is selected.

4.3.4.6.2. DELETED

4.3.4.6.3. DELETED

4.3.5. Anti-skid System: The anti-skid may be inoperative for flight to a destination with repair capability. Required en route stops are authorized.

4.3.5.1. A local training flight may continue once airborne if the anti-skid fails provided the system is turned off. The mission is restricted to one termination landing.

4.3.6. Landing Gear System: If a landing gear or position indicating system malfunction is encountered, only a full stop landing will be made. Gear will not be moved from the down and locked position. The discrepancy will be corrected prior to the next flight. ***EXCEPTION:*** If repair capability does not exist and a positive determination is made that further flight can be accomplished with the gear down and locked, the Group Commander or COMAFSOF may authorize flight to a destination where repair capability exists provided the gear is not moved from the down and locked position. Required en route stops are authorized. If proper coordination is not feasible, the PIC will inform the appropriate authority when circumstances permit.

4.3.7. Doors and Ramp System: Aircraft will not depart on a pressurized flight unless the door warning light system for the cargo ramp is operative.

4.3.7.1. Aircraft will not be flown with a crew entrance door or crew entrance door warning light malfunction.

4.3.7.2. Aircraft will not be flown pressurized with a cargo ramp lock malfunction. Unpressurized flight is authorized with a cargo ramp lock malfunction only when mission requirements dictate.

4.3.8. Navigations Systems: Comply with FLIP series publications for required navigational systems while operating in the Minimum Navigation Performance System (MNPS).

4.3.8.1. For flights in MNPS airspace and below in the North Atlantic Region or the Composite Hawaii/Mainland Route System, the following minimum operable navigation systems are mandatory: ***NOTE:*** ATC uses the same reporting and investigating criteria for gross navigational errors that occur below as well as within MNPS airspace.

4.3.8.1.1. Two independent sources of drift and ground speed, i.e., Doppler and inertial navigation system (INS), Doppler and global positioning system (GPS), INS and GPS, or dual INS.

4.3.8.1.2. Two independent sources of heading, i.e., one C-12 compass system and one aligned inertial system. The C-130 standby compass is not considered a separate source for the purposes of this paragraph.

4.3.8.2. For flights on all other Category I routes, the following minimum operable navigation systems are mandatory:

4.3.8.2.1. Doppler (except for AC-130U), INS, or GPS.

4.3.8.2.2. Two independent sources of heading, i.e., one C-12 compass system and one aligned inertial system. The C-130 standby compass is not considered a separate source for the purposes of this paragraph.

4.3.8.3. For all other flights on Category II routes, or tactical missions, the PIC will decide what the minimum navigation requirements are to safely execute the mission.

4.3.9. Radar: Radar Weather Mode Inoperative: Crews shall not fly in Instrument Meteorological Conditions (IMC) in the vicinity of forecast or actual thunderstorms without operable on-board weather radar. Crews will maintain positive communications with and obtain weather updates from Command Post (or applicable Command & Control agency) and the local weather updating agency (typically METRO). Crews may use radio relays through other aircraft for this information so long as positive communications with the other aircraft are maintained. In either case, if communications are lost, crews will reposition the aircraft to re-establish communications or land.

4.3.10. Ground Collision Avoidance System (GCAS): The GCAS will be operational for all departures unless parts are not available on station to repair the unit. For failure after departure, flight may continue to a destination with repair capability. Required en route stops are authorized.

4.3.11. Enhanced-Traffic Alert and Collision Avoidance System (ETCAS). The ETCAS (if equipped) will be operational for all non-contingency departures unless parts are not available on station to repair the unit. For failure after departure, flight may continue to a destination with repair capability. Required en route stops are authorized. Comply with host nation requirements.

4.3.12. Cockpit Voice Recorder (CVR). The CVR will be operational for all departures unless parts are not available on station to repair the unit. For failure after departure, flight may continue to a destination with repair capability. Required en route stops are authorized.

4.3.13. Digital Flight Data Recorder (DFDR). The DFDR (if equipped) will be operational for all departures unless parts are not available on station to repair the unit. For failure after departure, flight may continue to a destination with repair capability. Required enroute stops are authorized.

4.3.14. AC-130 Operational Flight Program (OFP). OFP reload is primarily a maintenance function. Authorized crews may use tested procedures to do in-flight OFP reload if necessary to safely recover the aircraft and/or prevent loss of life.

4.3.15. Aircraft will not depart with an inoperative Identification Friend or Foe (IFF)/Selective Identification Feature (SIF) without the approval of ATC and the PIC. ***EXCEPTION:*** Formations must have at least one operational IFF/SIF per element.

4.3.16. Identification Friend or Foe/Selective Identification Feature (IFF/SIF). Refer to **Paragraph 6.24** for IFF/SIF requirements.

Chapter 5

AIRLAND OPERATIONS

5.1. Aircraft Maximum Gross Weight Policy. Aircraft maximum gross weight is 155,000 pounds. Waiver authority for operations up to 165,000 pounds is Operations Group Commander or COMAFSOF/Commander Air Force Forces for AFSOC C-130 operations within their AOR. Waiver authority for operations above 165,000 pounds is HQ AFSOC/A3. The maximum waiverable gross weight is 175,000 pounds. Operations above 155,000 pounds require an AFTO Form 781A entry with the actual gross weight at which the aircraft was operated. Operations above 155,000 pounds, although structurally possible, are not advisable for routine operations and should be limited due to the increased airframe fatigue and maintenance costs incurred. When operating aircraft at gross weights in excess of 155,000 pounds use primary fuel management and check the limit flight speed versus altitude chart in Section 5 of the flight manual. Aircraft will not be operated in such a manner to exceed flight manual or performance manual limitations during ground or flight operations. Preflight Operational Risk Management (ORM) will focus on takeoff conditions/obstacles and extreme diligence will be used when computing Takeoff and Landing Data (TOLD). Climb out factor and 3-engine climb performance will be incorporated into TOLD cross-check. Tactical or low-level operations above 155,000 pounds for non-contingency missions are not authorized. Aircraft will land at or below 155,000 pounds.

5.2. Checklists.

5.2.1. The Pilot Flying (PF) the aircraft will initiate all checklists unless the flight manual or this instruction establishes another procedure.

5.2.2. Carry abbreviated checklists. The only pages (or inserts) authorized in approved checklists are C-130 series Technical Order (T.O.) aircrew checklists, AFSOC approved checklists and briefing guides, and OG/OGV approved information guides. Units may construct locally approved in-flight guides using AF Form 4124, AFSOC Flight Crew Information Guide and will provide a copy to OG/OGV for approval.

5.2.3. If making personal notes on checklists, briefings, or information guides they must be current .

5.2.4. Abbreviated checklist items that do not apply to unit aircraft or mission may be lined out. Do not challenge these items during checklist accomplishment.

5.3. Duty Station. Both pilots shall be in their seats during flight. One of the pilots may be out of their seat for brief periods to meet physiological needs. With both pilots in their seats, the PIC may authorize rest periods for one pilot occupying a primary duty station during non-critical phases of flight. Comply with Controlled Cockpit Rest guidance in AFI 11-202V3. Only one pilot, or the flight engineer (FE), may be absent from their duty station at a time. All aircrew members will notify the PIC prior to departing assigned primary duty station.

5.4. Flight Deck Entry.

5.4.1. The following personnel are authorized on the flight deck during takeoff, landing, and critical phases of flight. They must be in compliance with **paragraph 5.9.2**

5.4.1.1. Additional crewmembers (if seats are not required by primary crewmembers or flight examiners).

5.4.1.2. Individuals approved by the group commander or COMAFSOF.

5.4.2. The PIC may authorize passengers to visit the flight deck during non-critical phases of flight. Refer to **paragraph 3.1.5** for unqualified personnel access restrictions to any primary crew station.

5.5. Takeoff and Landing Policy.

5.5.1. The PIC will occupy either the left or right seat during all takeoffs and landings.

5.5.2. A qualified Instructor Pilot (IP) or Evaluator Pilot (EP) may takeoff or land from either seat under any condition.

5.5.3. A qualified Mission Pilot (MP) or First Pilot (FP) may takeoff and land from either seat. Comply with paragraph 5.6.

5.5.4. A qualified MP/FP will land from the left seat during aircraft emergencies, unless conditions prevent compliance.

5.5.5. Pilots in IP upgrade training may take off and land from the right seat under the supervision of an IP or EP when an unqualified pilot occupies the other seat.

5.5.6. A qualified MP will takeoff/land from the left seat under the following conditions:

5.5.6.1. During formation departures and recoveries. Evaluators, instructors and instructor upgrade students may land from the right seat for training, currency, or proficiency.

5.5.6.2. During maximum effort or substandard airfield operations. Evaluators, instructors and instructor upgrade students may land from the right seat for training, currency, or proficiency.

5.5.6.3. During missions operating in hostile airspace (IAW AFI 11-401) or in areas of hostile activity (ORM assessment of High). For units operating in defined combat zones, AFSOC/A3 or designated COMAFSOF may authorize takeoffs and landings from the right seat at specific airfields with the following restrictions:

5.5.6.3.1. PICs must have accomplished 5 takeoffs and landings at the airfield before allowing their copilots to takeoff or land.

5.5.6.3.2. Copilots must have observed 5 takeoffs and landings at the airfield before they are authorized to takeoff or land.

5.5.6.4. At airfields that require any waiver approval. ***EXCEPTION:*** Non-DoD approach waivers.

5.5.6.5. At certification airfields specified in the HQ AMC Airfield Suitability and Restrictions Report (ASRR).

5.5.6.6. For all Night Vision Goggle (NVG) Airland operations. ***EXCEPTION:*** Current and qualified MPs/Mission Copilot (MC)s may accomplish NVG landings (non-shortfield/non-maximum effort) from the right seat provided that the left seat pilot is NVG Airland current and qualified.

5.5.7. PICs who possess less than 100 hours in command in any C-130 aircraft since initial upgrade will make all takeoffs and landings when the right seat is occupied by a First Copilot (FC) or FP.

5.6. Copilot Landing Policy. Except as specified above, and provided no distinguished visitor (DV) four or higher are on board, copilots may takeoff or land:

5.6.1. From either seat if an instructor or flight examiner occupies the other seat.

5.6.2. From the right seat if an FP or above occupies the left seat. Comply with paragraph 5.5.7.

5.6.3. If qualified, from the right seat using NVG for non-shortfield/non-maximum effort operations provided that a NVG Airland current and qualified PIC occupies the left seat. Runway width must be 100' or greater.

5.7. Landing Gear and Flap Operation In-flight.

5.7.1. The landing gear will be operated by the pilot in the right seat. Actuate the landing gear only after command of the pilot flying the aircraft. Prior to actuation of the landing gear, the other pilot will acknowledge the command by repeating it.

5.7.2. Operate the flaps only after the command of the PF. Prior to operating the flaps, acknowledge the PFs command by repeating it. The PIC may assign flap operation to either the pilot monitoring (PM) or the flight engineer.

5.8. Use of Outside Observers: Use crewmembers to assist in outside watch during all taxi operations and in flight during arrivals and departures.

5.9. Seat Belts:

5.9.1. Crewmembers occupying either the pilot, copilot, or flight engineer seat will have seat belts fastened at all times.

5.9.2. All occupants will be seated with seat belts fastened during taxi, takeoffs and landings. ***EXCEPTION:*** Flight examiners, instructors, mission commanders, crewmembers performing scanner duties, flight engineers, aerial gunners, and loadmasters performing required duties during taxi, takeoffs and landing; however, they will have a designated seat and required restraint available.

5.10. Aircraft Lighting:

5.10.1. Use taxi lights during all taxi operations. Use wingtip taxi lights during night taxi operations (except AC-130H). Use landing lights at night in unlighted areas. Use the landing and taxi lights during all takeoffs and landings. Use taxi lights in flight any time the landing gear is extended unless reflections cause pilot distractions in instrument conditions.

5.10.2. Use anti-collision lights or strobe lights from takeoff to landing on all flights. The PIC may turn off anti-collision lights when it is in the best interest of safety to do so. Aircraft with both anti-collision lights and strobe lights inoperative may continue to a base where repairs can be made.

5.10.3. Formation and leading edge lights should be on in addition to the anti-collision/strobe and position lights during operations below 10,000 feet. Landing lights will

be used in accordance with AFI 11-202V3, chapter 5. ***NOTE:*** Formations may vary lighting as necessary provided adequate visual identification of the formation is maintained.

5.10.4. Contingency operations may dictate that external lights are off and internal lights are limited to the minimum necessary for aircrew activities.

5.11. Advisory/Required Calls.

5.11.1. The PF will periodically announce intentions during departures, arrivals, approaches, and when circumstances require deviating from normal procedures. Table 5.1. through Table 5.5. depict mandatory calls for non-precision approaches, precision approaches, climbout and descent, respectively.

Table 5.1. Departure.

PHASE OF FLIGHT	PM	PF
Takeoff Aborted Prior to Refusal Speed	"REJECT" Note 1	
At Refusal Speed	"GO"	
At Takeoff Speed	"ROTATE"	

Table 5.2. Approaches Flown to MDA and MAP.

PHASE OF FLIGHT	PM	PF
100 feet above procedure turn, step-down, and FAF altitudes	"100 ABOVE"	
100 feet above MDA	"100 ABOVE"	
At MDA	"MINIMUMS"	
Runway environment in sight and the aircraft is in a position to execute a safe landing.	"RUNWAY IN SIGHT"	
At MAP	"MISSED APPROACH POINT"	Note 2
At or past the MDA or MAP; AND Runway environment not in sight or the aircraft is not in a position to execute a safe landing.	"GO AROUND"	

Table 5.3. Approaches Flown to a DA or DH.

PHASE OF FLIGHT	PM	PF
100 feet above FAF/glideslope intercept altitude	"100 ABOVE"	
100 feet above DA/DH	"100 ABOVE"	
At DA/DH with runway environment in sight and the aircraft is in a position to execute a safe landing.	"LAND"	Note 4
At DH (precision approach only) with Approach Light System (ALS) in sight (CAT I ILS) and the aircraft is in a position to execute a safe landing.	"CONTINUE" Note 2	Note 4
At or below the DA/DH; AND Runway environment not in sight or the aircraft is not in a position to execute a safe landing.	"GO AROUND"	

Table 5.4. Climb Out.

PHASE OF FLIGHT	PM	PF
Transition Altitude	"TRANSITION ALTITUDE" Note 5	Note 5
1000 feet below assigned altitude/FL	"1000 BELOW"	

Table 5.5. Descent.

PHASE OF FLIGHT	PM	PF
Transition Level	"TRANSITION LEVEL" Note 5	Note 5
1000 feet above assigned altitude/FL, initial approach fix, or holding altitude	"1000 ABOVE"	

NOTES:

1. Prior to Refusal Speed, any crewmember noting a safety of flight condition/malfunction will state "Reject" and give a brief description of the malfunction.

2. The PF will announce his/her intentions to either land or go-around. If the runway environment is not in sight and/or the aircraft is not in position to execute a safe landing, a go around will be made.

3. With weather at CAT 1 minimums on a CAT 1 ILS, the pilot may only see the initial portion of the approach light system. The pilot may continue to 100 Height Above Touchdown (HAT) with reference to the approach light system but may not descend below 100 feet above touchdown zone elevation using the approach lights as reference unless the red terminating bars or the red side row bars are distinctly visible and identifiable.

4. The PF will announce his/her intentions to either land, continue, or go-around. Respond intention to "Land" if runway environment is in sight, will remain in sight throughout touchdown and the aircraft is in a position for a safe landing.

5.11.2. Deviations:

5.11.2.1. The PM will inform the PF when heading or airspeed deviations are observed, or when the altitude is more than 100 feet from the desired, and no attempt is being made to correct the deviation.

5.11.2.2. Any crewmember seeing a deviation of 200 feet altitude or 10 knots in airspeed, or a potential terrain or obstruction problem, will immediately notify the PF. Deviations from prescribed procedures for the approach being flown will also be announced.

5.11.3. Runway Environment. The runway environment consists of one or more of the following elements:

5.11.3.1. The approach light system (except that the PF my not descent below 100 feet above the Touchdown Zone Elevation (TDZE) using the approach lights as a reference unless the red termination bars or the red side row bars are also visible and identifiable).

5.11.3.2. The threshold, threshold markings, or threshold lights.

5.11.3.3. The Runway End Identified Lights.

5.11.3.4. The touchdown zone, touchdown zone markings, or touchdown zone lights.

5.11.3.5. The runway, runway markings, or runway lights.

5.11.3.6. The Visual Approach Slope Indicator.

5.12. Communications Policy:

5.12.1. Aircraft Interphone:

5.12.1.1. All crewmembers will monitor interphone. Crewmembers will notify the pilot before going off headset and advise when back on headset.

5.12.1.2. Do not discuss classified information on the interphone during radio transmissions.

5.12.1.3. Classified interphone or radio transmissions will be recorded on the cockpit voice recorder if it is operating. Ensure the CVR remains on and running until the tape is clear of any recorded classified conversations.

5.12.1.4. Non-aircrew members may monitor interphone or radio transmissions only when specifically approved by the PIC. The PIC will brief communications policy to these personnel prior to flight. The PIC must ensure no one monitors classified information for which they are not cleared or transmits classified information over the radios.

5.12.1.5. Sterile Cockpit. Limit conversation to that essential for crew coordination and mission accomplishment during checklists, taxi, takeoff, approach, landing, and any other critical phase of flight.

5.12.2. Command Radios:

5.12.2.1. The pilot not flying the aircraft normally makes all radio calls.

5.12.2.2. All crewmembers will monitor the primary radio unless specifically directed to do otherwise by the PIC or subsequent chapters of this instruction. The PIC will designate crewmembers required to monitor the HF and or SATCOM radio.

5.12.2.3. The pilot operating command radios will tell the crew which radio is primary.

5.12.2.4. Pilots are responsible for ensuring emergency frequencies are monitored at all times.

5.12.2.5. During emergencies, request simultaneous Ultra-High Frequency (UHF) and Very-High Frequency (VHF) transmissions when operating in a terminal area under radar control.

5.12.2.6. One of the pilots will record and read back all ATC clearances. The navigator will record the clearance and monitor the read back including all transmissions pertaining to ATC instructions involving departure, en route, and approach procedures. Disregard this procedure when such action interferes with timely completion of more important duties.

5.13. Pilot Proficiency with Munitions.

5.13.1. AC-130s may do pilot proficiency events at joint-use or military fields with munitions on board provided a letter of agreement between the OG/OGV or /COMAFSOF and airfield manager is on file. A list of approved airfields will be published in local area procedures.

5.13.1.1. If an emergency situation requires the gunship to full stop at the airfield, the PIC will ensure the aircraft is parked IAW Chapter 18, **Table 18.1**

5.14. Wind Limitations. Maximum crosswind limits are in accordance with flight manual limitations. Remain within the "recommended" or "caution" areas of the crosswind charts for normal takeoffs and landings. Simulated engine out landings (one or two engine inoperative) must fall within the "Recommended" area unless otherwise approved by the Group Commander, or COMAFSOF (for contingency operations).

5.15. Runway Condition Reading (RCR) and Runway Surface Condition (RSC): The performance charts used to determine braking action are based on concrete runways. The runway surface should be considered wet when water on the runway causes a reflective glare. The RCR values for the following runway surfaces in Table 5.6. are estimates based on operational experience and should be used only as a guide.

Table 5.6. RCR Values.

TYPE SURFACE	RCR (DRY)	RCR (WET)
Asphalt	23	12
Aluminum Matting	20	10
M8A1/With Anti-Skid (PSP)	20	8
M8A1/Without Anti-Skid (PSP)	13	3
Clay	16	5
Crushed Rock/Coral	16	5

5.15.1. Limit AC-130 operations into and out of slush or water covered runways to a covering of one inch. This number is based on performance charts where an RSC of 10 is equal to one inch of slush or water. Performance data where more than one inch of slush or water is present may not be accurate.

5.16. Wake Turbulence Avoidance. Pilots must ensure wake turbulence avoidance criteria are met during flight operations. Acceptance of a visual or contact approach clearance, or instructions to follow an aircraft, is acknowledgment that the pilot will maintain a safe interval for wake turbulence avoidance. Adhere to aircraft wake turbulence avoidance and separation criteria contained in Department of Defense (DoD) FLIP planning (General Planning Chapter 5).

5.17. Runway and Taxiway Requirements. Use normal takeoff and landing procedures whenever practical. For mission accomplishment, if approach end overruns are available and stressed or authorized for normal operations, they may be used to increase the runway available for takeoff. All speeds and distances will be computed "without nose wheel steering." For mission accomplishment the PIC may authorize "with nose wheel steering" corrections on dry hard surfaced runways in lieu of downloading cargo/fuel. Use of non-hard surfaced runways or taxiways requires group commander, or COMAFSOF approval.

5.17.1. Normal Operations:

5.17.1.1. Takeoff. Minimum runway length is critical field length.

5.17.1.2. Landing. Minimum runway length is landing distance plus the following correction factors:

5.17.1.2.1. Runway Visual Range (RVR) less than 40 (3/4 mile)--add 1,000 feet

5.17.1.2.2. RVR equal to or greater than 40 (3/4 mile)--add 500 feet.

5.17.1.3. Minimum runway width is 60 feet or 19 meters.

5.17.1.4. Minimum taxiway width is 30 feet or 9 meters.

5.17.1.5. NVG Operations: Minimum runway length for landing is landing distance plus 1,000 feet.

5.18. Aircraft Taxi and Taxi Obstruction Clearance Criteria.

5.18.1. Do not taxi an aircraft within 25 feet of obstructions without wing walkers monitoring the clearance between aircraft and obstructions. With wing walkers, avoid taxi obstructions by at least 10 feet. ***EXCEPTION:*** IAW AFI 11-218, aircraft may taxi without marshallers/wing walkers at home station along fixed taxi lines which have been measured to ensure a minimum of 10 feet clearance from any obstruction and the obstruction is permanent. Aerospace Ground Equipment (AGE) and vehicles are considered a permanent obstruction provided it is parked entirely within a designated area. Areas will be designated by permanent markings such as painted boxes or lines on the ramp or another suitable means. Adjacent aircraft are also considered a permanent obstruction, provided the aircraft is parked properly in its designated spot and is not moving.

5.18.2. When taxi clearance is doubtful, use one or more wing walkers. If wing walkers are not available, the PIC will deplane one or more crewmembers to maintain obstruction clearance and provide marshaling using AFI 11-218 signals. Use wing walkers, deplaned crewmembers, or a crewmember on interphone positioned at the paratroop door(s) to act as an observer while maneuvering on narrow taxiways. During night taxi operations, marshallers will have an illuminated wand in each hand. Wing walkers are only required to have one illuminated wand. Observers should be in a position to see wing walkers at all times (through door or windows) and communicate with the pilot.

5.18.3. Use low speed ground idle when practical. If Foreign Object Damage (FOD) is a problem, the outboard engines may be shut down provided gross weight, taxiway, and weather are favorable. Verify all sources of brake pressure before shutting down symmetrical engines.

5.18.4. After landing and clearing the runway, with approval of the pilot, the loadmaster may open the aft cargo door and lower the ramp to 12 inches above horizontal, to prepare for ammo offload or onload provided all equipment, cargo, and passengers remain secured in the cargo compartment/gun deck.

5.18.5. **Figure 5.1** provides obstruction clearance criteria for ground operations at airfields with fixed obstructions or terrain (i.e., fire hydrants, fuel pits, uneven surfaces). It depicts maximum obstacle or terrain heights at specified distances to ensure clearance with the main

landing gear on the edge of the operating surface. PICs will be advised of any known obstructions that exceed the shaded areas.

5.19. Reverse Taxi. Use extreme caution while backing the aircraft due to inherent hazards.

5.19.1. The pilot will coordinate engine status/utilization with the flight engineer, and taxi directions and signals to be used with the loadmaster and marshaller prior to commencing reverse taxi operations.

5.19.2. Secure all cargo and ensure all passengers are seated.

5.19.3. Open the aft cargo door and lower the ramp to approximately 12 inches above horizontal.

5.19.4. The loadmaster will be on the ramp in position to direct reverse taxi, report any hazards, and provide the pilot with timely interphone instructions on turns, distance remaining, condition of the maneuvering area, and stopping point.

5.19.5. During night reverse taxi operations, the pilot and loadmaster will ensure that visibility in the taxi area is sufficient to conduct safe taxi operations. The loading lights, retracted landing lights, NVGs, or any other source that provides adequate lighting of the taxi area may be used.

5.19.6. Stop no less than 25 feet from an obstruction even if using a wing walker.

5.19.7. The flight engineer will monitor engine instruments and overheat detection/warning systems for all engines.

5.19.8. The copilot will monitor outside the aircraft and backup the flight engineer on engine instruments.

5.20. Buddy and Windmill Taxi Starts. Buddy and windmill taxi starts must be approved by the group commander or COMAFSOF. Group commanders may delegate this authority to their squadron or mission commander when the unit is deployed. This authorization will not be construed to allow repeated buddy or windmill starts at various scheduled en route stops. Load all remaining crewmembers after completion of the windmill taxi start IAW applicable flight manual.

5.21. Takeoff and Landing Obstruction Criteria.

5.21.1. The mission directive is confirmation that AFSOC/CC, or COMASOF with area jurisdiction, has reviewed the airfields of intended operation for obstructions and other hazards IAW Air Force and AFSOC directives. The group commander or COMAFSOF will advise crews of known obstructions and other factors that could be hazardous to airland operations. PICs will not make an approach and landing into an airfield requiring certification by the ASRR unless they have previously operated into that airfield as a pilot, copilot, or observer and have reviewed the airfield certification briefing and audiovisual program within the last 14 days.

5.21.2. An airfield is considered suitable for C-130 operations when:

5.21.2.1. The airfield is listed as suitable in the HQ AMC/DOAS ASRR. Comply with ASRR guidance in AFI 11-202V3, AFSOCSUP1, Chapter 2.

5.21.2.2. No obstructions or rising terrain exceed the shaded areas of **Figure 5.2** This ensures clearance only if the aircraft is maintained within 35 feet of runway centerline and a bank of five degrees is not exceeded.

5.21.2.3. When an obstruction or terrain exceeds the shaded areas of **Figure 5.2**, specific approval by the group commander, or COMAFSOF is required and the PIC must be advised of the height and location of the obstructions as well as specific procedures to avoid the obstruction (e.g., landing beyond obstacles).

5.21.3. Delete.

Figure 5.1. Ground Operations Obstruction Clearance Criteria.

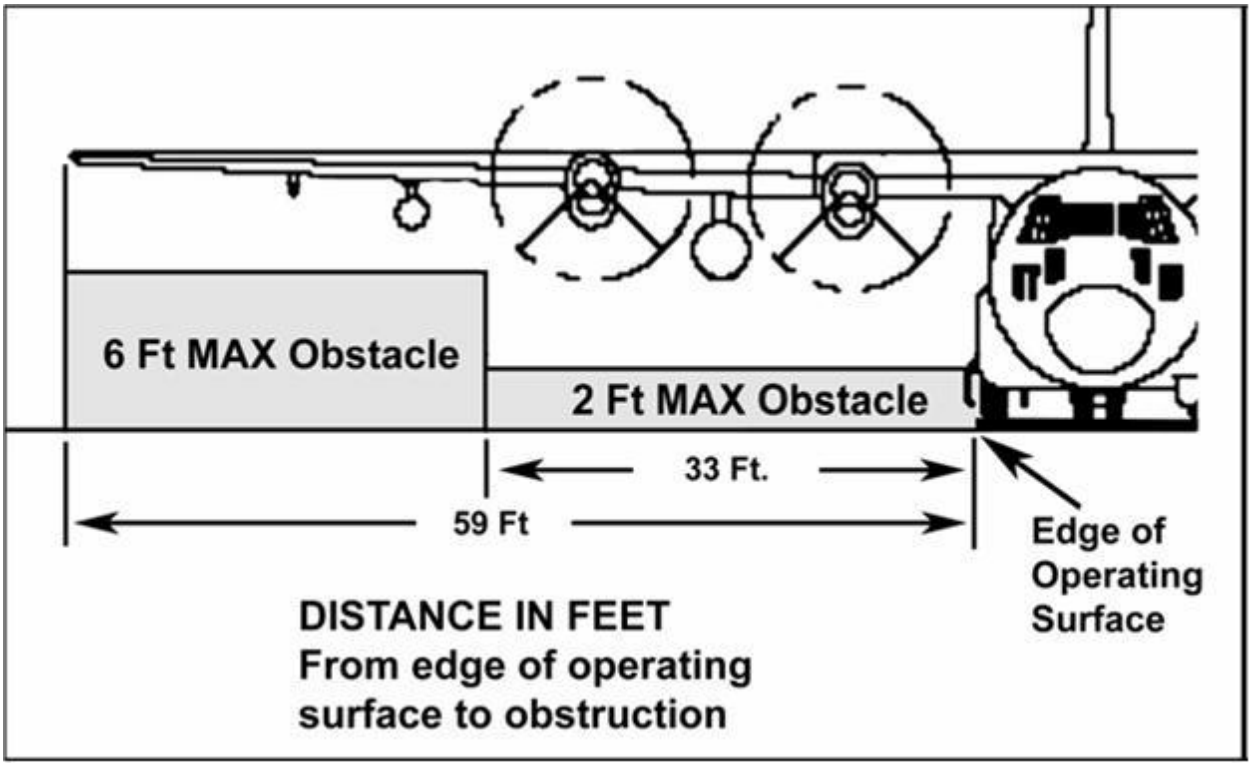
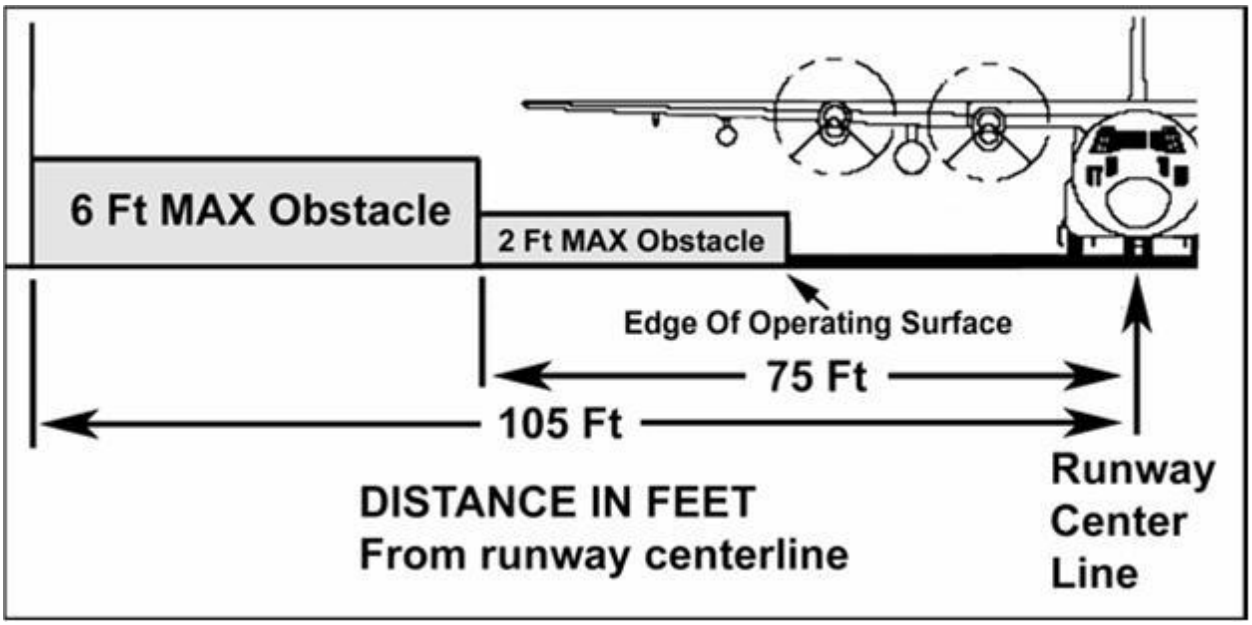


Figure 5.2. Takeoff and Landing Obstruction Clearance Criteria.



5.22. Intersection Takeoffs. Normally, initiate takeoffs from the beginning of the approved usable portion of the runway. The decision to make intersection takeoffs rests solely with the PIC. Base TOLD card computations on runway remaining from the point the takeoff is initiated.

5.23. Reduced Power Operations. Reduced power operations are intended to prolong engine service life and should be used any time maximum power is not required.

5.23.1. During proficiency air work (flights or operations that are mainly confined to any local traffic pattern), when reduced power is used, Turbine Inlet Temperature (TIT) will not be less than 1010º Celsius (C) for takeoff, not to exceed 19,600 inch-pounds of torque.

5.23.2. Reduced power for formation takeoffs to a torque corresponding to no less than 1010º C TIT for takeoff. Lead will reduce power to 970º C TIT once climb speed is obtained.

5.23.3. Climb power to cruise altitude will be 1010º C TIT, not to exceed 19,600 inch-pounds of torque, unless mission requirements dictate otherwise.

5.24. Three-Engine Takeoffs. Actual engine-out takeoffs require HQ AFSOC/A3 waiver.

5.25. Aircraft Recovery from Unprepared Surfaces. Aircrews should not normally attempt to recover an aircraft after inadvertent entry onto soft, unprepared surfaces not suitable for taxi. Ground crews using the appropriate equipment will accomplish aircraft recovery. Aircrews may accomplish recovery at austere locations if, after thorough inspection, the PIC is sure there is no damage and the surface will support the aircraft. If there is damage or if there is any doubt that the surface will support the aircraft, aircrews will not attempt recovery.

5.26. Engines Running Onload or Offload (ERO) AC-130H/U. For C-130H, crews will refer to guidance published in AFI 11-2MC-130 Volume 3. Do not use ERO procedures when explosive cargo is involved unless authorized by the Joint Airborne/Air Transportability Training (JA/ATT) exercise operation order or contingency ATO.

5.26.1. The ERO procedures in this paragraph may be used for any mix of personnel or cargo. The aft cargo door and ramp is preferred when more than 10 passengers are involved. The PIC will assess prevailing weather, lighting, and parking location to ensure a safe operation.

5.26.2. General Procedures:

5.26.2.1. The PIC will brief crewmembers on the intended ERO operation, emphasizing specific crewmember duties.

5.26.2.2. The parking brake will be set and one pilot will monitor brakes, interphone, and radio.

5.26.2.3. Operate engines in ground idle (low speed, if applicable). If conditions warrant, open air deflector door and lower flaps to reduce prop or jet blast aft of the aircraft.

5.26.2.4. Turn wing leading edge lights on during night ERO. Taxi lights may be used at the discretion of the PIC.

5.26.2.5. Resume taxi after the door warning light is out and when the LM has verbally acknowledged that the aircraft is ready for taxiing. ***CAUTION:*** Due to hazards involved (i.e., prop blast, proximity to engines or props, lack of paratroop door steps), only hand transferable items of cargo may be on or offloaded through the paratroop doors during EROs.

5.26.2.6. Do not onload or offload through the crew entrance door and ramp, or paratroop door at the same time.

5.26.3. Personnel onload and offload through the crew entrance door (except AC-130H).

5.26.3.1. During enplaning and deplaning, station a crewmember (normally the LM) on interphone (cord held taut) approximately 25 feet and at a 45-degree angle from the aircraft axis.

5.26.3.2. Brief deplaning personnel to remain forward of the interphone cord.

5.26.3.3. The PIC will give clearance to open the crew entrance door.

5.26.4. AC-130H personnel onload and offload through the right paratroop door.

5.26.4.1. Brief deplaning personnel to remain aft of the interphone cord.

5.26.5. Personnel or cargo onload and offload through the aft cargo door and ramp.

5.26.5.1. After clearance from the pilot, open the aft cargo door, and lower the ramp as required.

5.26.5.2. The loadmaster will direct all onload and offload operations. Passengers will be escorted by a crewmember when enplaning or deplaning. Deplane passengers before cargo and enplane passengers after cargo unless cargo size or location dictates otherwise.

5.26.6. ERO for crew changes during local training missions is authorized provided the enplaning crew does not approach the aircraft until the deplaning loadmaster on headset is in position outside the aircraft. Keep ERO for crew changes to the absolute minimum necessary to accomplish the mission.

5.27. Arrival. Plan arrival altitudes to minimize the threat. When more than one aircraft is involved, consider using multiple altitudes and traffic patterns to prevent predictable targeting by the enemy.

5.28. Traffic Pattern. Fly normal traffic patterns when the environment permits. Hostile activity or terrain may require significant modifications to normal traffic patterns. Refer to Chapter 18 for tactical recovery options.

Chapter 6

GENERAL OPERATING PROCEDURES

Section 6A—Pre-Mission

6.1. Aircrew Uniforms.

6.1.1. Wear the aircrew uniform as outline in AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel*, and the appropriate MAJCOM supplement, on all missions, unless other attire is authorized (When the USAF Foreign Clearance Guide (FCG) requires civilian attire, wear conservatively styled clothing).

6.1.2. All aircrew members will have flight gloves readily available during all flights and will wear them for takeoffs, landings, and when operating in a combat environment.

6.1.3. Crewmembers will remove rings and scarves before performing aircrew duties.

6.1.4. Arctic clothing is required when engaged in Arctic or Antarctic operations, or when required by local operating procedures.

6.2. Personal and Professional Equipment.

6.2.1. Passports. Carry passports on missions when required by the FCG.

6.2.2. Shot Records. Carry shot records on all off-station missions outside the CONUS, Alaska, or Hawaii. Aircrew members will ensure they meet immunization requirements for the mission.

6.2.3. Identification Tags. Identification tags will be worn around the neck or carried in a flight suit pocket during all flights.

6.2.4. FOD Hazards. Crewmembers will not wear wigs, hairpieces, rings, ornaments, pins, clips, other hair fasteners, or earrings in the aircraft or on the flightline. ***EXCEPTION:*** Plain elastic hair fasteners or plastic barrettes are allowed, providing they do not interfere with the wearing of headsets or helmets, or the donning of oxygen equipment. All devices will be accounted for before and after flight.

6.2.5. Restricted Area Badges. Carry the restricted area badge on all missions (except actual combat missions). Display the badge only in designated restricted areas.

6.2.6. Reflective Belts. A reflective belt or suitable substitute will be worn on the flightline during hours of darkness or periods of reduced visibility.

6.2.7. Tool Kits. A tool kit will be on board for all flights. Individual units will establish requirements for tools to be included in these kits and the crewmember responsible for the kit (Hostile Environment Repair Kit (HERK) tool kits satisfy this requirement). The lead gunner is responsible for taking gun-clearing tools on live fire off-station missions. ***NOTE:*** Gun clearing tools on live fire off-station missions are not required if AC-130 weapons/Explosive Ordnance Disposal (EOD) support is available at the deployed location.

6.2.8. Hostile Environment Repair Kit. One HERK will be onboard for all OCONUS and contingency deployment missions. Units will identify where the HERK will be stored on the

aircraft in the local supplement to this AFI. The flight engineer will ensure the HERK is onboard and serviceable (secured) during the aircraft preflight prior to departure.

6.2.9. Preflight and carry a headset, helmet and oxygen mask, and operable flashlight on all flights. When quick-don oxygen masks are installed, they will be preflighted (to include communications hook up) if they are used as the primary oxygen source. If the helmet and oxygen mask is the primary oxygen source throughout the flight, the quick-don mask is not required to be preflighted or hooked up. ***NOTE:*** Crewmembers will make available their personal helmet and oxygen mask to an aircrew flight equipment (AFE) facility for cleaning, maintenance, and communications testing every 30 days.

6.2.10. Protective Headgear: Wear helmets during contingency and combat missions. The PIC may waive this requirement for specific crewmembers when mission requirements dictate.

6.2.10.1. All personnel aft of flight station (FS) 617 **(AC-130H)** and FS 245 **(AC-130U)** will wear flight helmets while guns are configured for live fire operations. ***EXCEPTION*****:** During training missions, crew members remaining in the booth or right scanner compartment while guns are on the line are not required to wear helmets.

6.2.10.1.1. When conditions require personnel in the cargo compartment to wear the flight helmet the chinstrap will be fastened. ***NOTE*****:** Helmet visors should be lowered or eye protection worn by all personnel aft of flight station (FS) 617 when any door(s) are required to be open.

6.2.11. NVGs. All crewmembers required to carry NVGs will preflight them prior to flight for missions using NVGs. If available, the PIC will preflight and carry one spare set of NVGs. Each crewmember will carry approved spare batteries for their own NVGs.

6.2.11.1. Pilots will wear NVGs with similar acuity and gain.

6.3. Survival and Protective Equipment. This equipment may include, but is not limited to the following: flak vest, life preserver unit (LPU), survival vest and kit, parachute and protective headgear. Each individual on board will fit a parachute and have it readily available prior to all weapons delivery, combat, and contingency missions. All crewmembers will have individual survival vests readily available, and should wear them to the maximum extent possible, during combat and contingency missions. The PIC will determine minimum wear requirements based on threat assessment, mission, and crew considerations.

6.4. Aircrew Publications Requirements.

6.4.1. OG/OGVs will determine which crewmembers will carry the publications specified in Table 6.1. on all missions. These publications may be in digital or paper format. If in digital format, crews will ensure there are redundant e-tools viewing sources (hardware) on-board the aircraft. If e-tools viewing hardware is used in flight it must meet the requirements of AFI 11-202V3. All electronic media must be of equal or higher quality than paper products. Poorly scanned documents/charts do not meet this standard and are unacceptable. Aircrews participating in this program will carry all publications pertinent to their airframe rather than those only applicable to their crew position. This restriction assures in-flight publications access in those cases where hardware failure/data source corruption prevents access at one or

more crew positions. FLIP may be viewed/utilized in flight via an AFSOC/A3V approved e-tools device.

Table 6.1. Aircrew Publications.

Aircraft Flight Manual[1]
Aircraft Performance Manual
Abbreviated Flight Manual Checklists
Abbreviated AR Checklist
ATP-56(B) (Parts 1 and 2 and required annexes)
AFI 11-202V3
AFI 11-2AC-130V3
AFSOC MAN 11-201
Flight Crew Information Summary (FCIS)
Note 1: The EWO will carry the classified section when mission dictates**.**

6.4.2. Operations Group Stan/Eval (OG/OGVs) will develop procedures and standards for the e-pubs program. At a minimum, procedures will address a data backup plan at the OG/OGV level for the master publications file. For this purpose, utilize three separate data media storage devices (e.g., CD-ROM, hard drive, and local area network drive). If at all feasible, these data sources should be physically separated from each other in the event of catastrophic failure (e.g., fire, tornado etc.). Additionally, OG/OGVs will develop a plan to obtain the most current publications and aircrew members will update their publications at least monthly and prior to performing flight duties. OG/OGVs will also develop a method by which read-only publications will be provided to the end-user/aircrew and the timing of and process by which supplements to each publication will be posted. This method will also include procedures for maintaining electronic and paper publications concurrently, if appropriate. Each level (MAJCOM, Group, and Squadron) will be responsible for posting their particular supplements to publications; ultimately, the end-user still bears the responsibility for properly posted publications in either electronic or paper format. Lastly, OG/OGVs will establish procedures for in-flight use focusing on accessibility and reliability of information. In this regard, OG/OGVs are encouraged to restrict data source types (e.g., thumb drives, etc.) to ensure hardware capability in all crew positions. OG/OGVs will publish additional restrictions as necessary to ensure the e-pubs program does not require a greater workload in flight than the current model of paper products. ***EXCEPTION:*** Aircrew flight manual checklists will remain in paper format.

6.4.2.1. Electronic copies (CD-ROM, zip disk etc) of unit publications library are acceptable for deployments. Ensure all copies are maintained up to date and files not offered electronically are to be maintained in paper format. Appropriate equipment to view these files must be available.

Section 6B—Pre-Departure

6.5. Flight Crew Information File (FCIF). Review volume I, part A, of the FCIF before all missions. Crewmembers will certify their FCIF review as approved by Group Stan/Eval (i.e., Patriot Excalibur (PEX), AF Form 4121 *FCIF Currency Record*, Flight authorization, etc.).

6.5.1. PICs will verify crewmembers have certified FCIF review prior to flight.

6.5.2. Crewmembers delinquent in FCIF and joining a mission enroute will receive an FCIF update from their primary aircrew member counterpart on that mission. Instructor pilots flying with general officers are responsible for briefing appropriate FCIF items.

6.5.3. Crewmembers that do not have a unit FCIF card (or if PEX is not available) will certify FCIF review by entering the last FCIF number and their initials beside their name on the file copy of the flight authorization or their ACM orders.

6.5.4. For PICs flying outside the CONUS, initialing the AF Form 4121 also certifies review of the unit classified airfield threat and security evaluation file. If no new material has been added to volume I since the last review, complete the date and initials columns and leave the FCIF number column blank

6.6. Aircraft Mission Kits. Units will maintain one mission kit per aircraft. The entire mission kit, with the exception of any forms required to remain in any hard-copy format, may be stored electronically as long as all publications and forms are accessible as required for mission accomplishment. Prior to off-station departures, the PIC or a designated representative will ensure a current mission kit is on board the aircraft either in electronic or paper format. The kit will contain, but is not limited to the items listed in **Table 6.2**. Items required by a unit or wing directive to be carried by an individual crew member need not be duplicated in the mission kit. Maintain sufficient quantities of directives and planning documents to allow implementation of evacuation and contingency plans.

Table 6.2. Aircraft Mission Kit.

SECTION I – Publications	
1. AFI 11-2AC-130, Volume 1, AC-130 Aircrew Training 2. AFI 11-2AC-130, Volume 2, AC-130 Aircrew Evaluation Criteria 3. AFI 11-401, Aviation Management 4. DODM 4140.25-M, DOD Management of Bulk Petroleum Products 5. ATP-56(B), Air-to-Air Refueling 6. T.O. 1C-130-1-4 (SCNS airplanes only)	
SECTION II – Forms	
1. <u>AF Forms:</u> a. 15, USAF Invoice b. 70, Pilot's Flight Plan and Log c. 315, USAF AV Fuels Invoice d. 457, USAF Hazard Report e. 651, Hazardous Air Traffic Report f. 1297, Temporary Issue Receipt g. 2282, Statement of Adverse Effect – Use of Government Facilities h. 4051, Low Level Flight Plan and Log i. 4053, INS Flight Plan Log j. 4063, Pilot Information Card	**2. <u>DD Forms:</u>** a. 175, Military Flight Plan b. 175-1, Military Weather Brief c. 1385, Cargo Manifest d. 1801, DoD International Flight Plan e. 1854, U.S. Customs Accompanied Baggage Declaration or CF6059B, Customs Declaration f. 2131, Passenger Manifest g. CF 7507, General Declaration (Outward/Inward)

k. 4064, C-130 Takeoff and Landing Card l. 4108, C-130 Fuel Log m. 4116, C-130 Flight Plan Record n. 4118, SCA Planning Form o. 4119, C-130 Fuel Planning Worksheet p. 4125, Range Control Chart q. 4139, SPECIAL OPERATIONS C-130 IN-FLIGHT REFUELING WORKSHEET	**3. AFSOC Forms:** a. 88, Dedicated Crew Chief Trip Report b. 97, AFSOC Aircraft Incident Report
SECTION III - Miscellaneous	
1. Foreign Nation Custom Forms (when applicable)	
2. All applicable local forms	

Section 6C—Briefings

6.7. Briefing Requirements. Crew members and supporting/supported forces will not fly unless they attend the crew briefings for their mission. ***EXCEPTION*:** When pre-mission requirements dictate, PIC may excuse certain members from the briefing. The PIC will ensure that those members receive a face-to-face briefing prior to engine start.

Section 6D—Flight Planning

6.8. Call Signs. Use Voice Call Sign Listing (VCSL) if specified in mission directives. Otherwise, use squadron or wing static call signs as directed.

6.8.1. Not used.

6.8.2. Search and Rescue (SAR). When tasked to participate in SAR operations, use the call sign "AIR FORCE RESCUE" plus the last five digits of the aircraft tail number.

6.9. Flight Plans. Regardless of whether a flight plan is prepared by the aircrew or is furnished by another agency, the PIC and navigator will verify routes and flight altitudes to ensure proper terrain clearance. The aircrew navigator who prepares or accepts the flight plan will remain on duty at the navigator's station during departure and will brief the relieving navigator thoroughly on all en route and destination hazards.

6.10. Fuel Planning. Use the appropriate fuel planning publication or Technical Order specified in Chapter 11, or an approved Portable Flight Planning System (PFPS).

6.10.1. Flying at long-range cruise at the cruise ceiling conserves the most fuel and is encouraged, but crews may elect to fly at other speeds and altitudes deemed appropriate for the mission. Crews should step-climb when atmospheric conditions and aircraft gross weight allow. Coordination between the navigator and flight engineer is essential for the most efficient fuel planning profile and should be accomplished. The flight engineer should cross check the fuel requirements of PFPS with the performance manual. Use primary fuel management, in accordance with the aircraft flight manual, whenever practical.

6.10.2. Add extra fuel when fuel is unavailable at enroute stops; when compressed ground times during single-day, multi-sortie missions preclude refueling at each enroute stop; or, when enroute refueling would delay or be detrimental to mission accomplishment.

6.10.3. Fuel Conservation. Aircrews will review fuel conservation procedures in the appropriate flight manual and this instruction. Training missions should be planned at altitudes, routes, and airspeeds to minimize fuel usage. Crews should attempt to fly within these parameters as often as practical without compromise to mission objectives or flight safety. Additionally, give consideration to the following fuel conservation practices:

6.10.4. Do not ferry unneeded fuel. It takes fuel to carry fuel. Ramp fuel and recovery fuel should be tailored to reduce aircraft gross weight within parameters of safe mission accomplishment and training requirements. (Temporary exceptions allowed for C-130 aircraft affected by center wing-box issues).

6.10.5. Minimize aircraft weight through reduction of equipment not necessary to accomplish the mission.

6.10.6. After landing on taxi-back, consider shutting down unnecessary engines.

6.10.7. Do not fly fast for crew convenience.

6.10.8. Fly optimal altitudes to minimize fuel burn. Step climb when practical.

6.10.9. In-flight procedures such as climb/descent profiles and power settings should also be considered for efficient fuel usage.

6.10.10. Minimize use of GTC/APU. Use ground power units when practical.

6.10.11. Establish C2 and flight following procedures to ensure timely notification of mission changes/cancellations to avoid unnecessary or unproductive flight time.

6.10.12. Do not fly solely for the purpose of meeting flying hour program objectives.

6.10.13. Fly missions at the most fuel conservative cruise speed option. On missions that are time rather than distance oriented, consider flying the lowest practical cruise option. Crews are encouraged to fly long-range cruise airspeeds on other missions, if practical.

6.10.14. Use low speed ground idle or two engine symmetrical power when practical for ground operation.

6.10.15. Cruise at the altitude that gives the best ground distance traveled for each pound of fuel consumed. As a technique, climb if ground speed is reduced less than 5 knots for each 1,000 feet of altitude increase. Descend if ground speed will increase more than 5 knots for each 1,000 feet of altitude decrease. Do not fly above cruise ceiling.

6.11. Departure/Arrival Planning.

6.11.1. The PIC will provide the obstacle height, distance, and gradient information necessary for performance computations for the departure, alternate, and destination airfields to the flight engineer. As a minimum, review the appropriate terrain chart or sectional chart in addition to the Standard Instrument Departure (SID) (if applicable). The flight engineer will complete the AF IMT 4064 *C-130 Takeoff and Landing Data Card* and the AF IMT 4063 *Mini C-130 TOLD Card*, in accordance with Chapter 12**.** A pilot crewmember or additional flight engineer will cross check the AF IMT 4064/4063 for accuracy by using the performance manual, TOLD computer, or approved tabulated data. As a minimum, the person checking the data will:

6.11.1.1. Verify gross weight independently from the AF IMT 4063/4064.

6.11.1.2. Cross-check air minimum control, takeoff, and landing speeds.

6.11.1.3. Review and compare the computed distances, ground roll, and climb gradient (if applicable) with the actual conditions, runway available, and departure procedures.

6.11.2. Flight Rules. Comply with AFI 11-202V3, AFSOC Supplement 1, and AFMAN 11-217 Volume 1 requirements for: Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) departures and arrivals; enroute weather requirements; and weather requirements for departure, alternate, and destination airfields.

6.11.2.1. Traffic Collision Avoidance System (TCAS). IAW AFI 11-202V3 and applicable AFSOC Supplement.

6.11.2.1.1. Ground Collision Avoidance System (GCAS). Ensure the proper mode of the GCAS is commensurate with the aircraft's phase of flight.

6.12. Airfield Review. Accomplish review IAW AFI 11-202V3 and AFSOC Supplement 1.

6.13. Intelligence Briefing. Before departing on missions outside the United States, crews will receive an intelligence briefing that will emphasize terrorist, enemy, and friendly political and military development in the area in which they will be operating. In theater, aircrews should receive intelligence updates on initial arrival at a forward operating location, or enroute stop, and thereafter when significant developments occur. Report information of possible intelligence value to the local intelligence officers at the completion of each mission.

6.14. Authenticators and Classified Material. Obtain and safeguard current authenticators and other classified materials required for the area being transited. Carry authenticators when flying into an ADIZ, participating in exercises, on overseas missions, deployments, and when specified in operation plans.

6.14.1. The Communications Security (COMSEC) material required depends on the theater of operation and user. The base COMSEC custodian can assist in obtaining the material required for the mission. Base Operations at AMC bases maintains the COMSEC material used on most missions.

6.14.2. Turn in authenticators and other classified materials at your ultimate destination and obtain receipts for classified material. Command and Control Center will provide temporary storage for authenticators/classified materials during ground time at enroute stops. Issue and turn-in of authenticators is normally a function of Base Operations. At locations where no storage facilities exist, classified materials may be stored in the aircraft safe, if available.

6.14.2.1. Remove classified information stored in the Global Positioning System (GPS), INU, or mission computers.

6.14.2.2. Clear all Transmission Security (TRANSEC) systems, such as secure voice and IFF.

6.14.3. In the event of an emergency, destroy classified material and equipment prior to crash landing or bailout, if possible.

6.15. Mission Folder. Each unit will develop a mission folder for each mission to ensure all pre-departure information is available to aircrews.

6.16. Route Navigation Kits.

6.16.1. The PIC or a designated crewmember will be issued a route navigation kit at the home station, which will remain with the aircraft until its return. Kits should contain sufficient quantities of materials to cover the complete round trip from the issuing station and return, plus appropriate materials to cover the theater of operation. This kit may be carried electronically following the guidance in **paragraphs 6.4.1** and **6.4.2** ***EXCEPTION:*** En route charts will be readily available in paper format in flight at all times.

6.16.2. If carried in paper format, segregate route navigation kits into two separate parts:

6.16.2.1. Part I. Sufficient material to cover the planned route trip and theater of operation.

6.16.2.2. Part II. For inter-theater missions only. Maps, charts, and flight information publications for global operation, excluding items in Part I.

6.16.3. Group CC/COMAFSOF may augment kits as necessary to meet special operational requirements.

6.16.4. Minimum contents of route navigation kits will be in accordance with Table 6.3. Commanders may modify the items as necessary for local training missions.

Table 6.3. Route Navigation Kits.

Item (Applicable to Area of Operations)	Part I	Part II (Global)
FLIP Planning (GP, AP/1, AP/2, AP/3, AP/4)	1	1
FLIP IFR Supplement	2	1
FLIP Flight Information Handbook (FIH)	2	1
FLIP En Route Charts (High and Low)	2	1
FLIP Area Charts (Terminal)	2	1
FLIP Instrument Approach Procedures (High and Low)	3*	1
Standard Instrument Departures (SIDs)	3*	1
Standard Terminal Arrival (STAR)	3*	1
OPREP-3 Report Format	1	1
Maps and Charts	As Req'd	1 ea. GNC
FLIP VFR Supplement	1	
Current Air Almanac	1	
AF Form 72, Air Report (AIREP)	3	
* Two required when a navigator is not part of the crew.		
NOTE: Navigation Sight Reduction Tables (HO 249, Volumes I, II, and III remain on the aircraft at all times.		

Section 6E—Pre-flight

6.17. C-130 Dash One Preflight.

6.17.1. The aircrew Dash One preflight inspection, once completed, is valid for 72 hours provided the aircraft is either sealed or continuously monitored by squadron personnel.

6.17.2. When an aircrew assumes a preflighted spare or quick-turn, a thorough visual inspection will be performed, paying particular attention to areas affected by maintenance or servicing.

6.17.3. Dash One preflight inspections are done in preparation for flight by the aircrew assigned to fly the mission designated for that aircraft. Having a partial aircrew, not scheduled to fly, accomplish one or more preflights for local training flights is not an acceptable practice. ***EXCEPTION:*** Operational Readiness Exercises (ORE), Operational Readiness Inspections (ORI), and contingencies/evacuations.

6.17.4. All aircrew assigned to preflight and/or seal aircraft will comply with crew rest and duty restrictions in AFI 11-202V3 and AFSOC Supplement. A crew will not preflight more than 4 aircraft in a 12-hour period or perform preflight duties for more than 12 continuous hours.

6.17.4.1. Duty not Including/Involving Flight (DNIF) crewmembers may accomplish preflights only with the concurrence of the flight surgeon. It is the responsibility of the crewmember to know his/her duty limitations. If possible crewmembers should have the flight surgeon document the AF Form 1042 appropriately IAW with AFI 48-123V3.

6.17.5. Unqualified crewmembers may not preflight aircraft except under the supervision of an instructor.

6.18. AFTO Form 781. Review the AFTO Form 781 before applying power to the aircraft or operating aircraft systems. The Exceptional Release (ER) must be signed before taxi. A maintenance officer, maintenance superintendent, or authorized civilian normally signs the ER. If one of these individuals is not available, the PIC may sign the ER. Ensure that the DD1896, Jet Fuel Identiplate and AIR card are on board the aircraft.

6.18.1. For Red-X clearing at stations without maintenance support refer to Chapter 12.

6.19. One-Time Flights. An aircraft may be released for a one-time flight with a condition that might be hazardous for continued use, provided the aircraft is airworthy for one flight to a repair station. Refer to T.O. 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures,* for Red-X downgrade authority and procedures. One-time flight approval authority is OG/CC or COMAFSOF. The chief of maintenance, the senior maintenance officer, or the chief of the AFMC repair team must first authorize the release. After the maintenance release is obtained, contact OG/CC, via stan/eval channels, for flight authorization. The PIC's concurrence is required before the aircraft can be flown.

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6.21. Aircraft Servicing and Ground Operations.

6.21.1. Aircraft Refueling. Maintenance personnel should be scheduled on missions where a need is anticipated. Two qualified personnel are required. Crew members qualified in refueling may only perform refueling duties at airfields away from home station when maintenance support is not readily available and the mission would be delayed.

6.21.1.1. Flight engineers are qualified and authorized to accomplish these duties when maintenance personnel are not available. If ground support personnel are not available, the PIC will designate other crewmembers to assist the flight engineer. Use the appropriate checklist during all refueling and defueling operations.

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6.21.1.6. When crewmembers are required to refuel, the flight engineer will act as the refueling team supervisor. Flight engineers acting as refueling supervisors and panel operators will comply with T.O. 00-25-172 and applicable T.O. 1C-130xx series T.O.s.

6.21.1.7. Concurrent Ground Operations. The PIC and Concurrent Servicing Supervisor (CSS) shall ensure aircrew members and servicing personnel accomplish concurrent servicing in accordance with T.O. 00-25-172 and servicing technical orders. Aircrews performing Dash-1 preflight inspections or cargo loading concurrent with servicing must have cooperation and close coordination with the CSS. The CSS will remain in continuous intercom contact with fuel servicing team members during the entire servicing operation. In keeping with the guidelines in T.O. 00-25-172, CSS has authority over all phases of CSS operations to include personnel participating in the refuel.

6.21.1.8. Simultaneous fuel and oxygen servicing is not authorized.

6.21.1.9. Simultaneous fuel servicing and ammunition loading is not authorized.

6.21.2. Liquid Oxygen Servicing. Under no conditions are crewmembers allowed to service liquid oxygen.

6.21.3. Hot Refueling. Hot refueling (refueling with aircraft engines running) will only be conducted by crews that have been authorized and certified according to AFSOC Hot Refueling Guide, *C-130 Hot Refueling Operations Procedures.*

6.21.4. Fire Protection and Crash Rescue.

6.21.4.1. The aircraft engine fire extinguisher system fulfills the minimum requirements for fire protection during engine start. If available, position a portable fire extinguisher for added fire protection.

6.21.4.2. A fireguard is required for all engine starts including the GTC/APU. A crewmember or ground controller may act as fireguard.

6.21.5. Aircrew/Maintenance Engine Runs. Mixed aircrew/maintenance engine runs will not normally be accomplished. If conducted, the appropriate -1 procedures will be used.

6.21.6. Towing. Aircrew members will not normally participate in towing operations. The PIC will coordinate with the senior maintenance officer or superintendent to ensure the towing supervisor and crew are qualified. At non-USAF installations, the PIC must have approval from the airfield operations officer or manager prior to towing. The PIC will ensure the tow team supervisor briefs all personnel on their duties and the associated hazards. Proper checklists will be used. If any doubt exists as to the qualification of tow team personnel or the safety of the operation, make no attempt to tow the aircraft until qualified Air Force personnel can be located. Under no circumstances will any crewmember act as the towing supervisor.

6.21.7. When thunderstorms are reported within 10 Nautical Miles (NM) of the airfield, only operations leading to an immediate engine start and departure may continue. However, personnel must be prepared to cease all activities in the event lightning within 5NM is declared. When advised of lightning within 5NM of the airfield, all flight line activities will cease and personnel will seek shelter. Unless an immediate takeoff is a safer course of action, taxiing aircraft will return to parking.

6.21.7.1. Munitions loading will not be initiated, unless it can be completed before lightning becomes a hazard. If munitions loading has begun and lightning becomes a hazard, the crew will cease loading and depart the flight line/hot cargo. Ensure that the Command Post notifies security forces that there will be an unattended aircraft with munitions. Unless immediate takeoff is a safer course of action, any taxiing aircraft with munitions aboard will return to hot cargo if lightning is declared within 5NM.

6.21.7.2. Aircraft taxiing to parking or hot cargo when lightning is declared within 5NM should not expect a marshaller. The aircrew will hold in place or proceed to parking if clearance is assured. Seek shelter or remain in the aircraft if safer. Time permitting, coordinate with Base Operations (Pilot to Dispatcher frequency) if the aircraft will be parked in any location other than one assigned by the Air Mobility Control Center (Maintenance Operations Control Center) through the Command Post.

6.21.8. During engine start the ramp will be down for emergency egress. The cargo door and ramp will be closed for takeoffs, runups, and anytime the aircraft is taxiing on the active

runway. Prior to takeoff, the loadmaster will remove and stow the right paratroop ladder (AC-130H).

6.22. Aircrew Flight Equipment and Oxygen Requirements.

6.22.1. Oxygen. Oxygen on board for takeoff will be a minimum 10 liters.

6.22.2. Rafts. Ensure sufficient wing well life rafts are on board to accommodate all personnel on over water flights.

6.22.3. Life Preserver Unit (LPU):

6.22.3.1. Ensure sufficient quantities of life preservers are on board for all personnel for over water flights. While over water, LPUs will be sized and available at the crewmember's station, and worn whenever below 2,000 feet over water (except for takeoff and landing).

6.22.3.2. If over water and the mission requires wear of the parachute, the LPU will also be worn.

6.22.4. Anti-exposure suits. Anti-exposure suits will be available during over water flights when route of flight is beyond power off gliding distance from land and the water temperature is 60º Fahrenheit (F) or below. ***NOTE:*** Anti-exposure suits are not required when only the approach or departure is flown over water). If the water temperature ranges between 51º F and 60º F, the unit or mission commander may waive or extend the anti-exposure suit requirement after carefully considering the following factors:

6.22.4.1. Climate zone and existing weather throughout range of flights.

6.22.4.2. Operational requirements.

6.22.4.3. Number and type of aircraft in formation.

6.22.4.4. Time of flight over water.

6.22.4.5. Risk, based on aircraft load and mission configuration.

6.22.4.6. Degree of surveillance over mission.

6.22.4.7. Location, availability, and capability of SAR forces (Consider anticipated time in the water prior to pick-up).

6.22.4.8. Winds and wave height and their impact on SAR.

6.22.4.9. Altitude and distance from land.

6.22.5. Parachutes. All AC-130 aircraft will be configured with one parachute for each person.

6.22.5.1. Prior to flight, brief and instruct all passengers on parachute use.

6.22.5.2. During operations that require the cargo ramp, cargo door, or the paratroop door to be open in flight, personnel aft of the 40MM will wear a parachute or restraint harness.

6.22.5.2.1. Wear a restraining harness during all operations below 1,000 feet Above Ground Level (AGL).

6.22.6. Survival Kits/Vests. All AC-130 aircraft will be configured with one survival kit (ML-4) for each aircrew member. Survival vests may be used in lieu of survival kits if the mission will not take them beyond gliding distance of land.

6.23. Aircrew Flight Equipment Documentation. AFE personnel will accomplish a thorough aircraft preflight inspection prior to each mission. Local training missions only require a preflight inspection prior to the first flight of the day.

6.23.1. The PIC or designated representative will ensure appropriate serviceable protective clothing, AFE, survival equipment, and Dash 21 equipment for the entire mission are available prior to flight and all personnel are briefed or trained in their use prior to departing home station.

6.23.1.1. Prior to departing home station and following en route crew changes, the PIC or designated representative will review the AFTO Form 46, Prepositioned Life Support Equipment, to ensure all required equipment is on board and required inspections have been completed.

6.23.1.2. The PIC or designated crewmember will document and ensure missing aircrew AFE are annotated in both the AFTO Form 781A and AFTO Form 46.

6.24. IFF/SIF Operations.

6.24.1. Perform a ground check of the IFF/SIF before takeoff, using either the self test or ground radar interrogation.

6.24.1.1. If self-test is unacceptable and radar facilities do not permit ground check, takeoff is authorized if the IFF/SIF was operational on the previous mission. Accomplish an airborne check immediately after takeoff.

Table 6.4. Worldwide IFF Chart.

IFF Mode	NATO	LANTCOM and NOPAC	All other areas
1	IAW ACP 160, USAFER 60-17, NATO directives, Special Instructions (SPINS)/ATO	IAW ACP 160, U.S. Sup-1(C), NI 10-41, NI 10-15, NR 55-68, NR 55-2, SPINS/ATO	
2	IAW ACP 160, USAFER 60-17, NATO directives, SPINS/ATO	IAW ACP 160, U.S. Sup-1(C), and ANNEX A, SPINS/ATO	
3	As directed by ATC, SPINS/ATO	As directed by ATC, SPINS/ATO	As directed by ATC, otherwise IAW ACP 160, U.S. Sup-1(C)
4	Keyed and On		
NOTE: Mode 4 is not required within CONUS unless ADIZ penetration is anticipated. ***NOTE:*** Carry a keyer for use in the event of rerouting or diversion, except on local training missions.			

6.24.2. Use the IFF/SIF IAW Table 6.4. ***NOTE:*** IFF/SIF mode 1, 2, and 3/A coded, once set and transmitted are unclassified and may be left in the transponder.

6.24.3. An operational mode 4 is required. An operational check of the mode 4 will be made prior to takeoff (test equipment permitting). If mode 4 checks bad or fails in flight, the IFF/SIF unit will be repaired prior to flight and/or aircraft landed for repairs except per the following:

6.24.4. Mode S. Mode S equipped aircraft have the capability of assigning a unique default code that is associated with a specific aircraft registration as well as the flight identification that corresponds to the filed flight plan call sign.

6.24.4.1. Military aircraft have the ability to change the Mode S and Flight ID codes. Erroneous Mode S codes and/or Flight ID mismatch to filed aircraft identification degrade the safety and efficiency of air traffic control. Inadvertent duplication of an address will seriously degrade or even disable ETCAS operability.

6.24.4.2. Aircrew and squadron operations staff must ensure that the assigned/unique Mode S address (default code) be loaded in to the transponder correctly. Flight plan filed call signs must match exactly to the Flight ID inserted into the transponder. There will be neither leading zeros nor spaces/dashes ahead of or between the characters entered in the Flight ID. If the call sign is less than 7 characters, the inserted Flight ID will have spaces only at the end. This procedure is IAW DoD FLIP General Planning.

6.24.4.3. Ensure Mode S operation is IAW the aircraft flight manual. Due to its importance, anytime a Mode S code is entered, it will be verified by a second crewmember.

6.25. Cargo Documentation.

6.25.1. Proper cargo documentation will accompany each load. The cargo manifest and DD Form 1384, Transportation Control and Movement Document and special handling documents as applicable, will be delivered to the aircraft before departure. The manifest will be one of the following:

6.25.1.1. Computer printed product.

6.25.1.2. 80/80 (Offline Manifest) listing.

6.25.1.3. DD Form 1385, Cargo Manifest.

6.25.1.4. DD Form 2131, Passenger Manifest. This form is designed for use during exercises, wartime, and contingency operations.

6.25.2. Special handling documents, Shipper's Declaration for Dangerous Goods, will accompany the manifest as applicable

6.26. Dropped Object Prevention. During aircraft exterior visual inspections, pay particular attention to surfaces, panels, and components which could potentially be dropped objects. If a dropped object is discovered and the mission is continued, the flight crew will:

6.26.1. Ensure the write-up is entered in the AFTO Form 781A.

6.26.2. Notify the AFSOC Command Center as soon as practical. Include route of flight, altitude, and weather (i.e., turbulence, etc.).

6.27. Narcotics. Crewmembers will ensure narcotics and other unauthorized items are not smuggled on board the aircraft.

6.28. Flight Deck/Booth Congestion and Loose Objects.

6.28.1. Hold the number of persons on the flight deck/booth to the minimum commensurate with mission requirements.

6.28.1.1. AC-130H. At no time will the number of persons on the flight deck exceed 8 or 7 in the booth.

6.28.1.2. AC-130U. At no time will the number of persons on the flight deck exceed 7 or 9 in the Battle Management Center (BMC).

6.28.1.3. AC-130U. Fold down seats inside the BMC are authorized for use during the mission phases except takeoff and landing. Only instructors or evaluators (and crewmembers upgrading to these positions) can occupy fold down seats during takeoff and landing. This does not increase the crew complement, nor does it negate the requirement that each crewmember and passenger have an available, approved crash seat in the event of an emergency. The fold down seat will not be used during an actual landing emergency.

6.28.2. Keep the flight deck area uncluttered and orderly for all flight and ground operations. Specifically:

6.28.2.1. Do not place any item (checklist, chart, etc.) on the center pedestal in a position that covers or hides from view any switch, light, or gauge. Do not place any item behind condition levers or on the throttle quadrant.

6.28.2.2. Do not store on the flight deck any items not required for use or immediate reference in flight.

6.29. Passenger Policy. DoD 4515.13-R, Air Transportation Eligibility, establishes criteria for passenger movement on DoD aircraft. It defines five categories of passenger travel: space available, aero medical evacuation, orientation, and space-required. AFI 11-401 provides further guidance on orientation. Refer to these publications directly for details not addressed in this instruction. In all cases, individuals will be manifested on DD Form 2131, Passenger Manifest. ***NOTE:*** See **paragraph 3.3** for ACM policy.

6.29.1. Space-available. AC-130s will not be used for space available travel.

6.29.2. Aero medical Evacuation. Defined as the movement of patients by air. Specific guidance on eligibility and documentation is contained in DoD 4515.13-R. Commander, United States Transportation Command is the single manager for policy and procedure.

6.29.2.1. Restrictions. If tasked to conduct aero medical evacuation, both pilots must be fully qualified. Air to Air Refueling (AAR) may be performed if required for mission accomplishment after coordination with tasking authority. All other mission events and simulated Emergency Procedures (EP)s are prohibited.

6.29.3. Orientation. AFI 11-401 contains specific details on the Air Force Orientation Flight Program. Document authorization by letter and manifest on an AF Form 96. Requests for approval will include the mission profile and mission events to be accomplished. Forward requests through stan/eval channels. Report annual orientation activity IAW AFI 11-401 and AFSOC Sup.

6.29.3.1. Restrictions.

6.29.3.1.1. For spouse orientation, comply with restrictions in AFI 11-401 and AFSOC Sup. Additionally, AAR and threat maneuvers are prohibited.

6.29.3.1.2. For other orientation categories, both pilots must be fully qualified (does not apply to special qualification events not planned for the flight). AAR may be approved on a case by case basis by Group CCs or COMAFSOF. Simulated EPs are prohibited. All other mission events may be conducted as approved by approval authority. Passengers will be seated with belts fastened during threat maneuvers.

6.29.4. Public Affairs Travel. Defined as travel in the interest of adding to the public understanding of DoD activities. See AFI 35-101 for guidance, to include approval authorities, for public affairs flights. Document authorization by letter and manifest on a DD Form 2131. Requests for approval will include the mission profile and mission events to be accomplished Forward requests through public affairs channels.

6.29.4.1. Restrictions. Both pilots must be fully qualified in all sortie events. AAR may be approved on a case by case basis by Group CCs or COMAFSOF. Simulated EPs are prohibited. All other mission events may be conducted as approved by approval authority. Passengers will be seated with belts fastened during threat maneuvers.

6.29.5. Space-required. DoD 4515.13-R lists several categories of passengers, not previously mentioned, who are authorized official travel on DoD aircraft. Any individuals not on flight orders will be manifested on DD Form 2131, Passenger Manifest.

6.29.5.1. Supported forces. A sub-category of space-required passenger defined by this instruction as US and foreign military personnel who are an integral part of the mission being performed. Approval is assumed by the mission tasking. Supported forces will not normally be transported point-to-point on AC-130s. Group CCs or COMAFSOF may authorize supported forces on AC-130s on a case-by-case basis.

6.29.5.1.1. Restrictions. Both pilots must be fully qualified unless excepted by AFI 11-401. Simulated EPs are prohibited. There are no restrictions on mission events. Passengers will be seated with belts fastened during threat maneuvers. PICs will ensure that supported forces are briefed on the mission profile and mission events before flight.

6.29.5.2. Supporting forces. A sub-category of space-required passenger defined by this instruction as US and foreign military, DoD civilians, and US civilian employees under contract to the DoD, who directly support the mission or a deployment of an AFSOC unit. This may include, but is not limited to; maintenance, communications, intelligence, logistics, fuels, and flight test personnel, unit-supporting chaplains, civilian contractors required for in-flight checks or deployment support, Federal Aviation Administration (FAA) representatives, STS, fire support officers, and other military personnel who are on board to communicate/coordinate with ground forces. Off-station travel is documented by travel orders. Flights will be documented by letter of authorization from the Group CC or COMAFSOF. Squadron Commanders may approve squadron assigned personnel or maintenance personnel required for mission accomplishment. 18 Flight Test Squadron /CC is the approval authority for supporting forces in conjunction with test missions. When frequent local flights are necessary, commanders may issue annual authorizations by name or Air Force Specialty Code as appropriate. When using this

option, PICs will ensure that all restrictions in the following paragraph are complied with for each individual mission. Manifest all supporting forces on a DD Form 2131.

6.29.5.2.1. Restrictions. Both pilots must be fully qualified unless excepted by AFI 11-401. Simulated EPs are prohibited. There are no restrictions on mission events. Passengers will be seated with belts fastened during threat maneuvers. PICs will ensure that supporting forces are briefed on the mission profile and mission events before flight.

6.30. Military Customs Pre-clearance Inspection Program.

6.30.1. The military customs program was developed to assist the DoD and other US Government agencies in the control of narcotics, contraband, and prohibited agricultural products, and to expedite entry of DoD personnel and material into the customs territory of the United States.

6.30.2. Military Customs Inspectors will accomplish this inspection immediately prior to departure and may conduct more than one pre-clearance inspection on CONUS bound aircraft. When security considerations necessitate deviation from this policy, mission planners must coordinate with the appropriate agency to ensure the mission is not jeopardized.

Section 6F—Departure

6.31. Checklists. Accomplish all checklists with strict discipline. A checklist is not complete until all items are accomplished. ***EXCEPTION:*** The After Takeoff Checklist may be called complete with the exception of the leading edge check. Accomplish the leading edge check IAW the flight manual as soon as conditions permit.

6.31.1. Carry abbreviated checklists in the USAF flight crew checklist binders. The only pages (or inserts) authorized in checklist binders are C-130-series T.O. aircrew checklists, AFSOC approved checklists, briefing guides, and approved information guides. Units may construct locally approved in-flight guides using AF Form 4124, Flight Crew Information Guide.

6.31.2. Make personal notes in pencil on checklists and briefing or information guides, if desired. Such notes must be current.

6.31.3. An engine propulsion check may be performed anytime the crew deems necessary. If 95% engine efficiency cannot be obtained on all engines, the aircraft will not be flown. Accomplish the check IAW the specific flight manual.

6.31.3.1. Request clearance from the ground or tower controller prior to an engine propulsion check. Advise controller when prop wash will cross the runway.

6.31.3.1.1. Comply with the guidance in the flight manual and AFI 11-218 for engine run-up/propulsion system procedures.

6.31.3.1.1.1. Not used.

6.31.3.1.1.2. At no time will an engine run-up be attempted (throttles out of the ground range) unless the aircraft is in an approved engine run-up site (per Base Operations/Fixed Base Operator) or the active runway. ***NOTE:*** ATC clearance

does not constitute a safe environment for an engine run-up.

6.31.3.1.1.3. Using the MDS flight manual danger areas figure, ensure the area behind the aircraft is clear before starting an engine run-up. ***WARNING:*** Prop blast from engine run-ups/propulsion systems checks is hazardous to people, buildings, equipment, and other aircraft.

6.31.3.1.1.4. If an engine run-up/propulsion systems check was not accomplished, the first takeoff of the day will be static to allow for an engine efficiency check.

6.31.4. The propeller static feather check procedure is normally considered a periodic maintenance function; however, if the flight engineer elects to perform this procedure, ensure engine oil temperature is 20º C or greater.

6.32. Ground Collision Avoidance System Operation. Operate the GCAS in the normal mode (Audio On and Visual On) for all non-tactical operations. Crews may override the flap/glide slope advisory during the approach to landing as long as the alert is acknowledged by both pilots.

6.32.1. When a GCAS alert advisory/warning occurs and terrain/obstacles are clearly in sight, the flying pilot will call terrain/obstacle in sight, state intentions and visually clear the terrain/obstacles.

6.32.2. When a GCAS alert advisory/warning occurs and terrain/obstacles are not clearly in sight, immediately level off/begin a climb while rolling wings level, and add maximum power until the warning has ceased and adequate terrain/obstacle clearance is verified. ***WARNING:*** Do not delay pull-up for diagnosis of a GCAS warning. ***WARNING:*** Failure to roll wings level will increase stall speed.

6.33. Traffic Collision Avoidance System TCAS/ETCAS Operations. It is imperative to follow Resolution Advisories (RA)s to obtain aircraft separation computed by TCAS. Failure to follow the computed RA may increase the probability of a midair collision. ***NOTE:*** This system was not designed for use in the low-altitude environment, but it could provide valuable awareness of light aircraft or other military aircraft using military airspace. Use of Traffic Advisory (TA) only mode is recommended.

6.33.1. Multi-ship Formation. Lead aircraft (or designated alternates) will operate TCAS in the "TA only" mode. Consideration should be given to having the last aircraft in multi-element formations operating TCAS in "TA only" mode.

6.33.2. Use the above/below/normal settings as appropriate for the phase of flight and mission. The below setting should be used for tactical descents.

6.33.3. TCAS event documentation. The PIC should document all pertinent information surrounding an RA event on the AF IMT 651 HATR, and submit the report to the nearest air force safety office.

6.34. TOLD Cards. The flight engineer will complete AF Form 4064 cards IAW this instruction, Chapter 12. Power settings for departure will be based on type of takeoff and distance and height of obstacle. A pilot or additional flight engineer will cross-check the data for accuracy, by using the performance manual, Aircraft Performance Calculator (APC), or approved tabulated data.

6.34.1. Cross-check minimum control, takeoff, and landing speeds. This should be done for the initial takeoff, landing, and for significant changes in operating conditions (e.g., flaps up, etc.).

6.34.2. When performance is critical (e.g., high temperature, high altitudes, etc.) cross-check distances and ground rolls for the configuration to be used.

6.34.3. Normally use reduced power for takeoffs provided Refusal Speed (Vr) is equal to or greater than takeoff speed. Use normal takeoff power if Vr is less than takeoff speed.

6.34.4. IFR Departures. Comply with AFI 11-202V3 for IFR Departures. In addition to the requirements in AFI 11-202V3, chapter 8, the following guidance applies:

6.34.4.1. Departure End of Runway (DER) crossing restrictions. A DER crossing height may be required depending on the agency which designed the instrument departure. If a DER crossing requirement exceeds 50 feet, use the correction chart in the performance manual for balanced critical field length for the first 50 feet, and add 50 feet to balanced critical field length for every foot of altitude required above 50 feet. Example: 55 feet DER crossing requires the full correction on the balanced critical field length chart plus 250 additional feet of balanced critical field length.

6.34.5. VFR Departures. Comply with AFMAN 11-217 V2, AFI 11-202 V3, and the following: The aircraft must be capable of clearing all obstacles along the planned departure path one engine inoperative. If obstacles are not a factor, the aircraft must always be able to climb at least 200 feet per minute on three engines at obstacle clearance speed. When no obstacle exists on the planned departure, plan climb out to 1000 feet AGL or pattern altitude whichever is higher.

6.35. Departure Briefing. The pilot making the takeoff will brief the crew IAW the flight manual.

6.36. Power Application. To help prevent over-torque, the flight engineer will make a call over the interphone any time torque reaches 17,000 in-lb. Pilots and flight engineers will monitor torque as throttles are advanced.

6.37. Departure Monitoring. The navigator and pilot not flying the aircraft will back up the pilot and report any deviations from the planned departure. When radar facilities are available, departures will be radar monitored to the maximum extent possible.

6.38. Oxygen Requirements. IAW AFI 11-202V3, plus the following:

6.38.1. Crewmembers occupying a crew station will have an oxygen mask connected and readily available for use before engine start and until engine shutdown. Prior to flight, crewmembers will accomplish a communications and operations check of their oxygen masks.

6.38.2. Walk-around bottles do not satisfy AFI 11-202V3 supplemental oxygen requirements.

6.38.3. Crewmembers who do not have access to the aircraft oxygen system will have a Passenger Oxygen Kit (POK) within arm’s reach for pressurized flights above flight level (FL) 250. Prior to flight, visually inspect the POK to ensure it contains an adequate supply of oxygen.

6.38.4. Aircrews required to fly unpressurized missions above 18,000 feet mean sea level (MSL) will pre-breathe 100 percent oxygen for a minimum of 30 minutes. Begin pre-breathing so that uninterrupted pre-breathing times are complete before cabin altitude exceeds 14,000 feet.

6.38.4.1. Avoid breaking oxygen mask seal (above 18,000 feet MSL) at these altitudes, even for drinking water.

6.38.5. Decompression Sickness (DCS). For anyone thought to have symptoms of DCS, the following actions apply:

6.38.5.1. As mission permits, declare an in-flight emergency, descend to as low a cabin altitude as practical, and land at the nearest suitable installation where medical assistance can be obtained. Clearly indicate the possibility of DCS so that medical personnel will be best prepared to treat affected individuals.

6.38.5.2. Keep the person relaxed and as warm as possible and watch for potential symptoms in other crewmembers for the next 24 hours.

6.39. Flight Progress. Use all available navigational aids to maintain course centerline and positive fixing of the aircraft's position.

6.40. Navigation Aid Capability. Refer to Chapter 4, **paragraph 4.3.8** for minimum navigation capabilities.

6.40.1. North Atlantic Region and the US West Coast/Hawaii Route System. Aircraft must have an operable INS/GPS/Self Contained Navigation System (SCNS) prior to airspace/track entry. Aircraft without this equipment must return to a station with maintenance capability or re-file via routes specified in FLIP.

6.40.2. North Pacific (NOPAC) Region. Comply with the following procedures when transiting the Anchorage/Tokyo Oceanic Control Area/Flight Information Region (FIR) on the NOPAC north route:

6.40.2.1. Westbound aircraft on the NOPAC north route experiencing loss of radar capability at any point shall, fuel permitting, re-file a flight plan on another track or return to the nearest facility with radar maintenance capability.

6.40.2.2. Westbound aircraft on the NOPAC north route that have a single drift and groundspeed source and experience loss of that source at any point, may continue the NOPAC north route if the radar system is fully operable. Verify in flight that satisfactory returns are being received on all ranges, particularly the longer ranges (100 NM or greater). If the radar system is marginal or inoperative, fuel permitting, re-file a flight plan to another track or return to the nearest facility with maintenance capability.

6.41. Communications Instructions Reporting Vital Intelligence Sightings and Other Reports. Refer to AFI 10-206, Operational Reporting. Report all vital intelligence sightings from aircraft as indicated in the FLIP Planning or Flight Information Handbook (FIH).

6.42. In-Flight Meals. The pilot and copilot will not consume meals within 90 minutes of each other, before or during flight, if the meals were procured from the same vendor and consist of the same menu.

6.43. In-Flight Emergency Procedures. Report deviations from directives that occur as a result of an emergency IAW AFI 11-202V3 and this instruction.

6.43.1. Notification of Controlling Agencies. As soon as practical after completing the aircraft emergency action checklist, furnish the controlling agency and appropriate command, control, and communications (C3) a description and extent of the difficulty, assistance required, intentions, and any further pertinent information.

6.43.2. Emergency Landing. Aircrews must be prepared to divert to the nearest suitable airfield. Navigators must be ready to provide pertinent information including headings, distance, and frequencies.

6.43.3. Conference HOTEL. Conference Hotel. Lockheed Martin's In-Flight Conference HOTEL personnel can be contacted by calling the Warner Robins Air Logistics Center Command Post (CP) at DSN 497-2612. They are manned 24 hrs/day and are tasked with arranging contact between operational units and appropriate WR-ALC Personnel, including management level as well as technical. As a back-up, call the WR-ALC/LFPSC Maintenance Control Office at DSN 468-3567, 3029, 5428, or 472-2837. They are also manned 24 hrs/day except for Christmas. See Table 6.5. for Conference HOTEL POCs. Before requesting a Conference HOTEL through CP, first seek recommendations from local OG/OGV and/or HQ AFSOC/A3V.

Table 6.5. Conference HOTEL Phone List.

On Base is 6-XXXX; DSN is 468-XXXX **On Base Commercial is (478)-926-XXXX** **Off Base Home phones are (478) XXX-XXXX** **Base Pager is – 2933 or –2997; input pager number listed below, then your number**				
Title	**Name**	**Duty Phone**	**Home Phone**	**Pager**
Chief Engineer:	John McDonals	2714	397-2851	None
Electrical /Avionics:				
Lead Engineer	John Dorminey	7209	719-6236	None
Airlift Defensive Sys, SCNS	Larry Boykin	6275		None
Airframe Hardware IPT Lead	Woody Battle	2853	475-1340	None
Airframe Hardware IPT Lead	Brady Owens	6916	442-7446	None
Engineer	Jerry Smith	2733	987-7669	None
Systems:				
Lead Engineer	Jay Fiebig	2871	474-7515	#0162
Weapon System Safety	Pat Hampton	6011	474-8645	None
Mechanical Systems, ECS, Fuel	Hughie Craine	6011	922-3507	None
Flight Controls, Landing Gear, ECS, Bleed Air	Joe Calhoun	5375	477-0298	None
Propellers, Mech Sys	Bill Stillman	7979	922-3111	None
Engine, Props, General	Mike Fisher	6814	329-1006	None

Functional Systems Integrity Prog Manager	Glan Haponek	1779	953-5292	None
Structures:				
Lead Engineer	Jay Fiebig	2871	474-7515	#0162
Structural Engineer	Peter Christiansen	6775	918-0095	#0158
Structural Engineer	Molly Statham	2659	474-6752	#0157
Structural Engineer	Darren Fritz	9880	929-5656	None
Structural Engineer	Jarred Crook	7980	218-4522	None
Structural Engineer	Joel LeChene	6346	955-1916	None
Structural Engineer	Capt Jeffrey Pleinis	9879	218-0122	None
Structural Engineer	Lt LeTwan Tate	3764	(336) 587-6965	None

6.43.3.1. The PIC may initiate the conference when additional expertise is necessary to cope with emergencies or other conditions. It convenes at the lowest level where expertise is available, and will not be elevated for the purpose of keeping the next higher echelon informed.

6.43.3.2. Technical Assistance Service. The PIC may request (at anytime in the decision process) technical support and additional assistance from their home unit, MAJCOM staff, maintenance representatives, and/or civilian contractor support.

6.43.3.3. When in UHF or VHF range, initiate the conference over appropriate discrete frequencies. When out of VHF or UHF range, use HF radios to establish a phone patch with the nearest or controlling C3. Provide a narrative description of the situation including actions taken, intentions, and type of expertise desired.

6.43.4. Turnaround Procedures. Use procedures IAW FLIP.

6.44. Continued Flight with Engine Loss. A flight may proceed on 3 engines to its destination if 2-engine capability exists, favorable operating conditions prevail both en route and at the point of intended landing, and a suitable alternate airfield is available at all times. If these conditions cannot be met, the flight will terminate at the nearest facility (preferably military) which, in the judgment of the PIC, offers safe and favorable operating conditions.

6.45. Fuel Jettisoning. Fuel will not be jettisoned except for combat conditions, emergency conditions, or rescue missions requiring gross weight reduction.

6.46. Medical Assistance. When a person on board the aircraft requires medical care the PIC will inform the station of next intended landing in sufficient time so medical personnel may meet the aircraft. The request will include the individual's sex, approximate age, and the nature of the medical problem.

6.47. Low Altitude Over Water Operations. The accumulation of salt spray on windshields and side windows is a factor that must be considered for low-level over water flight. Windshields on aircraft equipped with windshield washers can be cleared; however, salt deposits on side windows will continue to restrict lateral visibility, possibly jeopardizing flying safety diminishing search effectiveness. Weigh the above factors against mission urgency prior to descent below 500 feet, when heavy seas or high surface winds exist. In some cases, it will be preferable to fly at a higher altitude to avoid this hazard.

Section 6G—Arrival

6.48. Crew Coordination. The pilot flying the approach will brief the crew on the descent, approach, and landing IAW the flight manual. The other pilot and navigator will monitor the approach and report any deviations from prescribed procedures. Crewmembers will confine their activities to aircraft operation, descent and approach monitoring, and checklist accomplishment from the initial descent point to block in. Under no circumstances will crewmembers deviate from these duties except for in-flight emergencies.

6.49. Coupled Approach Procedures. When a coupled approach is flown, assume manual control at or above published MDA or DA/DH.

6.50. Self Contained Approaches (SCA). IMC SCAs are operational procedures not normally intended for publication in FLIP. Plan all SCAs IAW aircraft specific planning guidance. Fly navigator-directed SCAs using ground-based radar monitoring, where available.

6.50.1. All IMC SCAs must be approved through stan/eval channels by HQ AFSOC/A3 or designated COMAFSOF, and must conform to the criteria specified in AFI 11-230, *Instrument Procedures*, and the AFSOC supplement to AFI 11-202, Volume 3. Refer to AC-130 SCA planning guidelines in **paragraph 18.26** for package construction and aircrew procedures. AFTTP 3-3.AC-130 also contains techniques for constructing SCAs.

6.51. Radar Altimeter Procedures. Set the radar altimeters to the HAT or height above aerodrome for the approach being flown in accordance with the flight manual. Pilots and navigators will crosscheck radar altimeters during descent to ensure adequate terrain clearance is provided throughout the descent and maneuvering portion of the approach. Once established in a VFR traffic pattern, the radar altimeter may be set at the discretion of the pilot.

6.52. Wake Turbulence Avoidance. Pilots must exercise the discipline necessary to ensure wake turbulence avoidance criteria are observed during flight operations. Acceptance of a visual or contact approach clearance, or instructions to follow an aircraft, is acknowledgment that the pilot will maintain a safe interval for wake turbulence avoidance. The following instructions expand wake turbulence avoidance criteria, but do not replace guidance in DoD FLIP planning.

6.52.1. For VFR traffic patterns behind heavy jets follow the "Vortex Avoidance Procedures" in FLIP General Planning.

6.52.2. Low approaches behind heavy jets will be flown no lower than that altitude which ensures the aircraft remains well above the flight path of the heavy jet.

6.52.3. Pilots operating under IFR into US civil airports will request 5 miles separation under radar control or 2 minutes non-radar control from heavy jets (departure and arrival).

Section 6H—Postflight

6.53. Impoundment. If an aircraft is involved in a serious incident, the PIC should impound the aircraft immediately and contact the AFSOC Command Center or controlling agency for further instructions.

6.53.1. Impoundment is the isolation or control of access to an aircraft or equipment item and applicable historical records so an intensified investigation can be completed.

6.53.2. If required, impound the aircraft IAW AFI 21-101, Chapter 9.

Section 6I—Debriefing

6.54. Maintenance. The PIC and the flight engineer ensure crewmembers complete the AFTO Form 781.

6.54.1. The PIC reviews the AFTO 781, determines those discrepancies considered as mission essential and indicates them by entering "ME" (mission essential) in block letters in the lower left hand corner of the AFTO Form 781A discrepancy block. Use "MC" (mission contributing) to indicate any discrepancies that, if corrected, would substantially contribute to mission accomplishment, but are not mission essential.

6.54.2. Use block 14 (discrepancy) of the AFTO Form 350, Repairable Item Processing Tag, with an AFTO Form 781 entry to identify and tag any defective item.

6.54.3. Enter "Aircraft subjected to salt spray" on the AFTO Form 781A any time the aircraft is flown under 3,000 feet AGL over salt water, excluding takeoffs and landings.

6.54.3.1. Bird Bath procedures. Clear water rinse facility (birdbath) usage guidelines for AC-130U. AC-130H will not use the bird bath.

6.54.3.1.1. If a birdbath facility is unavailable make the following annotation in the AFTO form 781A, "aircraft subjected to salt spray, birdbath unavailable." The following guidance will be used to maximize the effectiveness of the birdbath and to ensure safe operations.

6.54.3.1.1.1. Crews will ensure that sensors such as the radar/Infrared Detection System (IDS) are off prior to entering the birdbath.

6.54.3.1.1.2. The APU will remain off with doors closed to prevent flameout and flooding of the APU compartment.

6.54.3.1.1.3. Set flaps to 100% and switch off and extend both auxiliary and normal landing lights.

6.54.3.1.1.4. All four engines should be at normal ground idle with the lowest power setting available. Two engines in normal ground idle, and two in low speed ground idle may be used if aircraft weight does not restrict the forward movement through the bath.

6.54.3.1.1.5. Complete the "AFTER LANDING CHECKLIST" after the rinse is completed, run the engines at normal ground idle for a minimum of two minutes to aid in drying out engine nacelles.

6.54.3.1.2. Review local procedures for birdbath operating guidelines. Each birdbath is unique in design and function; local procedures such as direction of entry, wing tip clearance criteria, noise abatement concerns, etc., must be reviewed prior to birdbath use. ***CAUTION:*** It is possible to experience some type of overheat indication during or immediately following the birdbath due to water intrusion in the overheat warning systems. Each crew will have to analyze the indication and make a judgment as to the emergency action taken.

6.54.4. Ensure fuel on-loaded or off-loaded during refueling is entered in the AFTO Form 781H, Aerospace Vehicle Flight Status and Maintenance.

6.54.5. Immediately after arrival, the PIC and other pertinent crewmembers debrief maintenance personnel on the condition of the aircraft, engines, avionics equipment, and all installed special equipment. At stations where there is no AFSOC maintenance, and maintenance support is required, the PIC ensures a thorough debrief is provided to the controlling C3 prior to entering crew rest.

6.55. Debriefing. The PIC or a designated representative will pass significant information to support agencies, such as weather, ATC, or base operations. Debrief intelligence when applicable. The PIC will conduct a crew debriefing after each mission. The debriefing will include all applicable crewmembers so that common problems can be discussed and resolved. Crewmembers may be excused from the debrief at the discretion of the PIC.

6.56. Aircrew Notification Procedures. When transiting installations, the PIC will establish a point of contact with the local command post, local base operations, or local airport manager, when the crew is billeted in off-base quarters. The PIC will be notified immediately in case of incident or emergency affecting the safety or security of the aircraft.

Section 6J—Miscellaneous Procedures

6.57. Customs, Immigration, and Agriculture Inspections.

6.57.1. Obtain Customs, Agriculture, and Public Health clearance, as required, prior to opening any doors, hatches, or windows, other than the crew entrance door, or enplaning and deplaning personnel.

6.57.2. Proceed directly from the aircraft to Customs, Immigration, or Agricultural inspection for processing when required by the inspector.

6.57.3. US military aircraft are sovereign. When cleared to over-fly or land in foreign territory, it is US policy to assert that military aircraft are entitled to the privileges and immunities which customarily are accorded warships. These privileges and immunities include, in the absence of stipulations to the contrary, exemption from duties and taxation; immunity from search, seizure, and inspections (including customs and safety inspections); or other exercise of jurisdiction by the host nation over the aircraft, personnel, equipment, or cargo on board. USAF PICs will not authorize search, seizure, inspection, or similar exercises of jurisdiction enumerated above by foreign authorities except by direction of HQ USAF or the American Embassy in the country concerned.

6.57.3.1. The PIC will not permit the inspection of their aircraft by officials of any foreign government. If requested to do so, the PIC and crew will deny access and seek aid from the senior AFSOC or other USAF representative, US Embassy, or consulate within the host nation. Customs or other officials will be informed of the above policy and requested to confirm their request through their own government and with US Department of State representatives. If necessary the aircraft will be sealed by the crew and the crew entered into crew rest and departure intentions will be canceled until resolution of the matter by appropriate authority. Inform command and control authorities by the fastest available means should this situation occur. When confronted with a search request by foreign authorities, aircrews should consider the following procedures:

6.57.3.1.1. In most cases, search attempts may be stopped by a statement of the PIC to the foreign officials that the aircraft is sovereign and not subject to search without consent of HQ USAF or the chief of mission in the country concerned. This should be clearly conveyed in a polite manner so as not to offend foreign authorities who may honestly, but mistakenly, believe they have authority to search USAF aircraft.

6.57.3.1.2. If foreign authorities insist on conducting a search, the PIC must negotiate to delay the search until contact is made with HQ USAF/A3O-AO or the appropriate embassy. The PIC should unequivocally state that they have no authority to consent to the search and that they must relay the foreign request to these agencies for decision. The PIC should then notify these agencies of the foreign request by the most expeditious means available. Thereafter, PICs should follow instructions provided by the appropriate embassy and HQ USAF.

6.57.3.1.3. If foreign officials refuse to desist in their search request, the PIC should indicate that they would prefer to fly the aircraft elsewhere (provided fuel and mechanical considerations permit a safe departure) and request permission to do so.

6.57.3.1.4. If permission is refused and the foreign authorities insist on forcing their way on board an aircraft, the PIC should state that they protest the course of action being pursued and that they intend to notify both the appropriate American Embassy and HQ USAF of the foreign action. The PIC should then allow the foreign agents on board the aircraft, without physical resistance, and thereafter report the incident to HQ USAF and appropriate embassy as soon as possible.

6.57.3.1.5. In all instances, specific instructions may be briefed because of sensitive cargo or equipment. These instructions and applicable provisions of classified supplements to the foreign clearance guide should be followed where applicable.

6.58. Border Clearance.

6.58.1. Normal Operations:

6.58.1.1. Border Clearance Responsibility. The border clearance responsibility will be as designated by the base or area command IAW AFI 24-401, Customs-Europe, AFI 24-402, Customs-Pacific, AFI 24-403, Customs-Southern, and AFI 24-404, Customs-Domestic.

6.58.1.2. PIC Responsibility. Border clearance is the responsibility of the PIC, although many of the duties have been assigned to ground personnel and to the loadmaster. The PIC will ensure:

6.58.1.2.1. Crewmembers and passengers possess current passports and valid visas if required.

6.58.1.2.2. Crewmembers and passengers have current shot records or certificates of immunization.

6.58.1.2.3. Cargo entry documents are in proper order.

6.58.1.2.4. Departure or arrival to the US is through an air base where border clearance can be obtained.

6.58.1.2.5. Border clearance for aircraft cargo, passengers, crew and baggage, if required, is obtained before takeoff to a foreign area, or after arrival from a foreign area.

6.58.1.2.6. En route to the US, the loadmaster has distributed personal customs declarations to all passengers and crewmembers; has briefed passengers and crewmembers on customs regulations in accordance with Chapter 13 of this instruction; and has prepared and compiled Customs Form 7507, General Declaration (Outward/Inward) for the PIC's signature.

6.58.1.2.7. En route to the US, the base of intended landing is notified of any change in ETA, to ensure border clearance is accomplished as soon as possible after landing.

6.58.1.2.8. A Permit to Proceed is obtained when the mission requires an aircraft, which has landed in the US for customs clearance, proceed to another US base to obtain border clearance. The permit delays customs inspection of cargo, passengers, and crew until arrival at the offload station, saving intermediate offloading and reloading normally required for customs inspection. The Permit to Proceed is valid only to the airport of next landing, where the border clearance must be completed, or a new permit obtained. Do not make intermediate stops unless required by an emergency situation or directed by AFSOC.

6.58.1.2.9. When an aircraft lands for a US border clearance, a US Customs representative normally meets the aircraft to obtain the required documents. Do not deplane passengers or crewmembers, except a scanner, unless necessary for safety. Do not unload until approved by customs and agriculture personnel or their designated representatives. This procedure applies to the initial landing in the US and all subsequent landings until crew, passengers, and cargo complete final border clearance.

6.58.2. Exercise and Contingency Operations:

6.58.2.1. General. Certain missions, which do not transit normal ports of entry or exit, require special procedures to expedite compliance with customs, public health, immigration, and agricultural requirements. A joint memorandum of understanding establishes procedures and waivers.

6.58.2.2. Implementation. Traffic and border clearing agencies implement all or part of the agreement as necessary for each operation. Inspection and clearance may be accomplished at the CONUS on-load or off-load base instead of the normal air-point of entry, or at the foreign on-load or off-load base.

6.58.2.3. Customs Procedures.

6.58.2.3.1. Outbound. No requirement. Filing of Customs Form (CF) 7507 is waived.

6.58.2.3.2. Inbound. Prepare one copy of the following documents before arrival.

6.58.2.3.2.1. CF 7507 (non-aircrew member list not required).

6.58.2.3.2.2. Cargo manifest.

6.58.2.3.2.3. For troops out of country less than 140 days.

6.58.2.3.2.3.1. Troop commander's certificate for examination of troop baggage.

6.58.2.3.2.3.2. One copy of DD Form 1854, U.S. Customs Accompanied Baggage Declaration, for each non-aircrew member not under command of the troop commander, to include observers, support personnel, civilians, news reporters, and crewmembers.

6.58.2.3.2.3.3. Upon arrival at a CONUS off-load base, a Customs representative meets the aircraft and accepts the troop commander's certificate with respect to troop baggage. Individual baggage declarations are not required. The troop commander should have inspected troop baggage. Troops debark under the observation of the Customs representative with only a spot check of articles and baggage. The Customs officer may elect to make a more extensive inspection.

6.58.2.3.2.4. For troops who are out of the country 140 days or more:

6.58.2.3.2.4.1. One copy of DD Form 1854 for each non-aircrew member. This includes observers, support personnel, civilians, news media personnel, and crewmembers. Personnel may use DD Form 1854 or CF 6059B, Customs Declaration, when issued by the US Customs representative. See AFI 24-404 for further guidance.

6.58.2.3.2.4.2. Upon arrival at a CONUS off-load base, a Customs representative meets the aircraft and accepts the troop commander's certificate with respect to troop baggage. Individual baggage declarations are not required. The troop commander should have inspected troop baggage. Troops debark under the observation of the Customs representative with only a spot check of articles and baggage. The Customs officer may elect to make a more extensive inspection.

6.58.2.4. Public Health Procedures:

6.58.2.4.1. The PIC ensures that all crewmembers and passengers are properly immunized.

6.58.2.4.2. Spray the aircraft, if required

6.58.2.5. Immigration Procedures:

6.58.2.5.1. Outbound. No requirements.

6.58.2.5.2. Inbound. Submit one copy of CF 7507 to the Immigration inspector. Refer to the Foreign Clearance Guide for any other required documents.

6.59. Insect and Pest Control (Aircraft Spraying).

6.59.1. The PIC will ensure required spraying is accomplished when required by the Foreign Clearance Guide and certify the spraying on CF 7507, or on forms provided by the country transited.

6.59.2. Use insecticide, Aerosol D-Phenotrin-2%, NSN 6840-01-067-6674 (or equivalent), to spray the aircraft. Aircraft should never be sprayed with passengers on board. The only exception is when mandated by the FCG.

6.59.2.1. Aerosol normally is dispersed at a flow rate of 10 seconds per 1,000 cubic feet. Direct the nozzle toward the ceiling of the compartment or space being sprayed. Do not spray any plastic surface or allow the spray to wet it.

6.59.2.2. Spray spaces inaccessible from within the aircraft after completely loading fuel, baggage, cargo, and passengers, including baggage compartments, wheel wells, and other similar spaces. ***CAUTION:*** If the insecticide label directs disembarkation after use, spray prior to boarding crew or passengers. Close all doors and hatches for 10 minutes after dispensing and ventilate for 15 minutes before allowing anyone on board.

6.59.3. Spray for 50 seconds unless longer periods are specified for the country being transited.

6.59.4. When the crew discovers insect or rodent infestation of the aircraft while in flight, notify the destination C3, base operations, or airport manager of the situation before landing so the proper authorities can meet the aircraft.

6.59.5. Upon arrival, do not open cargo doors or hatches except to enplane officials required to inspect the aircraft for insect or rodent infestation. Do not on-load or off-load until the inspection is satisfactorily completed. This procedure may be altered to satisfy mission or local requirements, as arranged by the base air terminal manager.

6.60. "Due Regard" Procedures. When a unit commander authorizes a mission to be flown in international airspace and in-flight operational requirements conflict with International Civil Aviation Organization (ICAO) rules and procedures, the PIC may make the decision to proceed using "due regard" procedures, IAW FLIP General Planning and AFI 11-202 V3, while in international airspace over the high seas.

6.61. Hazardous Material Procedures. The term "hazardous material" as used in conjunction with airlift operations applies to the following classes and types of materials covered by AFJI 11-204, Operational Procedures for Aircraft Carrying Hazardous Materials) and includes any material which, because of its quantity, properties, or packaging, may endanger human life or property. Procedures in this paragraph apply whenever aircraft carry DoD Hazard Class/Division 1.1, 1.2, or 1.3 explosives, DOT Class A and B poisons, etiological or biological research materials, radioactive materials requiring yellow III labels, and inert devices. Also included are DoD Hazard Class/Division 1.4 explosives, oxidizers, compressed gases, flammable solids and liquids, and corrosive liquids listed in AFMAN 24-204, Preparing Hazardous Materials for Military Air Shipments.

6.61.1. Briefing. Reference AFMAN 24-204.

6.61.2. Cargo Documentation. Do not accept hazardous materials unless proper documentation, certification, and identification of cargo are provided. This includes transportation control number entered correctly on both the cargo manifest and the Shipper's Declaration for Dangerous Goods.

6.61.3. Flight Planning. The PIC (unless specifically briefed otherwise):

6.61.3.1. Enters “Hazardous Cargo” and the mission number in the appropriate section of the flight plan. Use remarks section of DD Form 175, Military Flight Plan, and other information section of DD Form 1801, DoD International Flight Plan.

6.61.3.2. Plans the flight to minimize over flying heavily populated or otherwise critical areas.

6.61.3.3. Prepares a departure message. The remarks section of the departure message should include the following:

6.61.3.3.1. Department of Transportation (DOT) class and DoD hazard class or division, if applicable, of hazardous material on board (Include net weight of DOT Class A or B poisons and net explosive weight (NEW) of Class A or B explosives).

6.61.3.3.2. Request for special support; e.g., isolated parking, security, technical escort teams, etc.

6.61.3.3.3. Inert devices (when applicable).

6.61.3.4. If Estimated Time Enroute (ETE) is less than 1 hour, or if other circumstances preclude timely receipt at destination, notify base operations at the first intended landing by priority telephone of the ETA and information listed in 6.61.3.3.

6.61.4. Before Engine Start. Ensure placards are removed. Give the controlling agency parking location, approximate engine start time, and verify that the fire-fighting agency has the hazardous materials information. If not, request the following be relayed to the fire fighting agency:

6.61.4.1. DOT class of hazardous material on board and the DoD hazard class or division for explosive material on board.

6.61.4.2. Net Explosive Weight.

6.61.4.3. Request for isolated taxiing (if necessary).

6.61.4.4. Estimated Time of Departure (ETD).

6.61.5. En Route. Normal procedures apply. Avoid flying over metropolitan or otherwise critical areas.

6.61.6. Before Landing. Accomplish the following unless specifically prohibited by the theater commander or FLIP planning.

6.61.6.1. Contact the base operations dispatcher, control tower, approach control, or other agency specified in FLIP at least 30 minutes (or as soon as practical) before ETA to announce that hazardous materials are on board and to verify that the appropriate base support agencies have received the departure message. If not, transmit the mission number, ETA, and information listed in 6.61.3.3.

6.61.6.2. If landing at a CONUS civil airport without a tower, give the above information to the nearest FAA flight service station.

6.61.6.3. Request the information be relayed immediately to base operations or the civil airport manager, crash or fire protection agency, and other support activities.

6.61.7. Parking:

6.61.7.1. DoD requires aircraft carrying DoD Hazard Class or Division 1.1, 1.2, explosives, DOT Class A poisons, and certain biological agents and munitions be parked in areas isolated from personnel. The PIC is responsible for ensuring cargo is correctly identified to the tower and ground control. When aircraft are not directed to an isolated area, identify the cargo again to tower or ground control. When identification is acknowledged, the host is solely responsible for selecting the parking area. Should host procedures be questionable, submit trip reports or hazard reports, as appropriate, to document such occurrences.

6.61.7.2. The military host is responsible for placarding aircraft. For non-military installations, the briefing to the PIC will include placarding requirements and, if required, placards will be furnished at the on-load base. The shipper must make prior arrangements with the airport manager for shipments of hazardous materials requiring placarding. The shipper is responsible for cargo identification, fire-fighting procedures, and isolated parking requirements.

6.61.8. Unscheduled Landing Due to In-flight Emergency. Transmit unclassified information to the appropriate air traffic control facility as follows:

6.61.8.1. Nature of emergency and intent to land.

6.61.8.2. Aircraft position and ETA.

6.61.8.3. Number of personnel and location in aircraft.

6.61.8.4. Fuel on board.

6.61.8.5. That hazardous materials are on board, location of the cargo, and applicable information listed in 6.61.

6.61.9. After Unscheduled Landing. Contact the AFSOC Command Center or appropriate C2 agency concerned by telephone, HF radio, or message, giving arrival notice, hazardous materials' information, and other pertinent information as required.

6.62. Thunderstorm Avoidance. Avoid thunderstorm and cumulonimbus clouds (CBs) using the following criteria:

6.62.1. Climbout, en route, and descent:

6.62.1.1. FL 230 and above: 20 nm.

6.62.1.2. Below FL 230: 10nm.

6.62.2. The size and intensity of thunderstorms or CBs are so variable that the PIC must determine avoidance takeoff and landing criteria. Takeoff, approach, and landing may be made without regard to the criteria in **paragraph 6.62.1** provided:

6.62.2.1. The thunderstorm or CBs and associated gust front, if present, can be avoided.

6.62.2.2. The distance of from the thunderstorms or CBs is increased as soon as possible after takeoff to meet the criteria in **paragraph 6.62.1**.

6.62.2.3. The missed approach course from the missed approach point will provide separation similar to that in climbout.

6.62.2.4. The aircraft is not flown below thunderstorms, CBs, or through the rain shaft associated with these clouds.

6.62.3. Avoid gust fronts and winds preceding a rapidly moving thunderstorm, the rain shaft, and the cloud base of thunderstorms and CBs. Do not fly under the anvil of a CB.

6.62.3.1. Avoid thunderstorms visually, by airborne radar, or by specific request of a ground-based radar with a weather-mapping capability. When relying exclusively on ground-based radar for weather avoidance and the ground controller is unable to provide avoidance instructions, attempt to maintain VMC by either changing routing or diverting to an alternate. If unable to maintain VMC, declare an emergency and request priority assistance. **NOTE**: The use of ground-based radar as the primary means of thunderstorm avoidance should be used only to depart an area of significant weather. It should never be considered a normal avoidance procedure.

Chapter 7

AIRCRAFT SECURITY

7.1. General. This chapter provides guidance for aircraft security on ground and in flight. AFSOC AC/C-130 aircraft are Protection Level "C" resources. This security priority designation applies to operational aircraft, wherever they are located, worldwide. Some aircraft contain equipment and documents that require protection per DoD 5200.1-R and AFI 31-401, *Information Security Program Management*.

7.2. Procedures. The PIC is ultimately responsible for the security of their aircraft when located away from US military installations. AFJI 31-102, *Physical Security*, covers security arrangements when US Air Force aircraft are located on other US military installations. Arrangements must be made to protect the aircraft during crew rest status at non-US protected locations. If US military security forces are not available, the US embassy assigned to that country must be consulted to ensure security arrangements are made. For missions involving a planning agency, the agency must coordinate with the PIC to ensure the planned security measures conform to mission requirements. The amount of security required will vary, depending on location and ground time.

7.2.1. For non-permissive or uncertain environments, the agency requesting the mission is responsible for airfield and landing zone (LZ) security. The crew will work with the agency requesting the mission to insure security meets the requirement for the mission. See AFTTP 3-3.AC-130 for security and planning details for these types of operations.

7.2.2. For permissive environments, PIC will receive a threat assessment and force protection capability evaluation briefing at home station prior to departure and receive updates enroute, if required. When landing at DoD component installation, the instillation commander is responsible to provide adequate security for the aircraft. The PIC will determine if security is adequate. Planning agencies and PIC will use **Table 7.1** to help assess the risk to parked aircraft for planned overnight stops located at non-US military installation overseas and civilian airfields. ***NOTE:*** Aircrews do posses the training to provide the appropriate security when present at the aircraft. For unscheduled or emergency landings at non-USAF installations, PIC will assess the aircraft security situation and take the following actions, if force protection capability appears insufficient:

7.2.2.1. Aircrew surveillance. If the aircraft is not remaining overnight, aircrews are capable of maintaining appropriate aircraft security. The PIC will direct armed crewmembers to remain with the aircraft and maintain surveillance of aircraft entrances and activities in the aircraft vicinity.

7.2.2.2. Area Patrol. Request area patrol coverage from local security forces to include back-up response forces. If local authorities request payment for this service, use AF Form 15, *USAF Invoice.*

7.2.2.3. Departure without Crew Rest. If local security forces are unacceptable or unavailable, the PIC may waive FDP restrictions IAW AFI 11-202V3 and depart as soon as possible for a destination with adequate force protection. If unable to depart the location due to system malfunction, the aircrew must secure the aircraft to the best of their ability. In no case, will the entire crew leave the aircraft unattended. Crew rest

requirements will be subordinate to aircraft security when the airframe may be at risk. The PIC should rotate a security detail among the crew to provide for both aircraft protection and crew rest until relief is available. PIC will coordinate through home station channels to acquire additional security.

7.2.3. Tailored Security Measures**.** Standard physical security measures may be impractical at times due to mission, terrain, climate, sociopolitical sensitivities, or other factors. For example, some countries don't allow armed security personnel. On other deployments, the mission may rely on maintaining a low profile and attracting as little attention as possible. At such locations, tailor security measures to meet unique requirements when necessary. As a minimum lock aircraft entry points and hatches. If it is not possible to lock aircraft, secure aircraft entry points and hatches in a manner to indicate unauthorized entry, i.e., taping hatch release handles or using seals. The PIC is the final authority for determining tailored security measures. Contact with US Embassy personnel is required at locations where security agreements are not in existence.

7.2.4. Ground security teams. Ground security teams may be considered to guard the aircraft for planned overnight stops. Teams may travel in Mission Essential Personnel (MEP) status and are responsible to the PIC at all times. The PIC will ensure security team members receive a mission briefing, aircraft egress, and passenger briefings, as appropriate. The squadron commander is the final approval authority for the need of ground security teams for their aircraft and authority may be delegated no lower than the PIC.

7.2.4.1. Ground security teams will comply with AFJMAN 24-204(I) at all times when carrying weapons, ammo, and equipment onboard the aircraft.

7.2.4.2. Due to the sensitivity of weapons in foreign countries, ground security teams will keep their weapons inside the aircraft and out of sight of foreign nationals, even if the FCG allows them to be carried outside the aircraft. If a destination requires weapons be carried outside the aircraft, the controlling MAJCOM must approve such action prior to deployment.

7.2.5. Unauthorized Entry. If, in the PIC's judgment, the aircraft needs to be locked and sealed as a measure to detect unauthorized entry:

7.2.5.1. Use the aircraft lock

7.2.5.2. If the aircraft lock is unavailable, secure the hatches and doors in a manner that will indicate unauthorized entry. For example, tape inside hatch release handles to the airframe, so that entry pulls the tape loose. Close and seal the main crew entrance door or left troop door using a metal boxcar seal or other controllable device to identify forced entry. Wipe the immediate area around the seal clean to help investigate forced entry. If the seals are damaged or have been tampered with, notify the appropriate local authorities, the controlling agency, and inspect the aircraft thoroughly.

7.2.5.3. Coordinate with the local base operations representative on procedures for servicing the aircraft while the crew is away. If a padlock is used, the key or combination will be left with base operations or the representative for servicing and maintenance personnel. ***NOTE:*** The aircraft should be locked during all off-station missions remaining overnight. ***NOTE:*** At a Temporary Duty (TDY) location with munitions on board a crewmember will be at the aircraft at all times or the aircraft will be locked. To

lock the AC-130H the camera door must be installed and tied down from the inside. Lock the right paratroop door at the bottom outside of the door. If the aircraft is left unattended, the aircraft commander will ensure the appropriate protection is provided by flight line security forces.

7.2.6. Security awareness is crucial to effective mission accomplishment. Aircrews must always remain vigilant to their surroundings, especially at high threat, low security locations. During pre-flight activities, aircrews will inspect accessible areas, to include aircraft wheel-wells, air conditioning compartments, and cargo compartment for unauthorized packages, personnel, or other unfamiliar devices. Report any suspicious items to host security forces. Aircrews will maintain a heightened security posture throughout all pre-takeoff activities.

7.3. Aircraft Force Protection Risk Assessment Matrix. Planning agencies and the PIC will use this matrix to help assess the risk to parked aircraft in a permissive environment. This matrix will be used for planned overnight stops at non-US military installations overseas and civilian airfields. A cumulative score of less than 55 implies that normal unmanned aircraft security measures are adequate. A score of 55 to 90 implies moderate security risk. Commander may consider additional security measures. If the cumulative score is greater than 90, commanders should consider deploying or contracting security personnel. The squadron commander or mission commander is the final approval authority for aircraft security issues. Authority may be delegated no lower than the PIC. *Exception*: during unscheduled or emergency landings the PIC is the final approval authority for aircraft security. The PIC should contact the US Embassy or United States Defense Attaché Office for security assistance. ***NOTE:*** Normally, additional security for the aircraft is not required at military installation within a NATO country or US civilian airfields approved by the FAA/TAS.

Table 7.1. Aircraft Force Protection Risk Assessment Matrix.

FACTORS	0 POINTS	5 POINTS	10 POINTS	15 POINTS
The local terrorist threat is currently: (1)	Negligible	Low	Medium (3)	High (3)
The local mob violence threat is currently: (1)	Negligible	Low	Medium (3)	High (3)
Installation/airport security services are:	Provided by host military forces only	Provided by host military and contract security forces	Contract security forces only	Not available (3)
Host security forces control entry:	The flightline and installation/airport	To the flightline only	To the installation/ airport only	To neither the flightline nor the installation/ airport (3)

FACTORS	0 POINTS	5 POINTS	10 POINTS	15 POINTS
There is perimeter fencing or barriers around:	The flightline and installation/ airport	The flightline only	The installation/ airport only	Neither the flightline or the installation/ airport (3)
Host security forces will provide _____ to guard the aircraft	An armed sentry	An unarmed sentry	Random security patrol coverage only	No sentry or random patrol coverage (3)
Host security forces will_____ security incidents involving the aircraft	Provide armed response to	Provide unarmed response to	Notify civilian authorities of	Notify the PIC of (3)
The aircraft will be parked:		Separate from host military and civilian aircraft	Among other host military aircraft only	Among civilian aircraft
The aircraft will _____illuminated during the hours of darkness (2)		Be adequately	Be marginally	Not be (3)
TOTAL POINTS: 1. Derive the local threat from valid intelligence sources only. 2. "Adequate lighting" is equal to the illumination provided by one standard USAF light cart. 3. If a security response team and security patrol is not present, commanders should consider deploying or contracting security personnel.				

7.4. Protective Standards for Aircraft Carrying Distinguished Visitors (DV). This paragraph applies specifically to aircraft transporting DV Code 4 or above. PICs are responsible for aircraft security at en route stops.

7.4.1. DoD Installations. Notify the base security forces of estimated arrival and departure times. Request continuous security surveillance during the entire ground time. If the installation is unable to comply, arrange for the best protection available.

7.4.2. Non-DoD Installations. Contact the airport manager or installation commander to arrange for force protection. If available security is inadequate, purchase additional security using AF Form 15.

7.5. Arming of Crewmembers. When directed, at least one crewmember each from the flight deck and cargo compartment will carry weapons.

7.5.1. Issue. Before departing home station, authorized crewmembers will obtain weapons, ammunition, lock, and key. Crewmembers must present a current AF Form 523, *USAF Authorization to Bear Firearms*, to be issued a weapon. Crewmembers will be reissued the same weapon until the mission terminates at home station. If an armed crewmember must

leave the crew en route, transfer the weapon to another authorized crewmember, using AF Form 1297, *Temporary Issue Receipt*.

7.5.2. Loading and Transfer of Weapons. Load and unload weapons at approved clearing barrels/facilities if available. To transfer a loaded weapon to another crewmember, place the weapon on a flat surface. Do not use a hand-to-hand transfer.

7.5.3. Wearing of Weapons. Wear weapons in a holster, concealed at all times to protect the identity of armed crewmembers. Do not wear weapons off the flight line, except to and from the C3, armories, and other facilities associated with aircrew activities such as base operations, fleet service, cargo or passenger terminals, flight line cafeterias, snack bars, etc.

7.5.4. Weapons Storage. Crewmembers will be armed before beginning preflight or onload duties. When no passengers are on board and after a satisfactory stowaway check, weapons may be stored in the gun box during flight. If no gun box is available retain weapon for the duration of the flight. Crewmembers will rearm before landing. Weapons need not be unloaded before being placed in the gun box.

7.5.5. Crew Rest. During crew rest, store weapons in the most secure facility available, normally the base armory. If a weapons storage facility is unavailable or the country prohibits or restricts the entry of weapons, secure firearms and ammunition in the gun box.

7.5.5.1. Aircraft without a Gun Box. If an aircraft without a gun box must remain overnight at a location where a government-owned storage facility is unavailable, use the nearest acceptable facility. Acceptable storage facilities are US or Allied military services armories US National Guard and Reserve armories, and US civil law enforcement armories. If none of these are available, or the PIC believes weapons security may be compromised, crewmembers may secure their weapons in their quarters, one crewmember will remain with the weapons at all times. In this case, turn the ammunition over to the PIC.

7.6. General Anti-Hijacking Guidance. Aircrews must make every reasonable effort to resist an aircraft hijacking attempt, resistance may vary from dissuasion, to direct physical confrontation, including the use of deadly force. Due to the sensitive nature of anti-hijacking procedures, crewmembers should reference AFI 13-207, *Preventing and Resisting Aircraft Piracy (for official use only)* and the FIH for specific guidance. Aircrews will not release any information concerning those procedures or hijacking attempts. Anti-hijacking is a crew duty performed exclusively by aircrew personnel. The hijacking of an AFSOC aircraft could create a serious international incident and jeopardize the safety of passengers and property. An aircraft is most vulnerable when the crew is on board and the aircraft is ready for flight. Hijackers cannot be dealt with as ordinary criminals. Some are mentally disturbed, emotionally unstable individuals for whom the threat of death is not a deterrent, but a stimulus to crime. Delay tactics have been most successful in saving lives and property. Detection of potential hijackers before they board the aircraft is the best solution to the problem.

7.6.1. Anti-hijacking inspections of space-required passengers may be conducted at the aircraft by the aircrew. Passengers (including MEP) will not carry weapons and/or ammunition on their person or in hand-carried baggage on board an aircraft. ***EXCEPTION:*** Special agents/guards of the Secret Service or State Department, and other individuals

specifically authorized to carry weapons with coordination of the PIC. In all cases the crew will be aware of location of weapons and ammunition.

7.6.1.1. If individuals must clear their weapons before boarding the aircraft, and access to clearing barrel/facilities is limited, as a minimum, direct them to:

7.6.1.1.1. Move to a safe, clear area at least 50 feet from any aircraft, equipment, or personnel before un-holstering/un-slinging their weapons.

7.6.1.1.2. Clear their weapons in accordance with standard safety procedures.

7.6.1.2. Deadhead crewmembers will not retain custody of ammunition on an aircraft but will turn it in to the troop commander or PIC. ***EXCEPTION:*** During combat operations, personnel may carry unloaded weapons and ammunition on board the aircraft. When the tactical situation dictates, personnel who might engage an enemy force immediately upon deplaning at the objective may carry loaded weapons aboard the aircraft at the discretion of the troop commander/team leader, and with the PIC's concurrence. Weapons will not be breached until clear of the aircraft.

7.7. Specific Anti-Hijacking Guidance. It is imperative that all crewmembers are familiar with the ground and in-flight resistance actions, covert communications, and forced penetration of unfriendly airspace procedures in AFI 13-207 and the FIH. In the event of a hijacking, crewmembers must act immediately and resourcefully, without instruction, in order to counter the attacker successfully.

Chapter 8

OPERATIONAL REPORTS AND FORMS

8.1. General. This chapter contains a description of applicable reports and forms. For assistance in completing safety forms contact the wing/group, unit, or local flight safety officer.

8.2. AF Form 457, USAF Hazard Report. Refer to AFI 91-202, *The USAF Mishap Prevention Program*. The USAF hazard reporting system provides a means for Air Force personnel to alert supervisors and commanders to hazardous conditions requiring prompt corrective action. A hazard is any condition, act, or circumstance that jeopardizes or may jeopardize the health and well being of personnel, or which may result in loss, damage, or destruction of any weapons system, equipment, facility, or material resource.

8.3. AF Form 651, Hazardous Air Traffic Report. Refer to AFI 91-202, Attachment 3, Hazardous Air Traffic Report (HATR) Program.

8.3.1. The Air Force HATR program provides a means for personnel to report all near midair collisions and alleged hazardous air traffic conditions. Use information in HATRs only for mishap prevention. AFI 91-202 list reportable incidents.

8.3.2. Procedures:

8.3.2.1. Make an airborne report of the hazardous condition to the nearest ATC agency (e.g., center, flight service station, control tower, or aeronautical radio station), and give the following information as appropriate:

8.3.2.1.1. Identification or call sign.

8.3.2.1.2. Time and place (radial/distance measuring equipment, position relative to the airfield, etc.).

8.3.2.1.3. Altitude or flight level.

8.3.2.1.4. Description of the other aircraft or vehicle.

8.3.2.1.5. Include a verbal statement as soon as possible after occurrence that a written HATR will be filed upon landing. ***NOTE:*** ATC agencies (e.g., FAA, etc) must know if an official report is being filed.

8.3.2.2. File the HATR as soon as possible (within 24 hours) using any available means of communication. Normally, it should be filed at the base operations office at the landing airport. If this is impractical and if communications permit, notify the safety office of the Air Force base where the condition occurred, the safety office at the home station, or as prescribed by the overseas MAJCOM. In any case, provide the safety office with all available information needed to prepare AF Form 651. Turn in the completed AF Form 651 to the wing/group safety office. ***NOTE:*** HATRs are not privileged information and may be released outside the USAF.

8.3.3. Individuals submitting a HATR are granted immunity from disciplinary action provided:

8.3.3.1. Their violation was not deliberate.

8.3.3.2. They committed no criminal offense.

8.3.3.3. No mishap occurred.

8.3.3.4. They properly reported the incident using the above procedures.

8.4. AF Form 711, USAF Aircraft Mishap Report Worksheet. Refer to AFI 91-204, Safety Investigations and Reports.

8.4.1. Responsibilities. Notify the appropriate authorities of any mishap involving aircraft or crew. When notified, AFSOC units will initiate investigative and reporting actions in accordance with AFI 91-204**.** ***NOTE:*** Do not attempt to classify a mishap.

8.4.2. Reportable Mishaps:

8.4.2.1. Report damage to the aircraft, or injury to the crew or passengers; as well as any damage or injury to another organization's equipment or personnel resulting from the movements or actions of an aircraft or crew.

8.4.2.2. Report the following occurrences:

8.4.2.2.1. A physiological episode. A physiological reaction, near accident, or in-flight hazard due to medical or physiological reasons. ***NOTE:*** In the event of a physiological episode, all crewmembers and passengers involved will report to a flight surgeon as soon as practical and request that a Class E physiological episode be reported in Air Force Safety Automated System (AFSAS). Physiological episodes include the following:

8.4.2.2.1.1. Proven or suspected case of hypoxia.

8.4.2.2.1.2. Carbon monoxide poisoning or other toxic exposure.

8.4.2.2.1.3. Decompression sickness due to evolved gas (bends, chokes, neuro-circulatory collapse), or severe reaction to trapped gas resulting in incapacitation.

8.4.2.2.1.4. Hyperventilation.

8.4.2.2.1.5. Spatial disorientation or distraction resulting in an unusual attitude.

8.4.2.2.1.6. Loss of consciousness from any cause.

8.4.2.2.1.7. Death by natural causes of any crewmember in flight.

8.4.2.2.1.8. Unintentional loss of pressurization if cabin altitude is above FL180, regardless of effects on personnel.

8.4.2.2.1.9. Alcohol intoxication and hangover (crew only).

8.4.2.2.1.10. Illness (both acute and pre-existing), including food poisoning, dehydration, myocardial infarction, seizure, and so forth.

8.4.2.2.1.11. Exposure to toxic, noxious, or irritating materials such as smoke, fumes, or liquids.

8.4.2.2.2. In-flight flameout, engine failure, required engine shutdown, suspected engine power loss, or loss of thrust sufficient to preclude maintaining level flight above minimum enroute altitude (MEA). ***NOTE:*** Intentional shutdowns for training

and Functional Check Flight (FCF) are excluded; however, report failure to restart, using the criteria above.

8.4.2.2.3. Un-commanded propeller reversal.

8.4.2.2.4. Flight control malfunction resulting in an unexpected or hazardous change of flight attitude, altitude, or heading.

8.4.2.2.5. Malfunction of landing gear when difficulty is experienced using emergency system or procedures.

8.4.2.2.6. In-flight loss of all pitot-static instrument indications or all gyro stabilized attitude or directional indications.

8.4.2.2.7. Spillage or leakage of radioactive, toxic, corrosive, or flammable material from aircraft stores or cargo.

8.4.2.2.8. All cases of departure from intended takeoff or landing surface onto adjacent surfaces.

8.4.2.2.9. Any incident that does not meet established criteria for a reportable mishap but, in the judgment of the PIC, must be emphasized in the interest of flight safety.

8.5. Reports of Violations/Unusual Events or Circumstances. Violations identified in AFI 11-202V3 and navigation errors (including over-water position errors exceeding 24nm, border and ATC violations) will be reported.

8.5.1. Include the following: factual circumstances, investigation and analysis, findings and conclusions, recommendations, and actions taken.

8.5.1.1. Attachments should include the following: notification of incident, crew orders, statements of crewmembers (if applicable), and documenting evidence (logs, charts, etc.).

8.5.2. In addition to the information listed, the historical flight plan will be downloaded onto a floppy disk and turned in to the C2 center or owning standardization and evaluation office.

8.5.3. Send the original investigation report within 45 days to HQ AFSOC/IG. AFRC units receiving alleged violations will send the original investigation through channels to arrive at HQ AFRC/IGI within 35 days. HQ AFRC/IGI will send the investigation report to HQ AFSOC/IG within 45 days.

8.5.4. The following Operations Report (OPREP)-3, Event or Incident Report, reporting procedures for all aircraft notified of navigational errors exceeding 24 NMs will be reported under AFMAN 10-206, Operational Reporting.

8.5.4.1. On notification of a navigational position error, the PIC (or agency receiving notification) documents the circumstances surrounding the incident (report content below) and ensures submission of an OPREP-3 report through C2 channels.

8.5.4.2. Include the following:

8.5.4.2.1. Name and location of unit submitting report, mission identification number, reference to related OPREPs-3, type of event (e.g., state "navigation position error."), date, time (Zulu), and location (e.g., air route traffic control center area).

8.5.4.2.2. Description of facts and circumstances. Include aircraft type and tail number, unit (wing/group or squadron assignment of crew), home base, route of flight, point of alleged deviation, and miles off course.

8.5.5. PICs must keep the appropriate agencies apprised of any unusual events or circumstances impacting their missions. Examples of reportable events include meaconing, intrusion, jamming, interference, fuel dumping, loss of multiple engines, hostile fire, injury to passengers or crewmembers, etc., This list is not exhaustive. Some events may require the C2 agency to forward OPREP reports to higher headquarters. The old adage, "when in doubt, report it," applies.

Chapter 9

FLYING TRAINING POLICY

9.1. General. This chapter outlines procedures, requirements, and restrictions for training and evaluation missions. Refer to AFI 11-202V1, *Aircrew Training*, AFI 11-202V2, *Aircrew Standardization/ Evaluation Program*, AFI 11-2AC-130, Volume 1, *AC-130 Aircrew Training*, and AFI 11-2AC-130, *Volume 2, AC-130 Aircrew Evaluation Criteria* for additional information.

9.2. Instructor or Flight Examiner Briefings. Before all training/evaluation missions, instructors/flight examiners will brief their students/examinees on the training/evaluation requirements, objectives, planned profiles, and seat changes.

9.3. Debriefing. After all training flights, instructors will:

9.3.1. Review and critique student performance.

9.3.2. Review training requirements fulfilled for each student and aircrew member (all aircrew members should understand thoroughly what training was accomplished).

9.3.3. Answer technical questions.

9.3.4. Preview the objectives of the next mission.

9.3.5. Complete all required documentation.

9.4. Simulated Emergency Flight Procedures.

9.4.1. Simulate emergencies (engine shutdown, placing switches in other than their normal positions, or an abnormal configuration such as no flap landing or simulated engine failure) only during training, evaluation, or currency flights when an instructor or flight examiner pilot is in one of the pilot seats. Instructor pilot candidates who occupy a pilot seat and are under the supervision of a flight examiner pilot, not in a pilot seat, may practice simulated emergency procedures during initial or re-qualification upgrade evaluations. Preface all simulated emergencies with the word "simulated" and terminate simulated emergencies if an actual emergency arises. All maneuvers discussed in **paragraph 9.8** require an instructor or flight examiner pilot in accordance with this paragraph, unless otherwise specified in the restrictions.

9.4.2. When conducting simulated engine(s) out training, the flight engineer will post actual charted minimum control speeds on the TOLD card. The instructor pilot should strive to maintain near, but not less than, zero torque on the simulated shutdown engine(s).

9.4.3. The following guidance applies to all engine(s) out training on AFSOC C-130 aircraft:

9.4.3.1. Instructor pilots should review T.O. 1C-130H-1-1, Performance Data, chapter 3 and appropriate T.O. 1C-130(A)H/U-1 chapter 3 information with their trainee(s) before flight. A complete understanding of minimum control speeds and the factors affecting those speeds are critical to performing simulated engine(s) out training successfully.

9.4.3.2. Normally turns should be planned to be in the direction of the good engines.

9.4.3.3. Turns into simulated failed engines should be minimized. Turns into simulated failed engines are permissible but require a higher degree of pilot skill than with actual

failed engines and must be smooth and coordinated. ***WARNING:*** Improper application of rudder or power can lead to an immediate out-of-control situation from which recovery might not be possible.

9.4.4. Simulated EPs are prohibited with passengers on board. ***EXCEPTION:*** Simulated EPs required for the purposes of a functional check flight are authorized. In this context, personnel on board are required for mission accomplishment. Limit personnel to the absolute minimum required.

9.4.5. Conduct simulated emergency flight procedures IAW AFI 11-202V3, chapter 5 and this instruction. Use a realistic approach and do not compound emergencies. Limit simulated emergencies to non-critical phases of flight when possible. Notify the controlling agency if a nonstandard traffic pattern or pattern requiring special sequencing is anticipated.

9.4.6. Request "option approach" prior to initiating an approach when a landing or low approach option is desired. (Example: "Request Instrument Landing System (ILS) option approach.")

9.4.7. Training maneuver restrictions for specific flight maneuvers and missions are listed in **paragraph 9.8**

9.5. Touch-and-Go Landings.

9.5.1. Touch-and-go landings may be performed by:

9.5.1.1. Instructor pilots, instructor pilot candidates on initial or re-qualification instructor evaluations, or flight examiner pilots in either pilot seat.

9.5.1.2. Any pilot from either seat providing an instructor pilot, instructor pilot candidate on initial or re-qualification instructor evaluation, or flight examiner pilot is in the other seat.

9.5.1.3. Any current and qualified pilot when the aircraft commander is touch-and-go certified and is so designated on the flight orders. FP and above may fly from either seat, but copilot qualified pilots (MC, FC) must fly from the right seat, except as authorized above.

9.5.2. Touch-and-go landings are authorized when the crosswind component corrected for RCR is within the recommended zone of the landing crosswind chart. Ceiling and visibility/RVR must be at least 300 feet and ¾ mile (RVR 40).

9.5.3. Include type of touch-and-go as part of the crew briefing, i.e., ground idle or flight idle. Do not perform no-flap ground idle touch-and-go landings.

9.5.4. Touch-and-go landings are not authorized when normal wake turbulence criteria is not met, or when intercepting or crossing the flight path of a jumbo jet while performing an approach or landing.

9.5.5. The minimum runway for touch-and-go landings is 6,000 feet; 7,000 feet for ground idle touch-and-go.

9.6. Stop-and-Go Landings. Authorized only on designated training, evaluation, or currency missions.

9.6.1. Authorized by any C-130 qualified pilot provided the following conditions are met:

9.6.1.1. Crosswind component corrected for RCR must be within the recommended zone of the landing crosswind chart. Ceiling and visibility/RVR must be at least 300 feet and ¾ mile (RVR 40).

9.6.1.2. Use minimum braking to stop.

9.6.1.3. Runway remaining for takeoff must be sufficient to allow takeoff and refusal speeds to be equal.

9.6.2. Stop-and-go landings are not authorized in conjunction with no-flap landings, when normal wake turbulence criteria are not met, or when intercepting or crossing the flight path of a jumbo jet while performing an approach or landing.

9.7. Prohibited Maneuvers. The following maneuvers or procedures are prohibited in the aircraft and may only be practiced in the flight simulator.

9.7.1. Full stalls.

9.7.2. Approach to stalls (except FCF).

9.7.3. Rudder force reversals (fin stalls).

9.7.4. Simulated three-engine takeoff.

9.7.5. Spins.

9.7.6. Simulated runaway trim malfunctions.

9.7.7. Simulated hydraulic system loss by turning engine-driven hydraulic pumps off.

9.8. Maneuver Restrictions.

9.8.1. Windmill Taxi Start. Authorized during daylight. Crosswind component must be within the recommended zone of the takeoff crosswind chart. Runway must be dry, hard-surfaced, and at least 147 feet wide. Flight manual recommendations are mandatory.

9.8.2. Aborted Normal Takeoff. Authorized during daylight. Crosswind component must be within the recommended zone of the takeoff cross wind chart. Runway must be dry, hard-surfaced, and long enough to allow refusal and takeoff speeds to be equal. Initiate the abort by stating "REJECT" before refusal speed. Do not practice aborts from touch-and-go or stop-and-go landings. If actual engine shutdown due to a simulated malfunction is to be practiced, it must be pre-briefed.

9.8.3. Actual Engine Shutdown and Airstart. In-flight shutdown of one engine may be accomplished at not lower than 2,500 feet AGL in daylight VMC.

9.8.4. No-Flap Landing. Authorized in conjunction with a simulated engine(s) inoperative landing. Maximum gross weight is 125,000 pounds and the crosswind component must be within the recommended zone of the landing crosswind chart. Consider the copilot's level of experience and proficiency when determining if he is ready for no-flap training. Authorized in night VMC and day IMC if weather is at or above circling minimums.

9.8.5. Go-Around or Missed Approach. Initiate VFR go-arounds no lower than 100 feet AGL when practicing simulated emergencies other than simulated engine failures. Initiate practice instrument missed approaches no lower than the minimum altitude for the approach.

Minimum altitude is 500 feet AGL when aircraft equipment or personnel are on the runway. ***NOTE:*** Instructor/flight examiner pilot is not required.

9.8.6. Simulated Engine-Out Go-Around or Missed Approach. Initiate simulated engine-out go-around at not lower than 200 feet AGL. Initiate simulated engine-out missed approach no lower than the minimum altitude for the approach.

9.8.7. Simulated Engine-Out Landing. One throttle may be retarded to FLIGHT IDLE at not less than air minimum control speed (one-engine inoperative, out of ground effect) and not less than 300 feet AGL. Authorized in daylight IMC (circling minimums for the approach being flown), or night (1,000-foot ceilings and 2 statute miles visibility or circling minimums, whichever is higher). Use all 4 engines for touch-and-go takeoff.

9.8.8. Simulated Two-Engine Out Landing. Simulate failure of the second engine at not less than 1,000 feet AGL and not more than 125,000 pounds gross weight. Authorized in daylight VMC on a dry, hard surface runway at least 147 feet wide with a crosswind component within the recommended zone of the landing crosswind chart. Use all 4 engines for the touch-and-go takeoff, go-around or missed approach.

9.8.9. Simulated Two-Engine Go-Around or Missed Approach. Authorized in daylight VMC above 5,000 feet AGL. Airspeed at initiation of go-around will not be lower than two-engine air minimum control speed.

9.8.10. Unusual Attitudes and Spatial Disorientation. Authorized at not lower than 10,000 feet AGL in daylight VMC.

9.8.11. Slow Flight. Fly at approach, threshold, and 1.2 times stall speed with gear down and flaps 0, 50, or 100%. Do not exceed 15 º of bank.

Chapter 10

*LOCAL OPERATING PROCEDURES

10.1. General. Units will publish local and/or unique unit operating procedures as a supplement to this chapter commencing with 10.2. The title of this paragraph will indicate the unit concerned (for example, "16 SOS Local Operating Procedures").

10.1.1. Units will publish unit specific procedures for frequently used weapons ranges in the supplement to this chapter.

10.1.2. Procedures in this chapter will not duplicate, alter, amend or be less restrictive than the provisions of this AFI. All units will send their supplements to HQ AFSOC/A3V for review and validation prior to publication.

10.1.3. After validation, send final copies through stan/eval channels to HQ AFSOC/A3V and HQ AFFSA/A3OF.

Chapter 11

NAVIGATOR PROCEDURES

11.1. General.

11.1.1. AC-130 Flight Operations. All AC-130 flight operations requiring a navigator will use the navigation forms found in paragraph 11.1.2. of this instruction.

11.1.2. Forms. This volume contains instructions for completion of AF Forms 4116 and 4139. Computer flight plans may be used in lieu of the AF Form 70, Pilot's Flight Plan and Flight Log and the flight plan portion of the AF Form 4116.

11.1.3. Definitions. Category II Routes are defined as any route on which the position of the aircraft can be accurately determined by the overhead crossing of a radio aid (Non directional beacon (NDB), VHF Omnidirectional Radio (VOR), Tactical Air Navigation (TACAN) at least once each hour with positive course guidance between such radio aids. Category I Routes are defined as any route that does not meet the requirements of a Category II route, including low level and over-water routes.

11.1.4. Navigators will personally maintain charts and navigator's logs used on Category I routes as part of the flight record for a minimum of 30 days.

11.2. General Mission Planning Procedures.

11.2.1. Flight Plans. Regardless of whether a flight plan is prepared by the aircrew or is furnished by another agency, the aircraft commander and navigator will verify routes and altitudes to ensure proper terrain clearance. On overseas flights, verify the flight planned routing against the diplomatic clearance, if applicable. The navigator preparing or accepting the flight plan will remain on duty at the navigator's station during departure. Ensure all required fuel computations are accurate and complete, and confirm the ramp fuel load is compatible with mission requirements. During a crewmember change, the navigator on duty will thoroughly brief the relieving navigator.

11.2.2. Category I Routes. Accomplish flight planning using the AF Form 4116, or a Computer Flight Plan (CFP). Compute the required fuel load using the AF Form 4116 or AF Form 4139.

11.2.3. Category II Routes. Use the AF Form 70, AF Form 4116, or a CFP. Compute required fuel using the AF Form 4116, or AF Form 4139. Not required in the local flying area. For local training sorties, a personal log may be used.

11.2.4. Provide a copy of the flight plan to the pilot.

11.2.5. Fuel Planning. Required on all missions. Use AF Form 4116 or AF Form 4139. For tactical missions and local training sorties, a personal log may be used. Fuel requirements and calculations will be accomplished IAW AFI 11-202V3, AFSOC Sup 1, this instruction, and appropriate performance T.O. Accomplish fuel-planning IAW the appropriate C-130 fuel planning publications in Table 11.1. When using T.O. 1C-130(A)H-1-1 fuel planning charts, use 100% engine performance. CFP en route fuel may be used for fuel analysis in lieu of en route fuel derived from the performance T.O.

Table 11.1. Fuel Planning Guidance.

Aircraft	Performance T.O.	Planning Document
C-130E (-15 eng)	T.O. 1C-130H-1-1	T.O. 1C-130H-1-1
AC-130H	T.O. 1C-130(A)H-1-1	T.O. 1C-130H-1-1
AC-130U	T.O. 1C-130(A)H-1-1	T.O. 1C-130U-1

11.2.6. AC-130 navigators will compute an abort point along the AAR track where conditions will allow for a safe return to a refueling base with appropriate fuel reserves IAW AFI 11-202V3 and this instruction. This will be used in the event AAR is unable to be completed. Label this point on the navigator's chart.

11.2.7. Signature Block. If using AF Form 4116, or equivalent CFP, sign the form after completing the flight plan portion (or verifying the CFP) and completing the time and fuel analysis, wind factor, and Equal Time Point (ETP) data. The Navigator Signature block is found in Section II of the AF Form 4116.

11.3. Computer Flight Planning. The aircrew is always responsible for accuracy of data used in flight. All computer generated flight plans will be verified for correctness prior to each flight. Use only AFSOC approved computer flight planning software. Untested or Beta versions of developing software will not be used for actual mission planning.

11.3.1. Creating Flight Logs. CFPs from approved flight planning software may be used in lieu of manual flight log (AF Form 4116) so long as the CFP provides same information found on manual flight log.

11.3.2. Electronic Data Transfer. If the flight planning computer transfers a flight plan to the aircraft electronically, it must be an AFSOC approved system. Aircrews will not use unapproved versions of any system to load an aircraft navigation computer.

11.3.3. Air Mobility Command (AMC) CFPs. AMC CFPs may be available for missions that meet CFP support criteria and are within the capability of the system. Obtain the CFP through the command post, base weather facility, or base operations dispatcher. Review AMC provided CFP to ensure accuracy for AC-130 missions.

11.3.4. Computer Fuel Plans. Computer aided flight-planning systems (that meet the criteria in **paragraph 11.3.1**) produce flight plans and fuel calculations for C-130 and other aircraft. Computer Flight Plans may be used in place of the AF Form 4116. However, add alternate, identified extra, and reserve fuel if not included in the calculation. The printed format is user configurable and may be tailored to local needs.

11.4. ETP Calculations.

11.4.1. Use Section II (Fuel/ETP Planning), ETP Calculation portion, of AF Form 4116. For AC-130 missions, Wind Factor and ETP Data Computations are required on Category I routes or Category I portions of routes when the total time between the last suitable airfield (LSAF) and the First Suitable Airfield (FSAF) is 5 hours or more. Suitable airfields are those within 100 NM of flight planned course centerline meeting weather, fuel, and AFSOC C-130 runway requirements.

11.4.1.1. For air-to-air refueling missions, make a separate computation for each fuel analysis required. The ETP should drive the location of your planned AAR track. Plan

to have sufficient fuel at each End-Air-Refueling (EAR) point to proceed to an abort base if the tanker does not show or if otherwise unable to complete refueling. Use a point abeam the AAR abort base as the LSAF or FSAF for wind factor computations.

11.4.1.2. Wind factor and ETP computations are not required for round robin or search missions.

11.4.2. Wind Factor Data. For wind factor data, LSAF means level-off, abeam or over LSAF, or closest planned checkpoint or radio aid within 100 NM of LSAF. FSAF means abeam or over FSAF, closest planned checkpoint or radio aid within 100 NM of FSAF, descent point, or destination. Use any of the options in the ETP options graph, Figure 11.1. Specify the option used in the ETP computations section of the AF Form 4116. Record computations in the ETP computations section.

11.4.2.1. Total. Compute the average ground speed (GS) between LSAF and FSAF.

11.4.2.2. 1st Half. Compute the average GS between LSAF and approximate midpoint between LSAF and the FSAF. Subtract flight-planned average True Airspeed (TAS) from the computed average GS to obtain the 1st half wind factor.

11.4.2.3. 2nd Half. Compute the average GS between the approximate midpoint and the FSAF. Subtract flight planned TAS from the computed average GS to obtain the 2nd half wind factor.

11.4.3. ETP Data.

11.4.3.1. DISTANCE (LSAF TO FSAF). Enter the total distance (regardless of level off) from or abeam the LSAF along course from departure to or abeam the FSAF long course toward destination.

11.4.3.2. **(T)** MIN. The flight time from the ETP to the FSAF or return to the LSAF.

11.4.3.3. TOTAL TIME TO FSAF - T = TIME TO ETP. Subtract the time, (T) MIN, from the total flight plan time to the FSAF. TIME TO ETP is the total time from departure to the ETP (departure and takeoff may not necessarily be the same). Compute and record ETA to ETP by adding TIME TO ETP to departure time.

Figure 11.1. ETP Options.

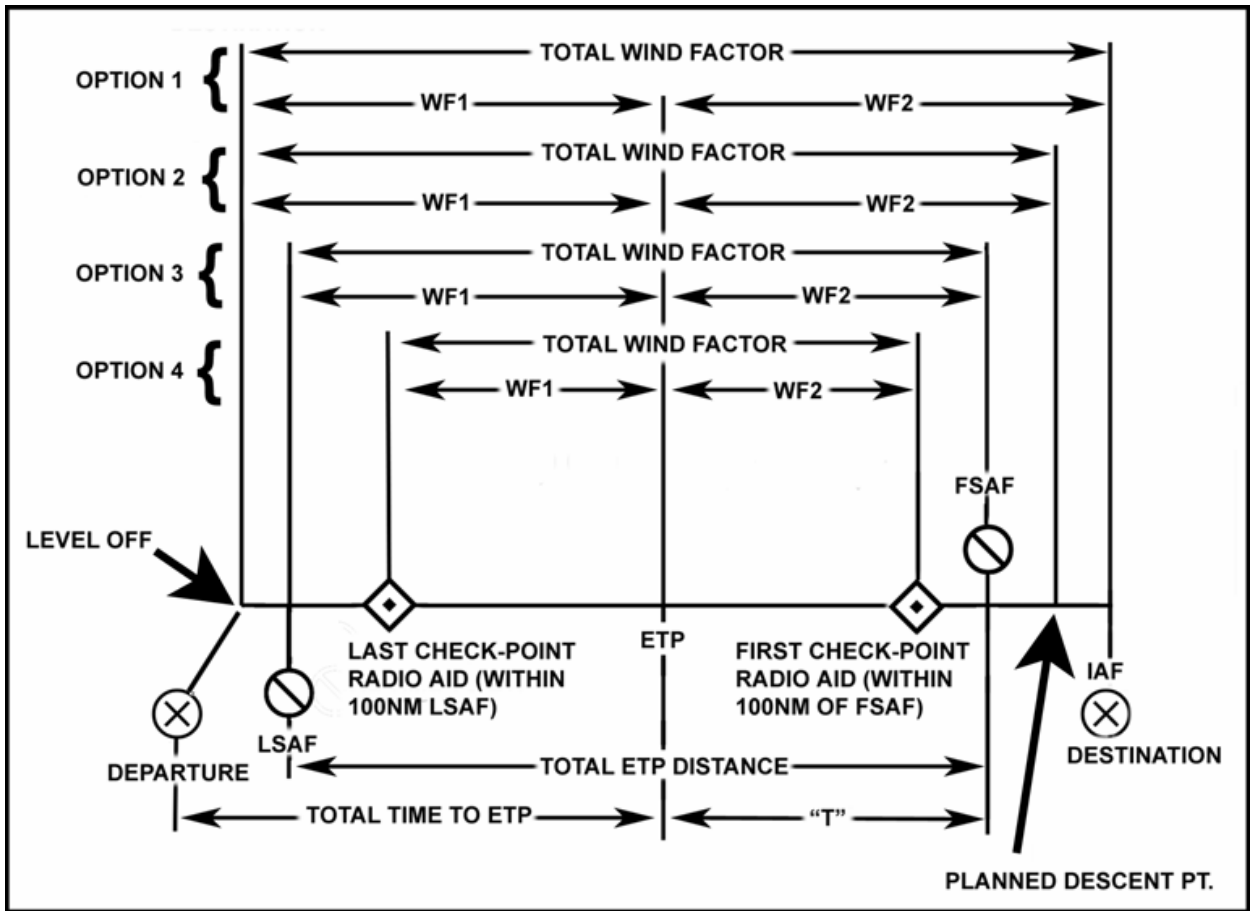


Figure 11.2. Example AF Form 4116 ETP Section.

ETP CALCULATION			
LSAF	MDPT		FSAF
DINNS	BURITT		TXKF
DIST 886	TIME 3+25	DIST 1164	TIME 5+13
- 278	- 1+18	- 727	- 3+25
= 608	= 2+07	= 437	= 1+48
GS 225	WF1 -20	225	WF2 -20
DIST (LSAF TO FSAF) (886)			T(108) MIN
(WF2-WF1) + 2(TAS) (490)		=	^60
TOTAL TIME TO FSAF - T = TIME TO ETP			
ETP METHOD 1 2 (3) 4 (CIRCLE ONE)			
ENROUTE FUEL FORMULAE			
CLIMB DISTANCE		CLIMB TAS	
CLIMB TIME	=	60	
FUEL FLOW (FFT)	ZONE		ZONE
60	X TIME (IN MINS)	=	FUEL
START CRUISE FF + END CRUISE FF			AVG
2		= CRUISE FF	
FUEL FLOW		FUEL	
PER ENGINE X 4	=	FLOW TOTAL	

11.5. AF Form 4116 Fuel Planning.

11.5.1. Use AF Form 4116, Section II (Fuel/ETP Planning). With the exceptions of the items explained in the following paragraphs, all items of the fuel analysis portion of this section are described fully in Table 11.2. See Figure 11.3. for an example of a completed AF Form 4116 Fuel Planning section. ***NOTE:*** To compute terminal fuel flow, use the specific range charts or the range summary charts in the applicable aircraft performance manual. Terminal fuel flow derived from an approved CFP may also be used. ***NOTE:*** The IMT AF Form 4116 has several overprints for C-130 use and should not be confused for AC-130 requirements. As seen on the IMT form, these include Holding entry of 2.0, and Taxi entry of 1.3 (AC-130 entry will be either 1.3 or 2.0).

11.5.1.1. Endurance. Flying time based on fuel available at takeoff (Item 11 minus Item 9). It is extracted from the appropriate fuel planning publication, performance manual for the planned constant altitude, forecast temperature deviation, and the aircraft gross weight at takeoff.

Table 11.2. Fuel Load Components.

1. EN ROUTE		Fuel for flight time from departure/EAR to EAR/overhead destination or initial penetration fix at cruise altitude (include time for planned search, recovery, approach, and climb, when applicable).		
2. RESERVE		Use AFI 11-202V3 reserve requirements. **Compute at terminal fuel flow. Min 2,000 pounds. Entry always required**.		
3. ALTERNATE AND MISSED APPROACH		**Alternate:** Fuel for flight time from overhead destination or EAR to alternate/abort airfield, or most distant alternate when two are required. Required whenever an alternate must be filed. **Missed Approach: 2,200 pounds.** Required if destination is below ceiling minimums, but above visibility minimums.	**Req'd Fuel Overhead Dest**	
4. HOLDING		Used when the required alternate is not available, located in Alaska, or at latitudes greater than 59 degrees N/S. **Use 2,500 pounds.**		
5. APPROACH AND LANDING		**Approach: 1,000 pounds. Entry always required.** **Minimum landing fuel: 4,000 pounds. Entry always required.** Landing fuel will not be included in BURNOFF.		
6. IDENTIFIED EXTRA	CONTINGENCY FUEL (PRESSURE LOSS)	Additional fuel for depressurized flight at an appropriate altitude from ETP to a suitable landing site. Used when pressurized and aircraft oxygen is not available to all occupants. **Compute at 1,000 pounds/hour for "T" time.** If computed fuel is less than item 2, no entry is required here. If computed fuel exceeds item 2, add the difference here.	**Flight Planned Fuel Load**	**Required Ramp Fuel Load**
	STORED FUEL	Ramp fuel for succeeding legs without refueling.		
	OFF-COURSE MANEUVERS	Fuel for anticipated off-course maneuvering for terrain, thunderstorm avoidance, ATC requirements. **Compute at 100 pounds/minute for departure, 50 pounds/minute for en route fuel.**		
	ICING	**500 pounds for each hour** of anticipated icing.		
	KNOWN HOLDING DELAYS	Fuel for anticipated or planned holding time. **Compute at terminal fuel flow.**		
	INSUFFICIENT/ UNRELIABLE NAVAIDS	**1,000 pounds maximum.** Add for insufficient or unreliable NAVAIDs at destination.		
7. TAXI AND RUNUP		**Normally 1,300 pounds.** For ammo upload missions use 2000 pounds.		
8. UNIDENTIFIED EXTRA		Difference between required ramp fuel and actual ramp fuel.		
9. REQUIRED OVER DESTINATION		Total of items 4, 5, and 6. **Will never be less than 5,000 pounds.**		
BURNOFF		Total en route fuel (#1) plus 1,000 pounds (approach fuel) plus taxi and run up (#9) plus identified extra fuel (#7) (except stored fuel). Entry optional.		

Figure 11.3. Example AF Form 4116 – Planning.

II. FUEL/ETP PLANNING			
NAV:	Lt Smith	BASIC WT:	107.0
AC:	Maj Schaeffer	CARGO/PAX WT:	5.0
TAIL#:	1056	RAMP FUEL:	38.0
DATE:	1 Jan 2013	RAMP WT:	150.0
C/S:	RCH 1234	TAKEOFF WT:	148.7

		TIME	FUEL
1. EN ROUTE		4+49	26.6
2. RESERVE		0+29	2.5
3. EN ROUTE + RESERVE		5+18	29.1
4. ALTERNATE + MISSED APPROACH		0+22	2.0
5. HOLDING	2.5	If Required	0
6. APPROACH + LANDING	1.0 + 4.0		5.0
7. IDENTIFIED EXTRA		0	0
8. TOTAL TAKEOFF (3+4+5+6+7)			36.1
9. TAXI	1.3 2.0		1.3
10. REQUIRED RAMP			37.4
11. ACTUAL RAMP			38.0
12. UNIDENTIFIED EXTRA			.6
13. REQ OVHD DEST (4+5+6+ WRF)			7.0

Note: Wing Relieving Fuel (WRF), when required, is calculated as unidentified extra; however, it must be included in Block 13.

Note: The 4,000 lb landing fuel is included as part of WRF.

NAVIGATOR SIGNATURE

11.6. AF Form 4139 Fuel Planning. AF Form 4139, Special Operations C-130 In-flight Refueling Worksheet. This worksheet is used in conjunction with a PFPS flight plan. The AF Form 4139 allows for fuel quantity information taken directly from a PFPS flight plan. This form is applicable to both single and double air refueling planning. The EAR #1 TO EAR #2 and EAR #2 TO AAR #2 ABORT BASE sections of this form are not applicable to single air refueling planning. Where applicable, use same rules as described for same item in Table 11.2. See **Figure 11.4** for an example of a completed AF Form 4139.

11.6.1. Information common to all sections.

11.6.1.1. Item A, OPERATING WEIGHT, is the basic aircraft operating weight plus the cargo & passengers' weight.

11.6.1.2. Ensure the aircraft gross weight does not exceed allowable limits for either ground or air refueling operations, without proper waiver authority.

11.6.1.3. Temperature Deviation. Use the appropriate temperature deviation for each route segment.

11.6.2. Single Air Refueling Instructions.

11.6.2.1. Section I, TAKEOFF TO EAR #1:

11.6.2.2. EN ROUTE (item 1). Calculate en route fuel from T/O to EAR using the flight planned cruise profile to the air refueling track. Increased fuel burn for time spent at lower altitude while on the AAR track will be accounted for in IDENTIFIED EXTRA (item 3).

11.6.2.3. IDENTIFIED EXTRA (item 3). Include 1000 pounds per hour for the time anticipated at lower altitude on the track prior to and during actual air refueling .

11.6.2.4. RESERVE (item 5). Ten percent of planned time from takeoff to EAR #1. Compute at terminal fuel flow; 0+45 maximum.

11.6.2.5. FUEL AT EAR #1 (No On-load) B-6, (item 7). Fuel remaining at the EAR #1, does not include AAR on-load.

11.6.2.6. PLANNED EAR #1 FUEL (item 8). Planned fuel at EAR #1 including the planned fuel transfer.

11.6.3. Section II, EAR #1 TO AAR #1 ABORT BASE:

11.6.3.1. Complete to account for an unsuccessful fuel transfer. An abort base is required for all refueling tracks. The departure base may be used. The designated abort base must meet alternate airfield weather requirements.

11.6.3.2. EN ROUTE (item 9). Time from EAR to abort base.

11.6.3.3. RESERVE (item 10). Ten percent of planned time from EAR #1 to abort base. Combined total for item 5 plus item 10 should not exceed 0+45. If the combined total exceeds 0+45, add only the balance for a total of 0+45 in this block. Compute at terminal fuel flow; entry only required when the flight time from EAR to alternate exceeds 1+30.

11.6.3.4. AAR #1 ABORT ALTERNATE (item 11). Optional entry.

11.6.3.5. HOLDING (item 12). Use 2,500 pounds if abort base is in Alaska, or at latitudes greater than 59 degrees N/S, or no alternate is available.

11.6.3.6. PLANNED RAMP FUEL (item 16). Must be sufficient to meet the requirements of (item 17, required ramp fuel) and the requirements of Section V fuel planning.

11.6.3.7. REQUIRED RAMP FUEL (item 17). Fuel required to fly from departure to the end air refueling point and continue to the AAR abort base with required reserves, in the event of an unsuccessful fuel transfer during the AAR. Includes fuel required to fly the entire air refueling track without a successful fuel transfer.

11.6.3.8. UNIDENTIFIED EXTRA (item 18). Does not need to meet the normal requirement (not to exceed 2200 pounds), since item 8 (Planned EAR #1 Fuel) must be sufficient to meet Section V, EAR to destination fuel requirements. If unidentified extra fuel is excessive, consideration should be given to reducing the proposed ramp fuel and increasing the proposed AAR on-load if possible.

11.6.4. Section III, EAR #1 TO EAR #2. Not applicable to single air refueling missions.

11.6.5. Section IV, EAR #2 TO AAR #2 ABORT BASE. Not applicable to single air refueling missions.

11.6.6. Section V, EAR TO DESTINATION:

11.6.6.1. Items separated by a diagonal (/) in this section are applicable to both single and double air refueling missions. The item letter or number prior to the diagonal (/) applies to single air refueling planning.

11.6.6.2. EN ROUTE (item 38). Time from end air refueling to final destination. Use the planned cruise profile for fuel calculations.

11.6.6.3. RESERVE (item 39). Ten percent of planned time from EAR to destination, not to exceed 0+45. Compute at terminal fuel flow.

11.6.6.4. HOLDING (item 41). Use 2,500 pounds if abort base is in Alaska, or at latitudes greater than 59 degrees N/S.

11.6.6.5. REQUIRED EAR TO DEST (item 44). This is the actual fuel, including reserves, required at the EAR point to fly to the destination. Do not exceed the aircraft maximum gross weight limit established in the applicable flight manual.

11.6.6.6. REQUIRED FUEL AT EAR (PRIOR TO ONLOAD) (item 47). The difference between the required EAR to destination fuel (item 44) and planned fuel on-load from the tanker (item 45).

11.6.7. UNIDENTIFIED EXTRA. Subtract required fuel at EAR (prior to on-load) (item 47) from the planned fuel at EAR (item 46). This value equals the extra fuel carried or additional fuel required (if negative) from the EAR to destination. When negative, additional fuel must be added, to ramp fuel, to the planned AAR on-load from the tanker, or in some situations may require moving the air refueling track or adding a second refueling.

11.6.8. Double Air Refueling Instructions.

11.6.8.1. Section I, TAKEOFF TO EAR #1:

11.6.8.2. EN ROUTE (item 1). Time and fuel from TAKEOFF to EAR #1. Calculate fuel using the flight planned cruise profile from takeoff to the AAR track. Increased fuel burn for time spent at lower altitude while on the AAR track will be accounted for in IDENTIFIED EXTRA (item 3).

11.6.8.3. IDENTIFIED EXTRA (item 3). Include 1000 pounds per hour to compensate for the time anticipated at lower altitude on the track prior to and during actual air refueling for AAR #1.

11.6.8.4. RESERVE (item 5). Ten percent of planned time from takeoff to EAR #1. Compute at terminal fuel flow; 0+45 maximum.

11.6.8.5. TOTAL (item 6). Total fuel required from TAKEOFF TO EAR #1. Does not include abort base fuel requirements.

11.6.8.6. FUEL AT EAR #1, no on-load (item 7). Fuel remaining at the EAR point. This item does not include the air refueling on-load for AAR #1.

11.6.8.7. PLANNED EAR #1 FUEL (item 8). Fuel at EAR #1 including the planned fuel on-load. This fuel quantity must be sufficient to meet the fuel requirements of Section IV (EAR #2 to AAR #2 abort base, item 35) and Section V (Required fuel at EAR #2 prior to on-load, item 47).

11.6.9. Section II, EAR #1 TO AAR #1 ABORT BASE (See **Figure 11.4** for an example).

11.6.9.1. Complete to account for an unsuccessful fuel transfer for AAR #1. An abort base is required for all refueling tracks. The departure base may be used. The designated abort base must meet alternate airfield weather requirements.

11.6.9.2. EN ROUTE (item 9). Time from EAR #1 to the abort base.

11.6.9.3. RESERVE (item 10). Ten percent of planned time from EAR #1 to abort base. Combined total for item 5 plus item 10 should not exceed 0+45. If the combined total exceeds 0+45, add only the balance for a total of 0+45 in this block. Compute at terminal fuel flow; entry only required when the flight time from EAR to alternate exceeds 1+30.

11.6.9.4. AAR #1 ABORT ALTERNATE (item 11). Optional entry.

11.6.9.5. HOLDING (item 12). Use 2500 pounds if abort base is in Alaska, at latitudes greater than 59 degrees N/S, or no alternate is available.

11.6.9.6. PLANNED RAMP FUEL (item 16). Must be sufficient to meet the requirements of (item 17, required ramp fuel) and the requirements of Section V fuel planning.

11.6.9.7. REQUIRED RAMP FUEL (item 17). This only considers the fuel required to fly from departure to the end air refueling point and continue to the AAR abort base with required reserves, in the event of an unsuccessful fuel transfer during AAR #1. It includes fuel required to fly the entire air refueling track without a successful fuel transfer. It does not consider the planned ramp fuel needed to complete the fuel requirements to the AAR #2 abort base or the destination.

11.6.9.8. UNIDENTIFIED EXTRA (item 18). Does not need to meet the normal requirement (not to exceed 2200 pounds), since item 8 (planned EAR #1 fuel) must be

sufficient meet EAR #2 and AAR #2 abort base fuel requirements. If unidentified extra fuel is excessive, consideration should be given to reducing the proposed ramp fuel and increasing the proposed AAR on-load, if possible.

11.6.10. Section III, EAR #1 TO EAR #2.

11.6.10.1. EN ROUTE (item 20). Time and fuel from EAR #1 to EAR #2. Use the planned cruise profile for fuel calculations.

11.6.10.2. IDENTIFIED EXTRA (item 21) Include 1000 pounds per hour for the time anticipated at lower altitude on the track prior to and during actual air refueling for AAR #2.

11.6.10.3. RESERVE (item 23). Ten percent of planned time from EAR #1 to EAR #2, not to exceed 0+45. Compute at terminal fuel flow.

11.6.10.4. FUEL AT EAR #2, NO ONLOAD (item 25). The planned fuel at EAR #1 minus the fuel required to fly from EAR #1 to EAR #2. This calculated fuel quantity is compared to the required fuel at EAR #2 prior to on-load (item 47) to confirm sufficient fuel planned through EAR #2.

11.6.10.5. PLANNED EAR #2 FUEL (item 26). Do not exceed the aircraft maximum gross weight limit established in the applicable flight manual.

11.6.11. Section IV, EAR #2 TO AAR #2 ABORT BASE:

11.6.11.1. Complete to account for an unsuccessful fuel transfer for AAR #2. An abort base is required for all refueling tracks. The designated abort base must meet alternate airfield weather requirements. This section is similar to the calculations for Section II, EAR #1 to AAR #1 abort base.

11.6.11.2. RESERVE (item 28). Ten percent of time from EAR #2 to abort base. Combined total for item 23 plus item 28 should not exceed 0+45. If the combined total exceeds 0+45, add only the balance for a total of 0+45 in this block. Compute at terminal fuel flow; entry only required when the flight time from the EAR #2 to abort base exceeds 1+30.

11.6.11.3. PLANNED EAR #1 FUEL (item 34). Must be sufficient to meet the requirements of item 35 (REQUIRED EAR #1 FUEL) to satisfy the AAR #2 abort base fuel requirements in the event fuel is not on-loaded during AAR #2.

11.6.11.4. UNIDENTIFIED EXTRA (item 36). Does not need to meet the normal requirement (not to exceed 2200 pounds), since item 26 (planned EAR #2 fuel) must be sufficient meet EAR #2 to destination and AAR #2 abort base fuel requirements in the event of no on-load. If unidentified extra fuel is excessive, consideration should be given to reducing the proposed PLANNED EAR #1 fuel (item 8) and increasing the proposed AAR #2 on-load, if possible.

11.6.12. Section V, EAR to DESTINATION (See **Figure 11.4** for an example).

11.6.12.1. Items separated by a diagonal (/) in this section are applicable to both single and double air refueling missions. The item letter or number after to the diagonal (/) applies to double air refueling planning. Use the planned cruise profile for fuel calculations.

11.6.12.2. RESERVE (item 39). Ten percent of time from EAR #2 to destination, not to exceed 0+45. Compute at terminal fuel flow.

11.6.12.3. UNIDENTIFIED EXTRA (item 48). This calculation assumes you receive the planned fuel on-load. Subtract fuel required at EAR #2 prior to on-load (item 47) from the planned fuel at EAR #2 prior to on-load (item 46). This value equals the extra fuel carried or additional fuel required (if negative) at the destination. When negative, additional fuel must be, added to the ramp fuel, available from the tanker, or in some situations may require moving one or both of the air refueling tracks.

Figure 11.4. Example AF Form 4139 – Special Ops C-130 In-Flight Refueling Worksheet.

SPECIAL OPERATIONS C-130 INFLIGHT REFUELING WORKSHEET

AIRCRAFT #: 1056	(A) OPERATING WT: 115.0	(C) PLANNED ONLOAD A/R #1: 28.0
AIRCRAFT CONFIG: N/A	(B) PLANNED RAMP FUEL: 40.0	(D) PLANNED ONLOAD A/R #2: 15.0

TAKEOFF TO EAR #1

T.O. GROSS WT: (A+B-2) 153.3 / 0 TEMP DEV:	FUEL PLAN, PAGE: TIME	FUEL
1. ENROUTE	4+30	26.7
2. TAXI & RUNUP		1.3
3. IDENTIFIED EXTRA	0	0.0
4. BURN OFF (T.O. TO EAR #1) (1+2+3)		28.0
5. RESERVE (T.O. TO EAR #1) TFF: 5.5	0+18	1.5
6. TOTAL (4+5)		29.5
7. FUEL AT EAR #1 (NO ONLOAD) (B-6)		10.5
8. PLANNED EAR #1 FUEL (7+C)		38.5

EAR #1 TO A/R #1 ABORT BASE

EAR A/R #1 GROSS WT: (A+7) 125.5 / 0 TEMP DEV:	FUEL PLAN, PAGE: TIME	FUEL
9. ENROUTE (EAR #1 TO ABORT BASE)	0+15	1.2
10. RESERVE (EAR #1 TO ABORT BASE) TFF: 5.5	0+02	0.1
11. A/R #1 ABORT ALTERNATE	N/A	0.0
12. HOLDING		2.5
13. APPROACH / LANDING		5.0
14. IDENTIFIED EXTRA	0	0.0
15. FUEL REQUIRED (EAR #1 TO ABORT BASE) (9+10+11+12+13+14)		8.8
16. PLANNED RAMP FUEL (B)		40.0
17. REQUIRED RAMP FUEL (6+15)		38.3
18. UNIDENTIFIED EXTRA (16-17)		1.7
19. REQUIRED OVERHEAD ABORT BASE (11+12+13)		7.5

EAR #1 TO EAR #2

EAR #1 GROSS WT: (A+8) 153.5 / 0 TEMP DEV:	FUEL PLAN, PAGE: TIME	FUEL
20. ENROUTE (EAR #1 TO EAR #2)	2+30	14.9
21. IDENTIFIED EXTRA	0	0.0
22. BURNOFF (EAR #1 TO EAR #2) (20+21)		14.9
23. RESERVE (EAR #1 TO EAR #2) TFF: 5.5	0+15	1.1
24. TOTAL (22+23)		16.0
25. FUEL AT EAR #2 (NO ONLOAD) (8-24)		22.5
26. PLANNED EAR #2 FUEL (25+D)		37.5

EAR #2 TO A/R #2 ABORT BASE

EAR A/R #2 GROSS WT: (A+25) 137.5 / 0 TEMP DEV:	FUEL PLAN, PAGE: TIME	FUEL
27. ENROUTE (EAR #2 TO ABORT BASE)	2+15	12.8
28. RESERVE: (EAR #2 TO ABORT BASE) TFF: 5.5	0+13	1.0
29. A/R #2 ABORT ALTERNATE	N/A	0.0
30. HOLDING		2.5
31. APPROACH / LANDING		5.0
32. IDENTIFIED EXTRA	0	0.0
33. FUEL REQUIRED (EAR #2 TO ABORT BASE) (27+28+29+30+31+32)		21.3
34. PLANNED EAR #1 FUEL (8)		38.5
35. REQUIRED EAR #1 FUEL (24+33)		37.3
36. UNIDENTIFIED EXTRA (34-35)		1.2
37. REQUIRED OVERHEAD ABORT BASE (29+30+31)		7.5
NAVIGATOR: Smith	DATE 01 Feb 2010	

NOTES ASSOCIATED WITH SPECIFIC ITEM NUMBERS

- ITEM 3: ADD 1,000 LBS PER HOUR FOR TIME ON A/R TRACK #1
- ITEM 8: MAXIMUM 55,112 LBS (CS), 58,604 LBS (SH)
- ITEM 10: ITEMS 5 + 10 TOTAL NOT TO EXCEED 1+00 HR
- ITEM 18: (IF NEGATIVE) FUEL MUST BE ADDED TO THE PLANNED RAMP FUEL (B). IF GREATER THAN 4,000 LBS, NO ENROUTE FUEL MANAGEMENT REQUIRED FROM T.O. TO A/R #1 ABORT BASE.
- ITEM 21: ADD 1,000 LBS PER HOUR FOR TIME ON A/R TRACK #2
- ITEM 23: ITEM 23 NOT TO EXCEED 1+00HR.
- ITEM 26: MAXIMUM 55,112 LBS (CS), 58,604 LBS (SH)
- ITEM 28: ITEMS 23 + 28 NOT TO EXCEED 1+00 HR TOTAL, IF TOTAL EXCEEDS 1 HR, ADD ONLY THE BALANCE TO TOTAL 1 HR IN ITEM 28
- ITEM 36: (IF NEGATIVE) FUEL MUST BE ADDED TO THE PLANNED RAMP FUEL (B), OR A/R #1 PLANNED ONLOAD (C). IF GREATER THAN 4,000 LBS, THEN NO ENROUTE FUEL MANAGEMENT REQUIRED TO A/R #2 ABORT BASE.
- ITEM 39: ITEM 39 NOT TO EXCEED 1+00 HR.
- ITEM 48: (IF NEGATIVE) FUEL MUST BE ADDED TO THE PLANNED RAMP FUEL (B). PLANNED A/R #1 ONLOAD (C), OR A/R #2 ONLOAD (D).

EAR TO DESTINATION

EAR GROSS WT: (A+8 / A+26) 152.5 / 0 TEMP DEV:	FUEL PLAN, PAGE: TIME	FUEL
38. ENROUTE (EAR TO DESTINATION)	4+20	25.2
39. RESERVE: (EAR TO DESTINATION) TFF: 5.5	0+26	2.2
40. DESTINATION ALTERNATE	N/A	0.0
41. HOLDING		3.5
42. APPROACH / LANDING		5.0
43. IDENTIFIED EXTRA	0	0.0
44. REQUIRED EAR TO DEST (38+39+40+41+42+43)		35.9
45. PLANNED ONLOAD (C / D)		15.0
46. PLANNED FUEL AT EAR (7 / 25) (PRIOR TO ONLOAD)		22.5
47. REQUIRED FUEL AT EAR (44-45) (PRIOR TO ONLOAD)		20.9
48. UNIDENTIFIED EXTRA (46-47)		1.6
49. REQUIRED OVERHEAD DESTINATION (40+41+42)		8.5

11.7. Flight Charts.

11.7.1. Maintain a plotting chart showing flight progress on all Category I routes and tactical missions. The following information will be shown on the chart:

11.7.1.1. Navigator's name and coordinated universal date in the vicinity of departure or coast out point. Chart number, and chart edition will be annotated on the back of all stripped charts. Check the Chart Updating Manual CHUM on all charts (GNC, JNC, etc.). CHUM information is not required on high-level charts.

11.7.1.2. The flight plan centerlines and portions of ADIZ and FIR boundaries pertinent to the route. Label reporting points with proper names or geographical coordinates. Place the applicable portion of the "No Fly" line on all charts used for missions flown in the vicinity of unfriendly territory or other no-fly areas. Prominently mark warning and restricted areas within 25 NM of planned course and 3000 feet of planned altitude on the chart (not required if a FLIP en route chart with this information is immediately available and used). Annotate airfields along the planned route which could serve as possible emergency landing areas. Consider the following factors when selecting emergency airfields: type aircraft, weather conditions, runway length, runway weight-bearing capacity, runway lighting, radio navigational aids, and proximity to planned flight path.

11.7.1.3. Fixes or position plots and clearly designated time of each fix or position. Fixes or positions may be numbered and the corresponding numbers entered in the position column of the log instead of the geographical coordinates or descriptive position.

11.7.1.4. Annotate the calculated ETP along the route if ETP is required for the mission.

11.7.1.5. Annotate AAR abort point as described in **paragraph 11.2** if applicable for the mission.

11.7.2. In the interest of conservation, re-use flight charts for high level missions whenever this would not affect plotting accuracy of fixes or position determination.

11.7.3. Approved laptop computers running a current version of Falcon View with appropriate chart coverage and chart scale may be used for tactical missions instead of paper charts. Required paper charts must be available should Falcon View not be accessible.

11.8. In-Flight Procedures.

11.8.1. Communications & Radios. Monitor the primary command radio unless otherwise directed by the aircraft commander. Record ATC clearances and monitor the read back. This includes all ATC instructions during departure, en route, and approach. This procedure is not required when ATC instructions require immediate execution by the pilot, or when such action interferes with the timely performance of other time-sensitive navigator duties.

11.8.2. Departure and Approach Monitoring. Immediately after takeoff, cross-check available flight instruments with the airborne radar to ensure the aircraft remains clear of terrain and obstructions. During departure and arrival in IMC with airborne radar inoperative, use all available navigational aids to accurately position the aircraft. On all departures and arrivals, have the appropriate approach plate open to monitor course, timing, and altitude. Backup the pilots and assist as necessary. Report any deviations immediately.

Assist in clearing for other aircraft when possible. Confine activities to these critical duties during all departures and arrivals.

11.8.2.1. To monitor aircraft on approaches and departures, the navigator will use a terrain chart in ONC, TPC, or JOG scale with current CHUM depicting all terrain and obstructions within 25 NM of the airfield terminal area.

11.8.3. Flight Following. The navigator will flight follow on all missions using a suitable plotting chart (JNC, JNCA, or GNC). This is not required in the local flying area for Category II routes, pilot proficiency sorties, or tactical missions.

11.8.4. Heading Deviation Checks. Heading deviation checks are not required on Category II routes or tactical missions. On Category I routes or route segments of 3 hours or longer, compute heading deviation for each compass system as soon as practical after initial level-off or coast-out. Record deviations for all compass systems. Use procedures in **paragraph 11.13**

11.8.4.1. On aircraft with reliable single INS or SCNS with a reliable INS, accomplish an initial heading deviation check to validate the INS heading. On dual INS equipped aircraft, confirm the INS true headings agree within 1 degree of each other. This can be accomplished by comparing the airfield diagram runway heading found in the approach plate and applying magnetic variation.

11.8.4.2. A deviation check is not required on flights transiting Category I routes of less than 3 hours if: the aircraft is equipped with two or more operable heading systems (the standby compass is not considered a system for this requirement) and the difference between systems does not exceed 2 degrees.

11.8.5. True Airspeed (TAS) Checks. TAS checks are not required on Category II routes or tactical missions. Compute TAS check on all Category I routes of 3 hours or longer using procedures in **paragraph 11.14** Compute within 1 hour after reaching the initial cruise altitude. Aircraft without an operable or reliable air data computer or transducer will accomplish a TAS check after every change in altitude greater than 4,000 feet in addition to the initial TAS check.

11.8.6. In-Flight Fuel Management. Required for each flight over a Category I route when the flight time between LSAF and FSAF airfields is 4 hours or more. Record first entry upon level-off. Time between level-off entry and next entry may be up to 1 hour and 30 minutes, and no more than 1 hour each entry thereafter. Use the in-flight fuel management sections of the AF Form 4116 or AF Form 4139 when air-to-air refueling is performed. The navigator may terminate these procedures one hour from destination, when the Category I route segment is completed, or at the discretion of the Aircraft Commander. See **paragraphs 11.11** and **11.12** for procedures.

11.8.6.1. Tactical and local training missions. Navigators will calculate a “Bingo” fuel that ensures the crew will have enough fuel to leave the operating area and return to the recovery airfield with appropriate fuel reserves. If AAR is planned, navigators will calculate a fuel requirement that ensures the crew will have enough fuel to leave the operating area, travel to and transit the planned AAR track, and return to the recovery/divert base with appropriate fuel reserves in the event AAR is unable to be completed.

11.8.7. Fix Interval. Navigators will maintain a flight log on Category I routes of 3 hours or longer. Time between recorded fixes/positions will not exceed 1 hour. Navigators will periodically record spot readings between recorded fixes/position that include time of reading, aircraft heading, drift angle, ground speed, wind data, and TAS. Use procedures in **paragraph 11.10** Perform associated fix/position plotting on flight chart IAW **paragraph 11.7.1.3**

11.8.8. ETP Calculations. Re-compute the ETP when the actual arrival over any reporting point prior to the ETP exceeds 15 minutes ahead or behind time when the change was caused by erroneous wind information. If the change was caused by factors other than a change in the wind (slower TAS flown than planned, weather deviation, etc.), simply compute a new ETA to the ETP, as the ETP itself will not have changed. Follow procedures in **paragraph 11.4**

11.8.9. Immediately report malfunctions or loss of navigational capability which will degrade course centerline accuracy to the air traffic control center.

11.9. Laptop Computers. Laptop computers running Falcon View moving map software and connected to a handheld GPS may be used to provide in-flight situational awareness.

11.9.1. Laptop computers and handheld GPS will be used IAW AFI 11-202V3.

11.9.2. Navigators will carry a handheld GPS unit on all Category I route sorties.

11.9.3. Laptop computers with handheld GPS Falcon View moving map displays will not be used as the primary source of navigation.

11.10. Flight Records. Use AF Form 4116, Section I (Flight Data) and Section IX (In-Flight Data). Record enough detail to reconstruct the mission. Units may publish their standards for log procedures in the unit supplement. This form will consist of planning and in-flight progress data. It will be completed in sufficient detail to fully evaluate or reconstruct the flight. See **Figure 11.6** and **Figure 11.7** for examples for completed AF Form 4116 Sections I and IX.

11.10.1. Flight Data. Section I of AF Form 4116 is used to record data for the planned route. A CFP with identical flight plan information may be used in lieu of manually entering data in Section I. The Flight Data areas are explained below.

11.10.1.1. Waypoint (WPT). Enter airport or Navigational Aid (NAVAID) identifier, waypoint name, or leg number. The level-off line will be labeled as "L/O". If an alternate is required, record this line as "ALT" with flight data from planned recovery airfield to alternate airfield.

11.10.1.2. TO. Enter coordinates for this waypoint.

11.10.1.3. TAS/ALT. Planned true airspeed and altitude for the leg. Entry not required for climb-out and descent legs.

11.10.1.4. TC. Planned true course for the leg.

11.10.1.5. WV/DA. Planned winds and calculated drift angle for the leg.

11.10.1.6. TH, VAR, MH. Planned true heading, magnetic variance, and magnetic heading for the leg.

11.10.1.7. GS. Calculated groundspeed for the leg. Entry not required for climb-out legs.

11.10.1.8. ZONE DIST, TOTAL DIST. Distance for the leg and total distance from takeoff to that point.

11.10.1.9. ZONE TIME, TOTAL TIME. Time to fly that leg and total time from takeoff to that point.

11.10.1.10. ETA, ATA, A/B. Estimated time of arrival to the point, actual time of arrival to the point, and amount of time ahead or behind ETA once arriving to the point.

11.10.1.10.1. Revise ETAs in-flight for unexpected takeoff time, route diversions, or unexpected speed changes that cause significant ETA changes.

11.10.2. In-Flight Data. Section IX of the AF Form 4116 will be used to record present positions, spot readings, and construct dead reckoning (DR) plots if necessary. The following paragraphs describe each item on the log and procedures for using the log.

11.10.2.1. Each item is described below.

11.10.2.1.1. Greenwich Mean Time (GMT). Time of recorded fix/position or DR plot.

11.10.2.1.2. POS. Position. Use "T/O" for takeoff, "A/H" for altered headings, triangles () for recorded fix/position, circles () for DR plots, and "LAND" for landing.

11.10.2.1.3. NAV DATA. Coordinates of position.

11.10.2.1.4. TC. True course.

11.10.2.1.5. WV/DC. Wind direction, velocity, and drift.

11.10.2.1.6. TH, VAR, MH. True heading, magnetic variance at that location, and magnetic heading.

11.10.2.1.7. DEV CORR. Deviation Correction. See **paragraph 11.13** for heading deviation check procedures.

11.10.2.1.8. CH. Corrected heading. Apply DEV CORR to MH to calculate this heading.

11.10.2.1.9. TAS. True airspeed at that time.

11.10.2.1.10. AD/GD/TIME. Air Distance, Ground Distance, Time. AD not used. GD and TIME used only for DR plot lines. TIME is calculated by applying ground speed to the distance (GD) of the DR plot.

11.10.2.1.11. GS. Ground speed at that time, or calculated for TAS against wind data for DR plot.

11.10.2.1.12. NEXT WPT. Next two waypoints on planned route.

11.10.2.1.13. DIST, TIME, ETA. Distance, time, and estimated time of arrival to next two waypoints.

11.10.2.1.14. TEMP/ALT. Outside air temperature and pressure altitude at that time.

11.10.2.2. As soon as practical after level-off or coast-out, whichever occurs latest, navigators will verify aircraft position by either navigation aid fix or radar fix.

11.10.2.2.1. Record the fix in AF Form 4116, Section VIII (Radar/NAVAID Data).

11.10.2.2.2. At the time of the fix, record the primary navigation solution and corresponding deltas for all other navigation solutions in AF Form 4116, Section VI (Fix/Computer Position).

11.10.2.2.3. After the coast-out, record, at a minimum, GMT, present position, true heading, spot wind data, TAS, altitude, and ETA to the next waypoint in AF Form 4116, Section IX (In-Flight Data).

11.10.2.3. After coast-out, recorded fix/position intervals will be no more than 1 hour IAW **paragraph 11.8.7**

11.10.2.3.1. Record the GMT, current position of the primary navigation system, true heading, spot wind data, TAS, altitude, ETA to the next waypoints, and corresponding deltas for all other navigation solutions.

11.10.2.4. Between recorded fixes/positions, periodically record spot readings at regular intervals to allow for calculating a DR plot in the event of a navigation system failure. Spot readings will include time of reading, aircraft heading, drift angle, ground speed, wind data, and TAS.

11.10.2.5. As soon as practical prior to coast-in, navigators will verify aircraft position by either navigation aid fix or radar fix.

11.10.2.6. In the event of a navigation system failure (INU or GPS) full log procedures will be implemented. Beginning at the last plotted position, compute a DR plot up to the present position. Plot a fix/position at a minimum of once per hour. A DR plot associated with the fix/position will be plotted on the chart prior to plotting the position. If the navigation system failure is resolved, the navigator may resume log procedures as outlined in paragraph 11.10.2.

11.10.2.7. Course Deviations. If deviating from planned course for weather or directed by ATC, at a minimum, record the aircraft position and spot data when initially deviating from course. Unless other action is required, record this information again at the approximate farthest point away from course during deviation prior to returning to course.

11.10.2.8. In Section IX (In-Flight Data) of the AF Form 4116, deviations may be recorded as an altered heading line (documented as —A/H). If unable to maintain log due to weather avoidance, the navigator may write —WEATHER DEVIATIONS on the line after the previous recorded fix/position data line. Once clear of weather and heading back to planned course or on course, a fix is recommended and the navigator should resume normal log work.

11.10.2.9. Clearance/Remarks. Enter ATC clearances as discussed in **paragraph 11.8.1** When practical, record assigned ATC frequencies on departure and approach in this section. Use this section to record other pertinent flight information as required.

11.10.2.10. RADAR/NAVAID Data. Use Section VIII of the AF Form 4116. Use this section to record actual and corrected readings (if applicable). Compare Doppler, INS, SCNS, mission computer (MC), and GPS positions (latitude and longitude, or distance-to-go and cross track) for each position fix. At minimum, record the integrated navigation solution. If a navigation solution is updated, record its incorrect position and show that it was updated (in remarks section). Fix data substantiated by ICAO identifier or coordinates in the position block on the actual side of the AF Form 4116 need not be duplicated in this section. See Figure 11.5. for an example of this section.

Figure 11.5. AF Form 4116 - Section VI & VIII, Fix Positions & NAVAID Data.

VI.	FIX/COMPUTER POSITION			VIII.	RADAR/NAVAID DATA			
TIME	GPS/SCNS	INS	DVS	TIME	STATION	READING	CORR	CORR READING
1620	N30-32.3 W81-32.3	N30-32.9 W81-31.5		1620	NRB	329/09	-3W	326/09
1650	N30-51.7 W79-32.5	N30-52.1 W81-32.1		1920	BDA	281/66	-15W	266/66
1720	N31-12.8 W77-13.0	N31-13.0 W77-12.5						
1740	N31-22.8 W76-00.0	N31-23.2 W75-59.2						
1840	N31-52.4 W71-15.9	N31-53.9 W75-14.9						
1920	N32-17.1 W66-00.9	N32-18.2 W65-58.9						

Figure 11.6. Example AF Form 4116 – Section I, Flight Data.

C-130 NAVIGATOR FLIGHT PLAN AND LOG

I. FLIGHT DATA

HIGHEST ACC FL: | AIRCRAFT COMMANDER: Maj Johnson | AIRCRAFT TAIL #: 1056

NAVIGATOR: Lt Smith | T/O TIME

DATE: 01 Jan 2008 | PARKING SPOT: G-2 | PROPOSED: 1430

FROM: KHRT | TO: TXKF | ACTUAL: 1500

WPT	TO	TAS ALT	TC	WV DA	TH	VAR	MH	GS	ZONE DIST	TOTAL DIST	ZONE TIME	TOTAL TIME	ETA	ATA	A/B
	N 30 24.95	↗		180/10											
KHRT	W086 41.26	↗		0					0.0	0.0	0	0			
	N 30 49.57	↗		180/10	001	2W	003	N/A	24.6	24.6	+08	+08	1508	1508	OT
CEW	W086 40.75	↗	001	0											
		190		180/10	089	2W	091	N/A	20.6	45.2	+07	+15	1515	1513	2A
L/O		15.0	091	-2											
	N 30 48.85	245		180/10	090	2W	092	245	7.7	52.9	+02	+17	1517	1515	2A
DEFUN	W 086 07.88	15.0	092	-2											
	N 30 33.08	245		180/10	095	4W	099	244	122.5	175.4	+30	+47	1547	1545	2A
GEF	W 083 46.99	15.0	097	-2											
	N 30 27.90	245		180/10	091	5W	096	244	102.8	278.2	+25	1+12	1612	1609	3A
DINNS	W 083 48.10	15.0	093	-2											
	N 31 10.00	245		180/10	076	8W	084	247	219.8	498.0	+54	2+06	1706	1710	4B
6	W 077 37.50	15.0	079	-2											
	N 31 41.00	245		180/10	079	11W	090	246	229.0	727.1	+56	3+02	1802	1809	7B
BURITT	W 073 12.25	15.0	082	-2											
	N 32 05.00	245		180/10	081	14W	095	246	237.3	964.3	+58	4+00	1900	1911	11B
8	W 068 35.00	15.0	084	-2											
	N 32 21.84	↙		180/10	082	15W	097	246	199.4	1163.8	+49	4+49	1949	2000	11B
TXKF	W 064 40.72	↙	085	-2											
ALT - KZZZ	N 33 21.84	245		180/10	358	15W	013	255	60.0	1223.8	+14	5+03	2003		
	W 064 40.72	15.0	360	-2											

NOTE: This is an example of a route from KHRT to TXKF, an island destination. A notional airfield (KZZZ) was added to this flight plan to show an example of an alternate (ALT) line.

Figure 11.7. Example AF Form 4116 – Section IX, In-Flight Data (Flight Log).

IX. IN-FLIGHT DATA

CLEARANCE/REMARKS: T/O Rwy 36, left turn to 200 up to 1500 ft, expect 15000 ft 10 minutes later, sqwauk 4441, contact departure on 360.6

Climb to 15K, turn to 045 to intercept flight planned route, contact JAX center on 346.4 / JAX altimeter 29.95

GMT	POS	NAV DATA	TC	W/V		TH	VAR	MH	DEV CORR	CH	TAS	AD/GD TIME	GS	NEXT WP	DIST	TIME	ETA	TEMP ALT	NAV DATA/REMARKS TIME	HDG	DA/GS	W/V	TAS
				DC										CEW	24	+08	1508	Down°	1630	097	-3/244	180/10	245
1500						T/O Climbout to CEW, V-198 to DINNS							FP	DEFUN	53	+17	1517	Up	1635	142	0/238	180/12	244
		N30 32.3		180	10									Wpt 6	210	+52	1712	5°	1645	045	-1/245	178/10	240
1620	Δ	W081 32.3	097	-2		095	3W	098	0	098	245		244	Buritt	440	1+48	1808	15000M	1700	100	-3/244	182/12	245
				180	10							122						5°	1715	100	-3/240	182/12	243
1650	O		097	-2		095	3W	098	0	098	245	+30	244					15000M	1800	100	-2/245	181/09	245
		ATC		180	10													5°	1815	098	-1/245	177/07	246
1630	A/H	Vector	140	-1		139	4W	143	0	143	245		245					15000M	1830	096	-1/245	177/10	246
		ATC		180	10													5°	1850	097	-1/245	185/07	244
1640	A/H	Vector	043	-1		042	5W	047	0	047	245		244					15000M					
		N30 51.7		180	10									Wpt 6	100	+24	1711	5°					
1650	Δ	W079 32.5	095	-2		093	5W	098	0	098	245		245	Buritt	330	1+21	1811	15000M					
				180	10							123						5°					
1720	O		097	-2		095	4W	099	0	099	245	+30	245					15000M					
		N31 12.8		180	10									Buritt	205	+50	1810	5°					
1720	Δ	W077 13.0	095	-2		093	5W	098	0	098	245		244	Wpt 8	440	1+48	1908	15000M					
																		°					
1720						WEATHER DEVIATIONS												M					
		N31 22.4		180	10									Buritt	144	+35	1815	5°					
1740	Δ	W076 00.0	097	-2		095	4W	099	0	099	245		245	Wpt 8	381	1+33	1913	15000M					
				180	10							245						5°					
1840	O		097	-2		095	4W	099	0	099	245	1+00	245					15000M					
		N31 52.4		180	10									Wpt 8	136	+33	1913	5°					
1840	Δ	W071 15.9	097	-2		095	4W	099	0	099	245		245	TXKF	335	1+22	2002	15000M					
				180	10							162						5°					
1920	O		097	-2		095	4W	099	0	099	245	+40	245					15000M					
		N32 08.2		180	10									TXKF	172	+42	2002	5°					
1920	Δ	W68 03.9	097	-2		095	4W	099	0	099	245		245					15000M					
																		°					
						Coast-In, Log Closed Out												M					
2000	+5																	°					
2005	LAND	TXKF				Joe Smith, 1Lt, USAF												M			LAND	2005	
																		°			T/O	1500	
																		M	TOTAL FLT TIME			5+05 (5.1)	

NOTE: This example corresponds with the flight plan example in **Figure 11.6.**

11.11. AF Form 4116 In-Flight Fuel Management. Use Section VII of the AF Form 4116. In-flight fuel management may be accomplished using the actual in-flight engine burn rates.

Using the actual in-flight burn rate method will produce an acceptable error, in that projected current four engine burn rates will lower as gross weight decreases and power is reduced to maintain a constant TAS. Block entries are as follows:

11.11.1. ETA DESTINATION. Revised ETA at destination/EAR.

11.11.1.1. Navigators may use flight plan generated by MCs to update ETAs. Also, laptops with current version of PFPS may be used to update ETAs. Navigators should update paper log in event either of these options are unavailable.

11.11.2. TIME. Record the departure time, level off time, and subsequent reading times. Time intervals between readings will be done IAW **paragraph 11.8.6** Typically, column 1 will be the take off entry and column 2 will be the level-off entry.

11.11.3. TERM FUEL FLOW. Terminal Fuel Flow.

11.11.4. FUEL FLOW. Fuel burn rate at time of reading.

11.11.5. AVG FUEL FLOW. Calculate by adding TERM FUEL FLOW and FUEL FLOW and dividing the sum by 2.

11.11.6. FUEL REMAINING. Fuel quantity at time of reading.

11.11.7. MIN DIV/REQ OVHD. Required fuel overhead (item 13 of the AF Form 4116 Fuel Plan).

11.11.8. DIFFERENCE. Subtract MIN DIV/REQ OVHD from FUEL REMAINING.

11.11.9. FUEL ETE. This is the DIFFERENCE converted to time. Calculate by dividing DIFFERENCE by AVG FUEL FLOW.

11.11.9.1. The navigator may choose to calculate FUEL ETE by dividing DIFFERENCE by FUEL FLOW (current burn rate) instead of using AVG FUEL FLOW. This will produce a more conservative FUEL ETE.

11.11.10. ETE DESTINATION. Estimated Time En route to destination. Subtract TIME from ETA DESTINATION.

11.11.11. EXTRA TIME. Subtract ETE DESTINATION from FUEL ETE. Report this value to the pilot. If this is a negative value, check the computation and values for errors. If they are correct, evaluate destination options.

Figure 11.8. Example AF Form 4116 - Section VII, In-Flight Fuel Management.

VII.	IN-FLIGHT FUEL MANAGEMENT								
	1	2	4	5	6	7	8	9	10
ETA DESTINATION	T/O	2000	2005	2010	2005				
TIME	1530	1550	1700	1800	1900				
TERM FUEL FLOW	5.6	5.6	5.6	5.6	5.6				
FUEL FLOW		6.2	6.0	5.9	5.8				
AVG FUEL FLOW		5.9	5.8	5.7	5.7				
FUEL REMAINING	38.0	35.5	28.5	22.6	16.9				
MIN DIV/REQ OVHD		10.0	10.0	10.0	10.0				
DIFFERENCE		25.5	18.5	12.5	6.9				
FUEL ETE		4+10	3+11	2+12	1+12				
ETE DESTINATION		4+10	3+05	2+10	1+05				
EXTRA TIME		0+00	0+06	0+02	0+07				

11.12. AF Form 4139 In-Flight Fuel Management. Use the reverse side of AF Form 4139 (Special Operations C-130 Air Refueling In-flight Management) for manual in-flight fuel management on missions incorporating one or two air-to-air refuelings. Using the actual in-flight burn rate method will produce acceptable error in that projected current four engine burn rates will lower as gross weight decreases and power is reduced to maintain a constant TAS. The TAKEOFF TO EAR #1 and TAKEOFF TO AAR #1 ABORT BASE sections are applicable to both single and double air refueling missions, while the EAR #1 TO EAR #2 and EAR #1 TO AR #2 ABORT BASE sections only apply to missions requiring two air-to-air refuelings. For all air-to-air refueling missions, use the AF Form 4116 Fuel Management section after completing the last air-to-air refueling. The GROSS WEIGHT and PAGE # blocks are not required. The navigator may use one of these blocks to record current fuel flow. All other entries on the form are self-explanatory except for the following:

11.12.1. From takeoff to End AAR #1 simultaneously work two enroute fuel management solutions, Takeoff to EAR #1 to ensure proper enroute fuel management to continue the mission, and Takeoff to AAR #1 Abort Base to ensure sufficient fuel in the event of a missed AAR.

11.12.2. From End AAR #1 to End AAR #2 simultaneously work two enroute fuel management solutions, End AAR #1 to EAR #2 to ensure proper enroute fuel management, and EAR #1 to AAR #2 Abort Base to ensure sufficient fuel in the event of a missed AAR for refueling number 2. These two sections are only applicable to missions requiring two air refuelings.

11.12.3. Use the AF Form 4116 fuel management section for EAR to destination using item 49 for the O/H Fuel entry.

11.12.4. TAKE OFF TO EAR #1 section.

11.12.4.1. EAR #1 FUEL, No Onload (47 / 7). Use item 47 for single AR missions, and item 7 for double AAR missions.

11.12.4.2. AAR #1 ADJUST (3). Include only that portion of the fuel in Item 3 used to compensate for additional time on the refueling track, computed at 1000 pounds per hour.

11.12.4.3. ETE TO EAR #1. RETA to EAR #1 minus the TIME of the fuel data.

11.12.5. TAKEOFF TO AAR #1 ABORT BASE section.

11.12.5.1. This section need not be completed if Item 18 on the front of the form exceeds 4000 pounds.

11.12.5.2. REQD OVERHEAD ABORT BASE #1 (19). The sum of the fuel required for the abort alternate, holding, and approach and landing.

11.12.5.3. AAR #1 ADJUST (3). Include only that portion of the fuel in Item 3 used to compensate for additional time on the refueling track, computed at 1000 pounds per hour.

11.12.6. EAR #1 TO EAR #2 section.

11.12.6.1. AAR #2 ADJUST (21). Include only that portion of the fuel in Item 21 used to compensate for additional time on the refueling track, computed at 1000 pounds per hour.

11.12.6.2. ETE TO EAR #1. RETA to EAR #2 minus the TIME of the fuel data.

11.12.7. EAR #1 TO AR #2 ABORT BASE section.

11.12.7.1. This section need not be completed if Item 36 on the front of the form exceeds 4000 pounds.

11.12.7.2. REQD OVERHEAD ABORT BASE #2 (37). The sum of the fuel required for the abort alternate, holding, and approach and landing.

11.12.7.3. AAR #2 ADJUST (21). Include only that portion of the fuel in Item 21 used to compensate for additional time on the refueling track, computed at 1000 pounds per hour.

11.12.8. From End AAR #2 to destination use standard AF Form 4116 in-flight fuel management procedures.

Figure 11.9. Example AF Form 4139 – Air Refueling In-Flight Fuel Management.

SPECIAL OPERATIONS C-130 AIR REFUELING INFLIGHT FUEL MANAGEMENT

NOTE: USE THE FLIGHT PLAN AND NAVIGATION LOG, FUEL MANAGEMENT SECTION FROM EAR TO DESTINATION USING ITEM 49 FROM THIS WORKSHEET FOR O/H FUEL ENTRY.

TAKEOFF TO EAR #1				
RETA TO EAR #1	1430	1430		
TIME	1130	1230		
TEMP DEV				
~~GROSS WEIGHT~~ FUEL FLOW	6.0	6.0		
PAGE #				
FUEL REMAINING	32.0	26.0		
(-) EAR #1 FUEL (NO ONLOAD) (47/7)	12.5	12.5		
DIFFERENCE	19.5	13.5		
(-) A/R #1 ADJUST (3)	0.0	0.0		
USABLE FUEL	19.5	13.5		
ADJUSTED FUEL ETE	3+15	2+15		
(-) ETE TO EAR #1	3+00	2+00		
TIME DIFFERENCE	+15	+15		
ADDITIONAL ONLOAD (IF REQ'D) @ 5000 LBS / HR, FOR A/R #1				

EAR #1 TO EAR #2							
RETA TO EAR #2	1700	1700					
TIME	1500	1600					
TEMP DEV							
~~GROSS WEIGHT~~ FUEL FLOW	6.0	6.0					
PAGE #							
FUEL REMAINING	37.9	31.9					
(-) EAR #2 FUEL (PRIOR TO ONLOAD) (47)	22.9	22.9					
DIFFERENCE	15.0	9.0					
(-) A/R #2 ADJUST (21)	0.0	0.0					
USABLE FUEL	15.0	9.0					
ADJUSTED FUEL ETE	2+30	1+30					
(-) ETE TO EAR #2	2+00	1+00					
TIME DIFFERENCE	+30	+30					
ADDITIONAL ONLOAD (IF REQ'D) @ 5000 LBS / HR, FOR A/R #2							

TAKEOFF TO A/R #1 ABORT BASE				
RETA TO EAR #1 ABORT BASE	1500	1500		
TIME	1130	1230		
TEMP DEV				
~~GROSS WEIGHT~~ FUEL FLOW	6.0	6.0		
PAGE #				
FUEL REMAINING	32.0	26.0		
(-) REQD OVERHEAD ABORT BASE #1 (19)	9.5	9.5		
DIFFERENCE	22.5	16.5		
(-) A/R #1 ADJUST (3)	0.0	0.0		
USABLE FUEL	22.5	16.5		
ADJUSTED FUEL ETE	3+45	2+45		
(-) ETE TO EAR #1 ABORT BASE	3+30	2+30		
TIME DIFFERENCE	+15	+15		

EAR #1 TO AR #2 ABORT BASE							
RETA TO A/R #2 ABORT BASE	1915	1915					
TIME	1500	1600					
TEMP DEV							
~~GROSS WEIGHT~~ FUEL FLOW	6.0	6.0					
PAGE #							
FUEL REMAINING	37.9	31.9					
(-) REQD OVERHEAD ABORT BASE #2 (37)	9.5	9.5					
DIFFERENCE	28.4	22.4					
(-) A/R #2 ADJUST (21)	0.0	0.0					
USABLE FUEL	28.4	22.4					
ADJUSTED FUEL ETE	4+44	3+44					
(-) ETE TO EAR #2 ABORT BASE	4+15	3+15					
TIME DIFFERENCE	+29	+29					

11.13. Heading Deviation Check Procedures.

11.13.1. Cross-check all available heading references (INS/Mission Computer) with actual magnetic variation to arrive at the magnetic course. Use AF Form 4116, Section V (Deviation Check). Block entries as follows:

11.13.1.1. TIME. Time of reading. Aircraft should be on a stable heading (not in a turn).

11.13.1.2. TH (INU). True Heading from INS currently providing heading information to the navigation solution.

11.13.1.3. MAG VAR. Magnetic variance at location of reading. Use magnetic variance from FLIP en route charts or current Falcon View data.

11.13.1.3.1. If aircraft navigation system is loaded with current magnetic variance data, those numbers may be used in lieu of using charts or Falcon View data.

11.13.1.4. MAG HDG. Magnetic heading calculated by applying MAG VAR to TH at time of reading.

11.13.1.5. DEV. Deviation. Difference between Compass Headings (below) and Magnetic Heading.

11.13.1.6. NO 1 CH, NO 2 CH, STBY CH. Compass readings from respective compass systems.

11.13.1.7. COMPUTER. Not required.

11.13.1.8. Celestial heading checks are not required on the AC-130H/U.

Figure 11.10. Example AF Form - Section V, 4116 Deviation Check.

V.	DEVIATION CHECK			
	1	2	3	4
TIME	1530			
TH (INU)	092.0			
MAG VAR	2W			
MAG HDG	094.0			
DEV	+1.0			
NO. 1 CH	095.0			
DEV	-1.0			
NO. 2 CH	093.0			
DEV	+1.5			
STBY CH	095.5			
DEV				
COMPUTER				

11.14. True Airspeed (TAS) Check Procedures.

11.14.1. True Airspeed Checks. The purpose of the TAS check on the AC-130U is to ensure the air data computer (ADC) is computing a proper calibrated airspeed/TAS and temperature.

Use AF Form 4116, Section IV. Heat of Compression and Standard Temperature tables are included on the form. Block entries are as follows:

11.14.1.1. TIME. Time of reading. Aircraft should be at a stable cruise airspeed.

11.14.1.2. ALT. Pressure Altitude at time of reading. Set 29.92 in altimeter (for reading only).

11.14.1.3. IOAT. Indicated outside air temperature. Apply Heat of Compression numbers to get Total Outside Air Temperature (TOAT). Record TOAT in this block next to IOAT.

11.14.1.4. IAS, CAS, EAS, TAS. Use the ICE-T method in AFPAM 11-216 to convert indicated airspeed (IAS) to true airspeed (TAS). Use the appropriate flight performance manual for airspeed corrections. On aircraft with TAS displays from operable air data computers/transducers (ADCs/ADTs), enter only the displayed TAS value. Where two values are displayed from different ADCs/ADTs, enter the average of the two values.

11.14.1.5. ITAS. Indicated true airspeed from ADC. Read directly from the true airspeed gauge.

11.14.1.6. CORR. Correction to ITAS. Subtract ITAS from TAS.

11.14.1.7. COMP TAS. Not required.

Figure 11.11. Example AF Form 4116 - Section IV, Calibration Section (TAS Check).

IV.	TAS CHECK			
	1	2	3	4
TIME	1530			
ALT (PA) 29.92	15000			
IOAT / TOAT	-6 / -12			
IAS	189			
CAS	190			
EAS (-2<270<-3)	188			
TAS	239			
−ITAS	240			
CORR	-1			
−COMP TAS				

STANDARD TEMPERATURES

ALT	TEMP	ALT	TEMP	ALT	TEMP	ALT	TEMP	ALT	TEMP
110	-7	160	-17	210	-27	260	-37	310	-46
120	-9	170	-19	220	-29	270	-39	320	-48
130	-11	180	-21	230	-31	280	-41	330	-50
140	-13	190	-23	240	-33	290	-43	340	-52
150	-15	200	-25	250	-35	300	-44	350	-54

HEAT OF COMPRESSION

TAS	TEMP	TAS	TEMP
190 - 210	-4	277 - 288	-9
210 - 230	-5	288 - 300	-10
230 - 246	-6	300 - 310	-11
246 - 263	-7	310 - 319	-12
263 - 277	-8	319 - 325	-13

Chapter 12

FLIGHT ENGINEER PROCEDURES AND FORMS

12.1. General. In addition to the duties listed in the flight manual, other applicable technical orders, and this instruction, the PIC may assign other duties to the flight engineer, as necessary. Except for ferry flights, hostile environment repair, and C-130 operations with suspected fuel tank foam fires these items need not be briefed and will be performed as normal procedures.

12.2. Authority to Clear a Red X. Flight engineers are not normally authorized to clear a Red X. In a situation where the aircraft is on a Red X and qualified maintenance personnel are unavailable, the flight engineer may obtain authorization to clear the red X from the home station LG/CC or designated representative in accordance with T.O. 00-20-1.

12.2.1. At enroute stations, flight engineers are authorized to sign off Red X symbols for: intake/exhaust inspections, dust covers and plugs installed, and aircraft panels removed and installed to facilitate other maintenance when away from home station.

12.2.2. Other crewmembers are not authorized to clear a Red X.

12.3. In-Process Inspections. All flight engineers must be aware of their responsibility to perform in-process inspections when clearing Red X symbols. During the assembly or reassembly of an item at those stages where further assembly will prevent the required inspection of the item, an in-process inspection will be performed.

12.3.1. Document the in-process inspection. (Refer to T.O. 00-20-1.).

12.4. Aircraft Servicing. Flight engineers normally are not required to refuel or defuel aircraft; however, the flight engineer is qualified and authorized to accomplish these duties when maintenance personnel are not available. This policy is designed for support of the aircraft and its mission while away from home station. TO 00-25-172, and TO 1C-130H-2-12JG-10-1 will be used during all servicing operations. If ground support personnel are not available, the PIC will designate other crewmembers to assist the flight engineer.

12.4.1. Aircraft Refueling. Aircrew members qualified in ground refueling may perform refueling duties.

12.4.1.1. Not used

12.4.1.2. When crewmembers are required to refuel, the flight engineer will act as the refueling team supervisor. Flight engineers acting as refueling supervisors and panel operators will comply with T.O. 00-25-172 and applicable C-130 series T.O.s.

12.4.2. Concurrent Ground Operations. The PIC and Concurrent Servicing Supervisor (CSS) shall ensure aircrew members and servicing personnel accomplish Concurrent Servicing in accordance with T.O. 00-25-172 and servicing technical orders. Aircrews performing Dash-1 preflight inspections or cargo loading concurrent with servicing must have cooperation and close coordination with the CSS. The CSS will remain in continuous intercom contact with fuel servicing team members during the entire servicing operation. In keeping with the guidelines in T.O. 00-25-172, CSS has authority over all phases of CSS operations to include personnel participating in the refuel.

12.4.2.1. Simultaneous fuel and oxygen servicing is not authorized.

12.4.2.2. Simultaneous fuel servicing and ammunition loading is not authorized.

12.4.3. Hot Refueling. Hot refueling (refueling with aircraft engines running) will only be conducted by crews that have been authorized and certified according to AFSOC Hot Refueling Guide, *C-130 Hot Refueling Operations Procedures.*

12.4.4. Fuel Management. In order to comply with the intent of primary fuel management and provide the greatest flexibility for maintenance and operations, standard ramp loads in excess of 30,000 pounds should be loaded as follows (except fuel burned during start, taxi, and takeoff):

12.4.4.1. Outboard main tanks: 7,500 pounds each is the minimum to be considered full.

12.4.4.2. Inboard main tanks: 6,900 pounds each is the minimum to be considered full.

12.4.4.3. Operational commitments, availability of fuel services, or planned landing criteria will in some cases, dictate that these procedures be adjusted however, every effort should be made to comply with these guidelines and the flight manual to maximize airframe life.

12.5. Forms Management. In addition to the procedures in T.O. 00-20-1 and AFI 11-401, the flight engineer will assist the PIC in maintaining the AFTO Form 781. Verify the exceptional release is signed before starting engines and resigned, if necessary, at en route stops.

12.5.1. After each flight, ensure the number of discrepancies (if any), landings, flight duration time(s), etc., are entered on the AFTO Form 781H. Review all AFTO Form 781A discrepancies and ensure clear, detailed entries are made, symbols, and date discovered, are entered for each discrepancy and the discovered blocks are signed.

12.6. Flight monitoring. The flight engineer will monitor aircraft systems during all phases of flight and ground operations. Notify the PIC of all abnormal indications and take appropriate action.

12.6.1. Maintain outside vigilance when flight deck duties allow.

12.6.2. Monitor the primary radio, interplane radio, interphone systems, and MAIN RCV, HOT RCV, P1, and HOT LISTEN (C-130E/H).

12.6.3. Advise and assist the pilot in maintaining required climb and cruise power.

12.6.4. State “17,000” over interphone when any engine torque approaches this value. ***NOTE:*** In the event of an inadvertent over-torque, refer to **Table 12.1** Carefully consider the over-torque actions criteria in order to determine mission impact.

Table 12.1. Over-torque Actions.

Torque Reading (in-lbs.)	Required Actions
19,600 – 21,500	781A Entry. Historical tracking only. No inspection required.
21,500 – 23,000	781A Entry. Visual inspection within 25 flight hours.

Over 23,000	781A Entry. Maintenance required for NDI and engine mounts change within 25 flight hours. Mag plug check. Reduction Gearbox may require change if gearbox oil pressure is lower than before over-torque.
WARNING: Failure to comply with these criteria could result in catastrophic structural failure. ***NOTE:*** The 25-flight hour limit is based on flight time to return the aircraft for maintenance. AFSOC aircraft that experience an over-torque over 23,000 in-lbs. are to immediately return the aircraft for inspection and required maintenance.	

12.6.5. Notify the pilot when either of the following conditions is noted:

12.6.5.1. Deviation of more than 200 feet from assigned altitude.

12.6.5.2. The aircraft configuration is incorrect for the maneuver being performed.

12.7. Prestrike/Post-strike Checklists. When the Prestrike checklist is initiated, ensure the aircraft is configured to enter the combat environment. When the Post-strike checklist is initiated, ensure the aircraft is configured properly (tactical environment permitting) for recovery to the landing airfield.

12.8. Aircraft Performance. Record computed data in accordance with the flight/performance manual and this instruction. Base all performance data on 95 percent engine efficiency unless mission requirements dictate otherwise. Calculate an additional torque value based on 100 percent engine efficiency so you can identify the actual efficiency of the engines when setting takeoff power. Do not accept an engine that produces less than 95 percent efficiency. TOLD card computations will be accomplished using the appropriate performance manual, approved tabulated data, or approved Aircraft Performance Calculator (APC). Computed data must equal or exceed the requirements of this instruction.

12.8.1. AF Form 4064, C-130 TOLD Card Calculations.

12.8.1.1. Complete TOLD card for takeoff prior to the BEFORE STARTING ENGINES CHECKLIST.

12.8.1.2. Complete data applicable to the type of takeoff and landing to be made (i.e., landing distance for normal landing).

12.8.1.3. New data is required for pressure altitude changes of 1,000 feet, gross weight changes of 5,000 pounds, or temperature change of 5ºC.

12.8.2. AF Form 4063, Pilot Information Card Calculations.

12.8.2.1. The minimum TOLD card requirements for a termination landing are: Air Minimum Control Speeds (vMCAs), Obstacle Clearance Speed, 3-Engine Climb Speed, 100 & 50% Flap Landing Speeds and Distances, 0% Flap Landing Approach Speed (Night or IMC), and 3-Engine climb capability (feet per nautical mile).

12.8.2.2. OGVs may approve overprinting the blank blocks of the AF Form 4063, Pilot Information Card (Mini TOLD Card). Submit information copies to HQ AFSOC/A3V upon approval.

12.8.2.3. When practicing no-flap landings, compute both vMCAs for 50 percent flaps and for no flap configuration (low rudder boost). Record both sets of speeds on the TOLD card.

12.8.2.4. When cruise time will exceed 4 hours, the flight engineer will post applicable cruise data 1 hour after the start of the cruise. Cruise data will be updated hourly. Always have 2 and 3 engine service ceiling readily available.

12.8.2.5. Following initial takeoff and landing recalculate affected speeds if favorable conditions afford an additional margin of safety in all other areas (e.g., gross weight decreases due to fuel burn off, while pressure altitude and temperature remain constant).

12.8.3. Deleted.

12.8.4. Deleted.

12.8.5. Deleted.

12.8.6. Deleted.

12.8.7. Deleted.

12.8.8. Deleted.

12.8.9. Deleted.

12.8.10. Deleted.

12.8.11. Deleted.

12.8.12. Deleted.

12.9. Aircraft Structural Integrity Program. Complete the applicable C-130 flight data worksheet and enter data IAW T.O. 1C-130-101 into AIRCAT web base immediately following the flight or within 3 duty days if a delay is unavoidable

12.10. Aircraft Fuel Usage.

12.10.1. Responsibility. The flight engineer will coordinate fuel usage/management with the navigator when the flight requires the completion of the AF IMT 4116, C-130 Flight Plan and Record.

Chapter 13

LOADMASTER PROCEDURES

13.1. General. In addition to the duties established in applicable TOs and other directives, the loadmaster will comply with the procedures and duties in this regulation. The PIC may assign other duties as necessary. ***NOTE:*** Aerial gunners who have completed cross-utilization training, as well as special missions aviation personnel, will comply with the procedures and duties in this instruction when performing loadmaster duties. The loadmaster will:

13.1.1. Plan loads; handle troops and passengers; supervise loading, tie-down, and offloading of ammunition, cargo, baggage, and mission equipment.

13.1.2. Perform scanner duties during flight in high threat environments.

13.1.3. Remain in the cargo compartment/gun deck for takeoffs and landing. When the passenger load requires two loadmasters, or a loadmaster and another qualified crewmember, then both personnel will remain in the cargo compartment. One will remain forward and one aft for takeoffs and landings.

13.2. Additional Aircraft Loadmaster Responsibilities.

13.2.1. Normally all air freight, fleet service, and servicing personnel are authorized to perform assigned duties in all AFSOC aircraft when escorted by an authorized individual. Air freight personnel are responsible for completion of cargo documentation, palletizing, and movement of cargo to and from the aircraft. They will advise the loadmaster of destination, size, weight, and type of cargo (classified, hazardous, etc.) to permit proper positioning; coordinate traffic activities that may affect loading and offloading; and assign sufficient air freight loading personnel for cargo handling. Air freight personnel are responsible for safe positioning of material handling equipment and cargo to and from aircraft cargo ramp or auxiliary ground loading ramps. Air freight personnel, under the direction of the loadmaster, prepare the aircraft for loading or stowing loading equipment if the aircraft is not to be reloaded, tie-down, and physically offload cargo. If cargo, aircraft equipment, or aircraft structure are damaged during loading or offloading, or if loading personnel are injured, the loadmaster will notify the AC, command post, or terminal operations officer.

13.2.2. The loadmaster is responsible for aircraft preflight; load planning; preparation of DD Form 365-4 operation of aircraft equipment; supervision and direction of loading, offloading, tiedown, and coordination with loading crew supervisor for checking the cargo against manifests. The loadmaster is responsible for safe movement of cargo into and out of the aircraft.

13.2.3. At locations with no air terminal or traffic personnel, the shipper assumes responsibilities in paragraph **13.2.1**

13.3. AC-130 Specific Duties.

13.3.1. Identify threats directed toward the aircraft and coordinate evasive maneuvers with the aircraft commander and electronic warfare officer (EWO) See paragraph **18.12**

13.3.2. Operate defensive equipment and direct evasive maneuvers from visual threat engagements.

13.3.2.1. Identify the type of anti-aircraft threats and locations for real time intelligence gathering relative to the mission and follow-on missions.

13.3.3. Possess a thorough knowledge of aircraft systems and component locations. Inform the crew of malfunctions and systems affected by battle damage. Assisting FE during in-flight emergencies and accomplish recommended corrective actions to isolate malfunctions.

13.3.4. Supervise and coordinate the on/offloading of ammunition, markers, and flares ensuring non-essential personnel remain clear of the immediate area and ammunition is safely handled (see Chapter 15).

13.4. Emergency Exits and Safety Aisles. Maintain emergency exits and safety aisles IAW AFSOCI 11-203V6, *AC-130U Configuration/Mission Planning*, AFSOCI 11-203V5, *AC-130H Configuration/Mission Planning*. Use AFI 11-2C-130V3-Addenda A, *C-130 Operations Configuration/Mission Planning* for AFSOC Backup Aircraft Inventory (BAI) C-130E/H aircraft.

13.5. Air Cargo Restraint Criteria. Restrain cargo IAW T.O. 1C-130A-9, *Cargo Loading Manual*.

13.6. Preflight Duties.

13.6.1. The loadmaster will normally report to the aircraft immediately after the crew briefing or as directed by the aircraft commander to begin preflight and loading duties.

13.6.2. AFSOC BAI C-130E/H aircraft do not routinely airlift channel cargo; however, if so tasked, contact the air terminal operations center (ATOC), airlift control element, or air freight/passenger service to obtain the cargo and passenger breakdown and assist in planning of proposed load. Security requirements for ammunition and weapons will be briefed to the loadmaster during the initial load briefing at ATOC.

13.6.2.1. AC-130s will not normally accept airlift channel cargo; however, floor loaded cargo may be transported to support AFSOC aircraft. Under no circumstances will an AC-130 be reconfigured while off station to accommodate cargo airlift.

13.6.2.2. At stations where aircraft tiedown equipment is exchanged, make every effort to ensure that a one-for-one exchange occurs. If this is not possible, the loadmaster will inform the aircraft commander of lost or missing equipment, make an AFTO Form 781 entry for the discrepancy and annotate missing items on the AFSOC Form 31, *Aircraft - 21 Equipment Inventory.*

13.6.3. DELETED

13.6.3.1. DELETED

13.6.3.2. DELETED

13.6.3.3. DELETED

13.7. Passenger Procedures. Space-available passengers will not be transported on AC-130 aircraft. AFSOC aircraft will not normally be tasked to support AMC passenger missions, nor will passengers be manifested or loaded aboard AFSOC aircraft without the prior approval of the aircraft/mission commander. If tasked to transport passengers, comply with the following procedures and paragraph **6.29**

13.7.1. Passenger Handling. The loadmaster is the key figure concerning good passenger relations. Be aware of the doubts and fears which may arise in the minds of passengers and anticipate their questions and actions. Passenger movement should be limited to physiological needs. Good judgment must be exercised on the number of passengers allowed out of their seats at one time. Encourage passengers to keep seat belts fastened when seated.

13.7.2. Do not allow passengers to lounge on or tamper with equipment, cargo, or baggage.

13.7.3. Ensure that non-mission-essential classified equipment remains covered during the entire mission when passengers are onboard and ensure they are denied access to this equipment. If troops require access to classified equipment, the requirement should be made known to the aircraft commander prior to the mission.

13.7.4. The loadmaster(s) will give one copy of the manifest to the PIC for filing with the flight plan and retain sufficient copies for border clearance. The loadmaster will complete anti-hijacking requirements IAW this instruction.

13.7.5. Most personnel carried aboard AFSOC aircraft are aboard to perform a specific mission. Every effort should be made to advise them of mission progress and deviations. The troop commander should be identified prior to boarding.

13.7.6. Determine if the troop commander has any special requirements prior to departure, and coordinate these requirements with the PIC.

13.8. DELETED.

13.9. DELETED.

13.9.1. DELETED

13.9.2. DELETED

13.9.3. DELETED

13.10. Border Clearance. Customs, Immigration, and Agriculture require certain forms for border clearance. The loadmaster will ensure that required forms are contained in the aircraft mission kit. Distribute the forms to the crew and ensure their completion prior to landing; deliver them to the proper persons. Also comply with the requirements of this instruction.

13.11. Weight and Balance. Accomplish weight and balance for the aircraft IAW T.O. 1-1B-50, *Weight and Balance*, and this instruction. A basic handbook of weight and balance, T.O. 1-1B-50, *Weight and Balance Data*, containing current aircraft status, is maintained by the unit possessing the aircraft which provides a supplemental weight and balance handbook for each aircraft. This supplemental handbook is in a wear-resistant binder and may not contain T.O. 1-1B-50 if a certified copy of Chart C provides the current basic weight, basic moment, and basic index. The binder will include the applicable T.O. 1C-130X-5, *Basic Weight Checklist and Loading Data*, and sufficient copies of DD Form 365-4. Also maintain AFSOCI 11-203V5 or V6, *Configuration / Mission Planning* Instruction or AFI 11-2C-130V3-Addenda A, as appropriate, in each binder.

13.11.1. Compute weight and balance by using the Chart E mathematical (moments) method. Prepare DD Form 365-4 IAW applicable *Configuration/Mission Planning* Instruction, and applicable T.O. 1C-130X-5.

13.11.2. The weight and balance section of the unit possessing the aircraft is responsible for providing the appropriate agency with information required to keep documents current and accurate.

13.12. Fuel Weight Computation. To compute fuel weight entered on the DD Form 365-4, read directly from each gauge and compute the sum for total fuel weight. Compute limiting wing fuel computations using the charts in the appropriate Dash One or *Configuration/Mission Planning* Instruction.

13.13. AC-130 Cargo/Baggage Airlift. When loading items on the ramp, ensure the latrine area remains clear and ramp egress is available.

13.13.1. AC-130H cargo/baggage may be floor loaded in the following locations: between the number 5 and 6 guns, cargo ramp, and wheel well.

13.13.1.1. Route tiedown straps over and around the 105 millimeter (MM) and secure them to the 40 MM or the floor tiedown ring forward of the number 5 gun. Ensure tiedown straps do not rest on, or crimp any electrical/hydraulic lines.

13.13.2. AC-130U cargo/baggage may be floor loaded in the following locations: crew rest compartment, wheel well, between the number 2 and 3 guns, above the 40/105 MM Ammunition Storage and Handling System (ASHS), and cargo ramp.

13.14. Pyrotechnics.

13.14.1. This section provides information in preparation for launching pyrotechnics. Reference: T.O.s 11A10-25-7, *Storage and Maintenance Procedures – Pyrotechnic Markers*, and 11A10-26-7, *Storage and Maintenance Procedures – Pyrotechnic Signals*.

13.14.2. Hazards. In general, pyrotechnics contain materials of a hazardous nature. Even though each of the ingredients in a pyrotechnic composition may be relatively stable within itself, it may react with one or more of the other materials to cause deterioration and create an even greater hazard. Pyrotechnics are more dangerous than many other types of ammunition because they are more easily activated. These items should not be handled roughly or exposed to moisture. When subjected to fire, most pyrotechnics burn with intense heat.

13.14.2.1. Toxic Hazards. Many chemicals used in pyrotechnic devices are poisonous if taken internally. This also applies to the residues of burned pyrotechnics. From the inhalation standpoint, the products of pyrotechnic devices and smoke generators present a serious problem. Although most of the smoke and fumes given off by pyrotechnics are considered non-toxic, heavy concentrations in closely confined spaces are dangerous and may be lethal, as they reduce the amount of available oxygen in the air.

13.14.3. Handling. Besides the hazardous basic compositions, pyrotechnics contain sensitive elements such as fuses, friction compositions, and primers. Pyrotechnics should be handled with care and protected against moisture, shock, friction, or heat. Care should be taken to avoid premature ignition or damage that may cause failure when fired. Boxes containing pyrotechnics should not be dropped or thrown. Protective or safety devices should not be removed until just before use. Care should be taken to avoid damage to fiber cases and rip cords located outside the casing of flares. Pyrotechnics should be handled so as to avoid denting or deforming the barrel or case. Do not use pyrotechnics which are dented, deformed, cracked, broken, or have signs of advanced rust, or have shipping covers with an

illegible lot number, manufacture date, or other required identifying information. Pyrotechnics will be handled only under the supervision of a competent, qualified person. Most pyrotechnics burn with intense heat; therefore, personnel should be adequately prepared to handle an emergency situation (e.g., heat resistant gloves and broom).

13.14.4. Storage. Units which have a requirement for storing pyrotechnics will obtain a license from the host base.

13.14.5. Issue Procedures. Pyrotechnics which have been issued for training purposes will be marked in bold capital letters with the word TRAINING. These pyrotechnics will always be stored separately from operational stock within storage areas.

13.14.6. Safety. All of the pyrotechnics described contain combustible chemicals which, when ignited, generate a flame or smoke (or combination of both) for a broad variety of purposes. These purposes include visual signaling, area or target illumination, and point marking. Most are intended to burn with intense heat.

13.14.6.1. Initiation Mechanism. Pyrotechnic devices normally are equipped with some type of safety pin, lock, or tape designed to prevent accidental activation of the initiation mechanism. Any pyrotechnic that shows sign of damage to safety features is considered unserviceable and must be carefully segregated for prompt disposition by EOD.

13.14.6.2. Accidental Initiation. If a pyrotechnic device should be accidentally ignited, in all cases its functioning will result in a fire hazard. The gases generated by this combustion could present a serious toxic hazard. Signaling devices containing propellant charges create an extremely dangerous missile hazard if accidentally ignited.

13.14.6.3. Fighting Pyrotechnic Fires. Pyrotechnic compositions characteristically contain their own oxidants, and therefore do not depend upon atmospheric oxygen for combustion. For this reason, excluding air from a pyrotechnic fire usually is ineffective. Many pyrotechnic mixtures, particularly illuminating flare compositions, burn with intense heat up to 4,500 degrees F. Normally, available extinguishers are of little or no value in fires of this kind, and in addition, may produce toxic or poisonous gases.

13.14.6.4. Safe Altitudes and Distances. Flares not entirely burned out and cooled when they land may ignite combustible material. Safe altitudes and distances depend upon the burning time, rate of descent, and drift of the flare. Such factors will be considered in determining minimum altitudes and distances of release. Signal flares are also a potential fire hazard when the parachute fails to support the signal properly. ***CAUTION:*** Flares will not be launched over areas subject to fire except in an extreme emergency. If such an emergency exists, flares should be dropped from sufficient altitude to allow complete burnout before hitting the surface.

13.14.6.5. Reporting Instructions. Prepare instructions for mishaps, accidents, and incidents IAW AFI 91-204, *Safety Investigations and Reports*. Prepare unsatisfactory reports IAW TO 00-35D-54, *USAF Material Deficiency Reporting and Investigating System*.

13.14.7. Launching Instructions. Gunship jettison locations are determined by the type of pyrotechnic launched.

13.14.7.1. Personnel launching pyrotechnics through open doors or hatches will wear a restraint harness (secured to the aircraft) or parachute, and will have heat resistant gloves and a broom or wood stick readily available in case of fire. Nomex gloves will be worn when deploying pyrotechnics.

13.14.8. Pyrotechnics Description and Operation:

13.14.8.1. MK-6 MOD 3; Signal, Smoke, and Illumination, Aircraft:

13.14.8.1.1. Description. This signal marker provides long burning (approximately 40 minutes) surface smoke and illumination for day or night use. It is used to mark sightings at sea, make sea evaluations, marking a sea lane for night water landing, and to simulate targets for the firing of weapons. It may be used to provide smoke on land surfaces if a fire hazard does not exist.

13.14.8.1.2. Operation. Prior to launching the signal marker, remove the adhesive tape covering the pull ring. ***WARNING:*** The smoke signal has a 90 second ignition delay and must be launched immediately after the igniter has been actuated. ***WARNING:*** Packaged signal markers dropped in excess of 10 feet or unpacked signals dropped in excess of 5 feet shall be considered unserviceable. ***NOTE:*** Do not remove the four square patches of adhesive tape covering the metal caps in the holes from which flame and smoke issue after ignition of the candle. At the time the signal is launched, the pull-type igniter is actuated by hand.

13.14.8.2. MK 6 Launch Preparation Procedures. Prepare the signal marker only after the pilot has given clearance to arm the guns. Position two MK 6 markers near the jettison location and pull back the protective tape to expose the pull ring. Leave tape partially attached to marker to allow replacement of the tape if marker is not required. ***WARNING:*** Do not prepare more than 2 marks at a time and do not remove more than 4 marks at a time from the storage container in flight. ***WARNING:*** Jettison MK 6 markers from the aft scanner bubble (AC-130H only), aft cargo door, or right paratroop door. At no time will any object be jettisoned out of any other location.

13.14.8.3. MK-25 MOD 3; Marker, Location Marine:

13.14.8.3.1. Description. This marker was designed for day or night use for all surface reference point marking purposes. It emits white smoke and yellow flame for 13 to 18 minutes.

13.14.8.3.2. Operation. To activate the marker, the base plate must be rotated from the safe to the armed position to allow the battery cavity ports to be opened. The ports are opened by pressing the two brass colored port plugs into the battery cavity using the thumb and forefinger. A one-pound force is required for plug removal. This device is considered to be a sealed unit until its base plugs (one or both) have been pushed in. Do Not push in the port plugs until immediately prior to jettisoning the mark. If a MK 25 must be retained inside the aircraft and the port plugs have not been pushed in, rotate the base plate to the safe position and return it to its package. The MK 25 will not be retained inside the aircraft after the port plugs have been pushed in. ***WARNING:*** The nose end of this marker must be kept out of line with the body or with other personnel at all times. If marker is initiated, the nose plug is expelled with considerable force creating a missile hazard.

13.14.8.3.3. Special Precautions. This marker may be converted for use in fresh water by adding one tablespoon of table salt through the base plugs. Only press in one port plug when adding salt. ***WARNING:*** Personnel launching MK 25 markers with salt added will wear a helmet with the visor down. ***WARNING:*** Converted markers must be used after adding salt. They must not be returned to storage. If not used, they must be jettisoned in flight, over water. ***WARNING:*** Be sure salt is not exposed to moisture before and during the conversion process, as moist salt may cause marker to ignite. ***CAUTION:*** Packaged flares dropped in excess of 6 feet or unpacked flares dropped in excess of 3 feet shall be considered unserviceable. ***NOTE:*** Converted markers will not perform as reliably in fresh water as unconverted markers in sea water.

13.14.8.3.4. MK 25 Launch Preparation Procedures. Position two MK 25 markers near the jettison location. ***WARNING:*** Do not remove more than 4 marks at a time from the storage container. ***WARNING:*** There is no electrical interrupt in the battery of the MK 25. The battery may activate when exposed to salt laden moisture in the least amount (i.e., sweat, moist salt air). Do not push in the port plugs until immediately prior to jettisoning the mark. The MK 25 will not be retained inside the aircraft after rotating the base plate from the SAFE position and pushing the port plugs in. ***WARNING:*** Jettison MK 25 markers only from the following locations: AC-130H – right troop door/jettison port, aft scanner bubble, or aft cargo door; AC-130U – Ammunition jettison port, right troop door, or aft cargo door. At no time will any object be jettisoned out of any other location.

13.14.9. All marks will be launched on command of the pilot using the procedures described in Chapter 18.

Chapter 14

ELECTRONIC WARFARE OFFICER PROCEDURES

14.1. General. In addition to the duties established in applicable T.O.s and other directives, the EWO will comply with the procedures and duties in this chapter. The EWO is primarily responsible for aircraft defense by denying the enemy effective use of the electromagnetic spectrum.

14.2. Mission Planning.

14.2.1. Mission Planning Equipment. The EWO will have a mission planning kit consisting of personal and professional equipment for mission planning purposes at home station or TDY. The EWO must be capable of using their unit's primary computerized mission planning system, as well as basic radar coverage formulas, graphs, and nomograms. The EWO will program threats, threat areas, and no-fly zones as appropriate into the aircraft MCs.

14.2.2. Mission Planning Factors. Detailed information on EWO mission planning can be found in AFTTP 3-1, Volume 1 (S), *General Planning and Employment Considerations*, AFTTP 3-1, Volume 2 (S), *Threat Reference Guide and Countertactics*, AFTTP 3-*3*.AC-130, *Combat Aircraft Fundamentals AC-130, and* Attachment 9 to this publication, *Electronic Warfare Officer Mission Planning Considerations.*

14.2.3. Mission Charts. The EWO will prepare mission charts IAW the specific employment chapter. The charts will include the location and lethal threat range rings (shadow graphing as required) of all the threat systems that could affect aircraft survivability. The nature of the mission will dictate the type, scale, and annotation of the charts required.

14.2.4. Training Missions. For tactical missions the EWO will brief a combat scenario with an associated Order of Battle (OB). During the mission, the EWO will direct the crew through the scenario in accordance with the duties outlined in paragraph 14.3. The EWO will brief all appropriate aircrew coordination items.

14.2.4.1. Expendables Training. Conduct all expendables training IAW CJCSM 3212.02, AFI 11-214, AFI 10-706 and any applicable local directives. Dispense expendables only within military operating area, Restricted Areas, or Warning Areas, and only when approved by the controlling agency and IAW agency procedures and restrictions. Dispense chaff IAW CJCSM 3212.02. Comply with all host nation/state agreements and restrictions for chaff employment outside of the CONUS. For flares, comply with the altitude restrictions listed in AFI 11-214. While over water, dispense flares only when greater than 3nm from any surface vessel, platform, or landmass.

14.2.5. On training missions with Electronic Counter Measures (ECM), the EWO will ensure coordination of ECM ranges is accomplished prior to the mission.

14.2.5.1. Electronic Attack (EA) Operational Software restrictions. Conduct all EA IAW CJCSM 3212.02, AFI 11-214, AFI 10-706 and any applicable local directives. Squadron Commanders have approval authority to load operational EA software onto their aircraft systems for contingency missions. Operational EA software can only be used for training in the CONUS with Group Commander permission and the signal collection risk

evaluated by squadron intelligence personnel, and SOSS/OSK. Operational software can only be used for training outside the CONUS with USAF/A3/5 permission. Use of operational software against Multiple -Threat Emitter Systems is prohibited at all times. Accomplishing system Built-In Tests IAW aircraft checklists with operational software is approved.

14.2.5.2. EA Training Software restrictions: Normally, operations within CONUS and overseas will use only EA software versions specifically designated for training. The use of training software against the Multi-spectral Test and Training Environment – Eglin ECM range is approved when emitters are hot. Operators may use training software against Multiple -Threat Emitter Systems only if using trains scoring. If training software is nonexistent or unavailable, transmission of operational EA for training is prohibited.

14.2.6. Coordinate air intercept (AI) training IAW AFI 11-214, *Air Operations Rules and Procedures*.

14.3. In-flight Responsibilities.

14.3.1. The EWO will perform in-flight duties IAW with their weapon systems' specific employment chapter.

14.3.2. The EWO will complete all equipment checks, preset defensive equipment, and go on watch prior to entering a threat area. Advise the crew when entering and exiting the hostile environment.

14.3.3. The EWO will notify and or warn the crew if threats are encountered.

14.3.4. The EWO will direct defensive maneuvers and perform ECM as appropriate. Brief ECM effectiveness when it can be determined.

14.3.5. Accomplish radio duties as assigned.

Chapter 15

AERIAL GUNNER PROCEDURES

15.1. General. This chapter provides AC-130 aerial gunners with supplemental information and procedures not covered in existing flight manuals. ***NOTE:*** Loadmasters who have completed cross-utilization training, as well as special missions aviators, will comply with the procedures and duties in this regulation when performing aerial gunner duties. Loadmasters and special missions aviation crew members who have been certified may perform lead gunner duties.

15.1.1. Prior to the formal crew briefing, the lead gunner will brief the aerial gunners on the following specific duties and safety procedures as a minimum:

15.1.1.1. Ammunition load and handling procedures.

15.1.1.2. Individual duties.

15.1.1.3. Gun malfunction and emergency procedures.

15.1.1.4. Cargo compartment lighting.

15.1.1.5. Interphone procedures.

15.1.2. Aerial gunners will attend the crew briefing to obtain pertinent information on the purpose and mission objective. The lead gunner or designated representative should attend the tactical brief as mission requirements allow in order to brief the gun crew on target area objectives.

15.1.3. Inspect gun systems prior to flight to ensure proper operation.

15.1.4. Load, arm, and safe gun systems, reporting gun and ammunition status through the flight engineer.

15.1.5. Troubleshoot and clear malfunctioning systems.

15.1.6. Perform emergency procedures as required or as directed by the aircraft commander.

15.2. Split Preflights. The following procedures apply when qualified gunners are splitting their respective preflight checklist.

15.2.1. The lead gunner or designated representative will review the AFTO Forms 781 for discrepancies that could affect the assigned mission.

15.2.2. The lead gunner or designated representative will ensure all weapons are safe and clear before beginning specific equipment inspections.

15.2.3. The lead gunner will delegate and supervise the remainder of the aerial gunner's preflight duties, as required.

15.3. Ordnance Loading/Download. Aerial gunners, loadmasters, and special missions aviators are the only crew members qualified to handle munitions.

15.3.1. Munitions will be delivered to the aircraft as coordinated with munitions personnel. Munitions personnel will perform handling and transfer of munitions and hand launched markers to/from the aircraft.

15.3.1.1. Restrictions:

15.3.1.1.1. Two Engine Shutdown for Ordnance Loading/Downloading checklist will be utilized when downloading brass with engines running.

15.3.1.1.2. Maintenance operations and munitions operations will not be performed simultaneously on the aircraft. Expose the minimum number of people to the minimum amount of explosives for the minimum time consistent with safe and efficient operations.

15.3.1.1.3. When using the Two-Engine Shutdown for Ordnance Loading/Downloading checklist, the cargo ramp and door will be open during the munitions operation.

15.3.2. Lighting.

15.3.2.1. It is the loadmaster and lead gunner's responsibility to ensure adequate lighting exists to complete the munitions operation safely. ***CAUTION:*** Aircraft lighting alone is not satisfactory.

15.3.2.2. For nighttime operations in permissive areas the aircraft interior lights will be on and set to bright white. Turn on the cargo loading lights and position them to provide maximum lighting for the up/down load operation. Ensure the position of the loading lights will not blind the ammunition trailer driver during approach to the aircraft. Flashlights alone do not provide adequate lighting.

15.3.2.3. For brass only downloading, the aircraft may return to normal parking and cargo loading lights and interior lights set to white is sufficient.

15.4. Personnel.

15.4.1. AC-130H. A minimum of two gunners will be used inside the aircraft when up/down loading ammunition (maximum of four gunners handling 105MM).

15.4.2. AC-130U. A minimum of two gunners will be used inside the aircraft when up/down loading ammunition (maximum of two gunners handling 105MM).

15.4.3. The lead gunner or designated representative and loadmaster will ensure the area is clear of non-essential personnel before starting the munitions operation and will continue to monitor the area while ammunition loading is in progress. Aircrew members not directly involved in the munitions operation, aircraft crew chiefs, and quality assurance/safety inspectors may remain with the aircraft on a non-interference basis.

15.5. Equipment Requirements.

15.5.1. Emergency Equipment. A 150 lbs fire extinguisher will be positioned between #3 and #4 engines. When handling White Phosphorus (WP) ammunition, firefighter gloves and water will be readily available. Munitions personnel will supply water for up/downloading.

15.5.2. Aircraft Equipment. Wheel chocks and ground wire will be installed prior to the start of any munitions up/down load operation.

15.6. Munitions Safety.

15.6.1. Adhere to local directives when performing munitions handling, ammo upload/download procedures, and aircraft parking with munitions. Ammunition types, classes/divisions, and N.E.W. may significantly impact where these procedures can be performed.

15.6.2. WP rounds must be rejected if the temperature monitor indicates 110º F or greater.

15.6.3. Extra water and firefighter gloves are required for flights carrying WP rounds. The loadmaster will position the water in the rear of the aircraft for wash-down purposes. This water will not be used for personal consumption until all WP ammunition has been expended or downloaded.

15.6.4. Munitions Integrity. Aerial gunners will inspect ammunition during upload procedures. Any round that suffers a traumatic impact in the opinion of the lead gunner will be rejected for use.

15.6.4.1. Ground Operations. Return damaged/unserviceable munitions to munitions personnel immediately (dropped round).

15.6.4.2. Airborne Operations. If rounds are determined damaged/unserviceable by the Lead Gunner, return damaged/unserviceable munitions to ammunition storage rack or jettison the round(s).

15.6.4.3. 40MM ammunition will be transported from the ammunition trailer to the aircraft storage racks in cans, and vice versa. At no time will any object be passed over 40MM ammunition cans containing live rounds.

15.6.4.4. Munitions personnel and the aerial gunners will check for 105MM fuse security during upload. Munitions personnel will check for fuse security during all returned munitions inspections. 105MM munitions with loose fuses are considered unserviceable and must be repaired at an authorized maintenance facilities within the Munitions Storage Area.

15.7. Post Flight.

15.7.1. The lead gunner will account for all ammunition residue and annotate expenditures on applicable forms.

15.8. Emergency Procedures with Ammunition.

15.8.1. Fire.

15.8.1.1. Notify aircraft commander/crew.

15.8.1.2. Notify fire department.

15.8.1.3. Fight fire and remove munitions, if possible. Note time fire envelops munitions.

15.8.1.4. All non-essential personnel will withdraw to 2,500 feet. Crewmembers fighting the fire will withdraw to 2,500 feet when fire envelops munitions, or after arrival of firefighters, whichever occurs first. If the NEW exceeds 500 lbs. with 105MM High Explosive (HE) on board, non-essential personnel must withdraw to 4,000 feet.

15.8.1.5. For fire with only division 1.3 munitions (markers, flares, or 105mm clearing rounds) on board, non-essential personnel must withdraw to 600 feet. ***NOTE:*** Withdraw distance requirements are contained in AFMAN 91-201.

15.9. AC-130 Munitions Operations Procedures.

15.9.1. Two Engine Shut-Down Procedures.

15.9.1.1. The aircraft commander will park the aircraft in the designated area, complete the Two-Engine Shutdown for Ordnance Loading/Downloading checklist, and give clearance to up/ download munitions to the loadmaster and lead gunner.

15.9.1.2. The lead gunner or designated representative will remain on headset during ordnance loading/downloading operations.

15.9.1.3. Prior to allowing the ammunition trailer to approach the right paratroop door the loadmaster will ensure all non-essential personnel are clear of the loading area, the gunners are in position and the lead gunner is ready to begin loading. The loadmaster will be positioned between the aircraft and vehicle to marshal the vehicle as necessary. The loadmaster will ensure the vehicle does not pass under any portion of the aircraft.

15.9.1.4. **(AC-130H)** When using the right paratroop door as an up/down load point, the entrance ladder will be removed and stowed before beginning munitions operations.

15.9.1.5. The gunners will meet the munitions vehicle and perform handling and transfer of munitions and hand launched markers onboard the aircraft. To prevent damage to the aircraft, a gunner will be in position inside the aircraft to marshal each trailer into position.

15.9.1.6. The 105MM ammunition trailer will be positioned at the right paratroop door by munitions personnel. 105MM ammunition will be up/down loaded through the right paratroop door only. 40MM ammunition, 105MM clearing rounds, and marine markers may be up/down loaded through either the right paratroop door or the aft cargo ramp.

15.9.1.7. Ammunition will not be removed from the ammunition cans until the cans are in place for loading. To facilitate up/down loading, the 40MM and 105MM guns may be elevated. If required, after up/down loading, ammunition cans will be properly secured in the aisle way or removed from the gun deck and the 105MM gun stowed.

15.9.1.8. The loadmaster will inform the pilot that up/down load is in progress when the first ammunition trailer is positioned at the aircraft. The loadmaster will be in position to monitor all munitions operations.

15.9.1.9. The armament placard will be annotated to reflect quantity, type, and location for all internal munitions, or cleared, as applicable.

15.9.1.10. The loadmaster and the lead gunner or designated representative will ensure a foreign object check is accomplished under the aircraft and in the loading area when up/down loading is complete.

15.9.1.11. The loadmaster will not call munitions up/down load complete until all ammunition has been up/down loaded and munitions handling equipment removed from the aircraft.

15.9.1.12. Accomplish the Engine Start after Ordnance Loading/Down Loading checklist and resume normal operations.

15.9.2. AC-130 Munitions Operations Procedures (Alert/Static Aircraft).

15.9.2.1. The cargo door and ramp must be open for ordnance loading/downloading. A crew chief, flight engineer, or loadmaster must be present to operate the equipment.

15.9.2.2. Prior to ordnance loading/downloading, the lead gunner or designated representative will ensure:

15.9.2.2.1. The aircraft is chocked and grounded, and a power unit is available (if required).

15.9.2.2.2. A 150 lb. fire extinguisher is positioned between #3 and #4 engines.

15.9.2.2.3. The AFTO Forms 781 have been checked for aircraft status.

15.9.2.2.4. All weapons are safe and clear.

15.9.2.3. **(AC-130H)** If using the right paratroop door as an up/down loading point, the entrance ladder will be removed and stowed before the start of the munitions operation. The entrance ladder will be re-installed when up/down load operations are complete.

15.9.2.4. The gunners will meet munitions personnel and perform all handling and transfer of munitions onboard the aircraft.

15.9.2.5. The 105MM ammunition trailer will be positioned at the right paratroop door by munitions personnel. 105MM ammunition will be up/down loaded through the right paratroop door only. 40MM ammunition, 105MM clearing rounds, and marine markers may be up/down loaded through either the right paratroop door or the aft cargo ramp.

15.9.2.6. Ammunition will not be removed from the ammunition cans until they are in place for loading. To facilitate up/down loading, the 40MM and 105MM guns may be elevated. As required, ammunition cans will be properly secured in the aisle way or removed from the gun deck and the guns stowed.

15.9.2.7. All ammunition is secured or removed, as appropriate

15.9.2.8. Ensure a foreign object check is accomplished under the aircraft and in the loading area when up/down loading is complete.

15.9.2.9. Annotate the armament placard to reflect quantity, type, and location for all internally/externally carried munitions, or cleared, as appropriate.

15.10. Ordnance Accountability. A specified amount of ordnance will be delivered to the gunship prior to each live fire mission. After the live fire portion is complete, the lead gunner will ensure all weapons are safe and clear, and inspect all ammunition racks, containers, and compartments. Return live ordnance and empty casings to munitions personnel as mission requirements dictate.

15.10.1. Loaded aircraft off station where there are no munitions personnel may be downloaded/cross loaded due to mission requirements. Munitions will only be downloaded/cross loaded by qualified aircrew members. This procedure will only be

performed with the approval of the mission commander and under the supervision of the lead gunner.

15.10.2. The lead gunner will ensure all munitions have been expended and are free of explosives prior to returning to aircraft parking.

15.11. AC-130 Lanyard Firing. Lanyard firing of the 40MM and 105MM, much like manual firing, has inherent risks with decreased safety margins. Lanyard firing may be utilized for specified employment situations when normal modes of fire are not available. The crew will thoroughly brief procedures prior to any lanyard firing. For pre-planned lanyard firing training, procedures will be reviewed during the pre-mission crew brief.

15.11.1. Specified Lanyard Fire Missions. Lanyard fire may be used for all contingency/combat missions and directed missions such as multi-lateral exercises, joint readiness exercises, ORI, etc. During training missions lanyard fire may be used, at the discretion of the aircraft commander, to meet syllabus requirements, familiarize crewmembers with procedures, or ensure crew proficiency. If lanyard fire is the only method available due to electrical firing malfunction, crews will fire the minimum number of rounds required to meet mission objectives and then return the weapon for maintenance. ***WARNING:*** Failure to properly execute lanyard firing can result in loss of life or injury to ground personnel, and/or off-range expenditures.

15.11.2. If in the opinion of the lead gun this procedure cannot be safely accomplished, the lead gun will notify the pilot. The following factors should be considered, but are not limited to: crew experience levels, cargo compartment lighting, student training, other weapons malfunctions, air turbulence, and time available.

15.11.3. The 40MM/105MM guns will be minimum safe prior to removing the firing rod or attaching the lanyard. (40MM – remove the firing rod pin and then remove the firing rod).

15.11.4. The lead gunner will ensure the following is briefed and accomplished prior to lanyard/manual firing:

15.11.4.1. The pilot will NOT depress the trigger on the yoke.

15.11.4.2. The flight engineer's Gun Select switch and the aerial gunner's Arm/Safe switch will be set to SAFE for the affected gun.

15.11.4.3. 105MM: A "Gun Ready" call from the gunners and flight engineer will be made as in other modes of fire. 40MM calls will be conducted as briefed by the lead gunner.

15.11.4.4. The pilot will state: "Give me number __ gun, trainable (or fixed), lanyard fire".

15.11.4.5. The FCO will state: "FCO is ready".

15.11.4.6. The navigator will state: "Nav confirms, cleared to fire".

15.11.4.7. The primary sensor operator will state: "Infrared Sensor Operator (IR)/Television Sensor Operator (TV)/Radar is tracking". ***WARNING:*** The gun being lanyard-fired must be within the trainable envelope (Trainable / Auto-Trainable mode) or the pilot must meet the proper conditions of rate and coincidence (all Fixed modes) before the "Ready, Ready, Fire" call is made.

15.11.4.8. In the Trainable mode of fire, a “Ready, Ready, Fire” call will be made over main interphone by the pilot or sensor operator. In the Fixed mode of fire, a “Ready, Ready, Fire” call will be made over main interphone by the pilot. ***WARNING:*** If the sensor operator drops consent or any crewmember identifies an unsafe condition, they will call “CEASE FIRE”. ***NOTE:*** The gunner working the LWCP will control gun operation and pull the 105MM lanyard/actuate the 40MM firing mechanism.

15.11.4.9. Crews will coordinate the number of rounds to be fired. Lanyard fire in dual target attack and 40MM rapid fire are prohibited (***EXCEPTION:*** Combat/Contingency Operations). ***WARNING:*** Do not load or fire the 105 MM in moderate or greater turbulence.

Chapter 16

SENSOR OPERATOR PROCEDURES

Section 16A— General Information

16.1. General. The purpose of this chapter is to discuss factors common to all gunship missions for sensor operators. Professional knowledge, expertise, and common sense remain key factors in the sensor operator's ability to make in-flight decisions that produce success. Technological devices, basic skill, ingenuity, and adaptability supplement standardized procedures. These procedures are directive and apply to all sensor operators assigned to AC-130 aircraft.

16.2. Mission Planning. During mission planning, the sensor operators will cover all elements and details of the mission to be flown. The following are tasks sensor operators will normally perform during mission planning.

16.2.1. Analyze Mission Tasking. Sensor operators will plot the target(s) and become thoroughly familiar with the time frame for mission execution, to include any operational restrictions.

16.2.2. Analyze Intelligence Data. Analyze intelligence data to determine the order of battle while gathering specific information on the targets and threats in the area of operations.

16.2.3. Target Study. The function of target study is to use assigned charts, maps, and imagery to determine the location of threats and targets. Positive target identification is made by using confirmation points depicted on the charts and imagery in coordination with the crew.

16.2.4. Sensor operators will ensure there is sufficient video recording media available for the mission and coordinate with the crew on media replacement procedures.

16.2.5. During mission planning, the sensor operator (when applicable) will coordinate the use of the laser illuminators and the laser designator range finder with the crew.

Section 16B— Basic Mission Profile

16.3. Enroute. Sensor operators will check and confirm targets, friendly positions, and threat coordinates prior to reaching the target area. All data entered prior to entering the area will be checked in order to identify any errors. Enroute to the target, the sensor operators will study the target area, and assist with terrain and traffic avoidance as required. At all times the sensor operators will monitor all controlling agencies for time-sensitive/additional target, friendly, and threat positions. One or both sensor operators will verify these positions, as they are relayed to the aircraft.

16.4. Prestrike. Complete all equipment checks, check/set Pulse Repetition Frequency (PRF) codes as required and set up Battle Damage Assessment (BDA) recorders. (AC-130U) Sensor operators will properly configure their dedicated Tactical Situation Map (TSM) for the upcoming mission.

16.5. Strike Operations.

16.5.1. Impacts. While shooting, the primary sensor will normally call all observed round impacts over MAIN or P2 interphone. If an impact is not observed a "NO JOY" call will be made. Any other sensor observing the impact will make a shot call, if not they will also make a "NO JOY" call. (AC-130U) When the navigator is firing with the APQ-180, the IR and TV sensor operators will be prepared to make shot calls if the impact is observed through the weather.

16.5.2. Offset. When using offset, the primary sensor operator tracks the friendlies or ground reference. Crewmembers will verify offset is displayed and observe the Sensor Angle Displays (SADs) on their displays. If an offset is being used for firing, the primary sensor SAD indicators in azimuth and elevation will be different from that normally used for direct firing. If the secondary sensor can visually identify the offset point, request to switch to direct fire.

16.5.3. Target Acquisition/Identification. The sensor operator(s) conduct target acquisition/ identification in conjunction with the navigator (NAV)/FCO and other sensor operator and track the target if made primary. The other sensor(s) will continue to search the area and continually back up the primary sensor.

16.5.3.1. The primary sensor operator will track the target or position. Update the pilot and FCO of changes in target tracking and movement. When firing in the fixed mode of fire drop consent and notify the Pilot before moving or reacquiring a new target outside the narrow field of view. In the trainable mode of fire, track the target and fire the weapon when cleared, assessing ordnance impacts.

16.5.3.2. The secondary sensor will also confirm the target the primary sensor is tracking, notifying the crew if they do not confirm it as the target. Search for additional targets, threats, or ground team(s) as required. Back up the primary sensor operator on shot calls, target ID, acquiring new targets, maintaining orientation, and aid the NAV/FCO as required.

16.6. Post-strike and Post mission. The post-strike phase of the mission begins at the combat exit point. Once the aircraft has departed the working area the sensor operators will complete all appropriate checklists IAW the flight manual. They will also collect all classified material as required, then prepare for the intelligence debrief upon landing. Sensor operators will fill out the sensor status form at the completion of the mission. One copy will be filed in the sensor status book, and the other will be given or faxed to sensor maintenance.

Section 16C—Sensor Operator Techniques

16.7. Visual Queues. The IR and TV wide fields-of-view are for general orientation such as locating major terrain features and road patterns. Search in the forward half of the look angle, and use an up and down search pattern to find lines of communication (LOC)'s or targets. After locating an LOC, search along and either side of it. Even though the LOC itself may not be distinctly visible, look for identifying features such as trails, vegetation, rivers, streams, valleys, or other geographic references. Search closely in areas with such indicators. Notify the navigator when abeam of or passing prominent landmarks or reference points. Keep the navigator informed regarding the distance from roads, rivers, streambeds, or areas to be searched. Give direction to the pilot or guide the aircraft into orbit when necessary. Cross-

reference with the other sensor operator for aid in searching all areas. Targets should be identified by the use of more than one sensor, and also from different parts of the orbit.

16.7.1. If the target is moving, immediately notify the pilot of the direction in which it is moving (i.e., Parallel Forward/Aft or Perpendicular Towards/Away, continue to advise the pilot unless directed otherwise) so the pilot can make an adjustment to the firing geometry to compensate for this movement. Sensor guidance and/or direction will be given to the pilot to reduce the possibility of losing the target.

16.7.1.1. When attacking a moving vehicle without moving target mode, the sensor operator should maintain a point on the LOC well in front of the oncoming target. Generally, the sensor operator can estimate this point by holding a stationary point and determining the distance traveled by the vehicle for the time period equal to the time of fall for the ordnance being used. The operator can then lead the vehicle accordingly. A single round of 105 MM or 40 MM fired in front of the vehicle may cause the vehicle to stop and allow use of stationary tactics.

16.7.1.2. To compensate for the movement of the vehicle, AC-130H/U aircraft are equipped with a moving target mode of operation. In this mode, the MC will automatically compensate for the vehicle movement. This mode only works on straight LOC's. If the target becomes stationary, ensure FCO selects stationary mode of fire and track direct.

Chapter 17

FIRE CONTROL OFFICER PROCEDURES

17.1. General. This section provides the FCO with supplemental information and procedures not covered in existing T.O.s. that have not migrated to AFTTP 3-3.AC-130. These procedures are directive and apply to all FCOs assigned to AC-130 aircraft. Currently all procedures have moved to other areas of this instruction. Chapter 17 will be maintained for future development of FCO procedures.

17.2. Gun Settings. AC-130 guns require a depression angle below the aircraft lateral axis and a lag angle aft of the lateral axis for ordnance to impact the target from the standard circular firing geometry. Gun Depression Angle (GDA) is primarily determined by aircraft altitude above the ground and aircraft bank angle. Gun Lag Angle (GLA) is primarily determined by true airspeed. There is a geometric interaction between GDA and GLA that causes slight corrections to be made to the basic angles. These corrections are generally of minor significance and do not add to an understanding of the primary factors involved. Other secondary corrections such as muzzle velocity are added to these angles for additional ballistic effects. On a stable aircraft platform, if the gun settings are varied, the ordnance impact point will vary in direct proportion to the change in gun settings. The guns may be set for various firing altitudes based on effective range and are also restricted by aircraft structural limitations.

Chapter 18

AC-130 EMPLOYMENT

18.1. General. This chapter provides guidance for the employment of the AC-130 Gunship. In order for the gunship to operate effectively, employment tactics must remain compatible with the combat environment. All crewmembers must actively participate in keeping tactics and publications up to date. Submit proposed publications changes to HQ AFSOC/A3V IAW this instruction. Submit proposed tactics changes to HQ AFSOC/A3TW.

18.1.1. Employment Decisions. The aircraft commander is the decision authority on tactics and employment. They are responsible for risk assessment and mission execution. Select weapons and munitions prior to flight whenever possible. This is not intended to limit flexibility, but to reduce task loading in the employment area.

18.2. Publications. Joint terminology will be used for mission planning and execution.

18.2.1. Gunship crewmembers will have a working knowledge of the information contained in the following Joint Publications (JP) Library, Volume 3-series: JP 3-03, *Doctrine for Joint Interdiction Operations*; JP 3-09.1, *Joint Laser Designation Procedures*; JP 3-09.2, *Joint Tactics, Techniques, and Procedures for Ground Radar Beacon Operations (J-Beacon)*; JP 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)*; JP 3-10.1, *Joint Tactics, Techniques, and Procedures for Base Defense*.

18.2.2. The Joint Technical Coordinating Group for Munitions Effectiveness Special Operations Working Group is used by the crew as a reference during mission planning for; target description, damage criteria, type of rounds to use, target vulnerability, hit/aim points, and weapons effectiveness.

18.2.3. Air Force Tactics Techniques and Procedures. The AFTTP 3-1 has several volumes for the different weapon systems and threats encountered by USAF aircrews. It gives information on general planning and employment considerations, threat reference and counter tactics, and individual weapon system employment guides.

18.2.4. AFTTP 3-1 Volume 1, *General Planning and Employment Consideration*. All aircrew will possess a working knowledge of Special Operations chapters found in V1, AFTTP 3-1V2, *Threat Reference Guide and Considerations,* and the specific aircraft volume AFTTP 3-1.AC-130, *Tactical Employment, AC-130.*

18.3. Critical Information. AC-130 crewmembers must not divulge sensitive information to persons who do not have a need to know. This includes private conversations and discussions over non-secure telephone lines. Attachment 2 lists this critical information.

18.3.1. Control of Classified Information and Materials. It is the responsibility of every crewmember to control the classified material they use. This includes maps/charts with target coordinates, friendly positions, battle lines, or threat positions drawn on them. Most imagery, target lists, Command Electronic Operating Instruction (CEOI), SPINS, Rules of Engagement (ROE), and strike data are classified and must be controlled and handled as such. Imagery from the sensor systems that has been recorded must be handled IAW the aircraft security classification guide.

18.4. Gunfire Modes. The AC-130H and AC-130U gunfire modes are covered in their respective flight manuals. Mode selection during employment will be determined by: tactical considerations, crew preference, and subsystem availability. ***WARNING:*** When firing in the trainable mode, the primary sensor must ensure the consent switch is off unless tracking the target and attempting to fire the weapon. ***WARNING:*** AC-130H. Constant consent is given when the beacon tracking radar (APQ-150) is locked on a ground beacon or when INS is selected as primary and consent is selected by the navigator.

18.4.1. AC-130H Restrictions. Crews will not shoot in IMC with ground personnel in peacetime. During training missions when live offsets are performed with the primary sensor tracking the ground party, the FCO will enable a safety circle of at least 500 meters. The navigator will confirm that the offset is in. Use caution when firing off a surface beacon. ***WARNING:*** When firing in offset mode, ensure the offset is to the correct position. Failure to heed this warning could cause injury or death to friendly ground forces. "Accomplish this by all means available." ***WARNING:*** For training missions, use extreme caution when using the ground party as a reference point for offset firing.

18.4.1.1. When using the INS as the reference for the offset, the GPS will be integrated into the Kalman filter position. (AC-130H) MC circular error of probability will be 0.02 or less. ***WARNING:*** When firing in the Trainable mode with Offset enabled, the pilot will not give consent until a "FCO READY" call is made, and the NAV confirms the target. If using the visual sensor, the sensor operator will give constant consent and the pilot will not depress the trigger until the "FCO READY" call is made and the NAV confirms the target.

18.5. AC-130U Radar. The APQ-180 radar gives the AC-130U an all-weather capability to fire against radar significant targets as well as a beacon offset capability.

18.5.1. Optimum high-resolution mapping requires the aircraft to be offset 20º or greater from the heading inbound to the target. Ideally the aircraft should be offset to the right to facilitate entering geometry. ***WARNING:*** The APQ-180 radar must be in WHX or RBGM and the Projectile Impact Point Prediction (PIPP) must be off during all training expenditures of M732/M732A2 or FMU-160 fused munitions.

18.5.2. Use projectile impact point prediction PIPP to tweak the appropriate weapons to the radar. Compare PIPP values with the visual sensors and note any discrepancies.

18.5.2.1. If the radar and weapon combinations have been tweaked, PIPP may be off for maximum ordnance delivery. PIPP can be selected for subsequent shots to check for accuracy.

18.5.3. The navigator should consent when fixed target track has a valid track indication and an azimuth and elevation bias of less than or equal to 1.

18.6. AC-130H Beacon Tracking Radar or Mission Computer in IMC. The APQ-150 beacon tracking radar or MC gives the AC-130H a limited all-weather capability. ***WARNING:*** AC-130H. Constant consent is given when the beacon tracking radar (APQ-150) is locked on a ground beacon or when INS is selected as primary and consent is selected by the navigator.

18.6.1. **(Contingency/combat use only)** The primary firing mode in IMC or unable to see the target will be direct trainable with the INS selected as the primary sensor.

18.6.2. The offset mode can be used to derive a position to allow gunfire in the direct mode. The direct mode is the primary and preferred mode of fire; adjustments can be made by updating coordinates or offsetting from the INS.

18.7. Munitions. Information on specific munitions and targets is contained in AFTTP 3-3.AC-130.

18.7.1. Round Jettison Procedures. The procedures in this paragraph apply to training missions and will serve as a baseline for contingency operations over established impact areas. The OG/CC or equivalent with OPCON holds waiver authority for these procedures, as well as authority for local supplementary procedures.

18.7.1.1. These procedures are intended for use in VMC, but may be used in the absence of IMC procedures if VMC cannot be maintained. Range-specific IMC procedures will be used if applicable. Jettison the round over the range in use or the nearest suitable impact area. In an emergency, jettison the round over an uninhabited area, immediately mark and relay the aircraft and round position to the applicable range controlling agency and C2 element (following procedures for an off-range expenditure).

18.7.1.1.1. Deleted.

18.7.1.2. Round jettison procedures will not be performed on training missions until all ground parties have departed the impact and ricochet areas. Standard round jettison altitude will be 3,000 feet AGL or IAW local range procedures. On water ranges, the normal firing orbit/altitude may be used for round jettison. Ensure the surface area is cleared by at least 5 nm.

18.7.1.2.1. Deleted.

18.7.1.2.2. Deleted.

18.7.1.2.3. Deleted.

18.7.1.2.4. Deleted.

18.7.1.2.5. Deleted.

18.7.1.3. Orbit the center of the impact area and attempt to keep the gun pointing in the center of the impact area until level at jettison altitude. Nominals will be updated during descent to maintain useful geometry (Exception: AC-130U crews may update nominals at their discretion). Once level at jettison altitude with the jettison area clear, the pilot will direct the crew to initiate round jettison procedures IAW the following sub-paragraphs and applicable local procedures.

18.7.1.3.1. The gunners will complete their emergency procedures up to, but not including, extracting the round.

18.7.1.3.2. Once the gunner is ready to extract the round, the navigator will begin a descending 40-second countdown (in 5-second increments) when the aircraft heading passes the heading that allows the round to impact the center of the desired impact area. The intent is to jettison the round at the end of the 40-second countdown.

18.7.1.3.3. **(AC-130H)** The gun should remain trainable, slaved and tracking the center of the impact area during descent to maximize the chances of an inadvertent

discharge impacting the center of the impact area. Once level and when directed, the FCO will fix the position of the respective gun and clear the gunners to select OFF for the 40mm gun. Rounds will be jettisoned through the jettison port, or the loadmaster's bubble. Crew members will wear appropriate restraining devices or parachutes when the bubble is open.

18.7.1.3.4. **(AC-130U)** The gun should remain fixed during the descent to ensure it remains within the firing envelope. Once level and when directed by the pilot, the FCO will select a non-wind corrected orbit and ensure FXD on the respective gun. The gunners will not select MANUAL for the 40mm gun until cleared by the pilot. Rounds will be jettisoned through the round jettison port. The TSM should be used with range corners displayed for position awareness. The gunner jettisoning the round will state "ROUND AWAY" on CALL and the navigator will mark the aircraft/round position.

18.7.1.3.5. If the round cannot be extracted within 15 seconds past the end of the countdown, continue the orbit and attempt once more before recovering with a hot gun. ***WARNING:*** At no time will an extracted round be retained in the aircraft for another orbit.

18.7.2. Hot Gun/Jammed Gun Procedures. These procedures will be used any time a gun contains a round that cannot be removed in flight.

18.7.2.1. Hot Gun. If, in the opinion of the lead gun, any probability for an inadvertent firing exists and the gun cannot be mechanically and electrically safed, the live fire will be terminated and the following procedures will be used:

18.7.2.1.1. Notify appropriate controlling agencies of the hot gun condition and declare an emergency.

18.7.2.1.2. Return to recovery airfield using approved hot gun routes and avoid bringing the guns to bear on any populated areas. The lead gunner will monitor the malfunctioning gun and select STOW/isolate hydraulics immediately prior to completion of before landing checklist.

18.7.2.1.3. Hot Gun parking will be IAW recovery airfield restrictions. Aircrew withdrawal distance is 400 feet.

18.7.2.2. Jammed Gun. If the lead gun determines that there is no probability of an inadvertent firing, the following procedures will be used:

18.7.2.2.1. The aircraft commander may elect to continue the live fire. Dry fires and aerial refueling are not authorized. ***EXCEPTION:*** Off station aircraft may conduct aerial refueling if mission requirements dictate.

18.7.2.2.2. The aircrew may execute a normal recovery to a full stop at recovery airfield. Multiple approaches/pilot pro are not authorized until the malfunction has been cleared.

18.7.2.2.3. Off-station/out and back aircraft are authorized to return to the recovery airfield at the completion of their live fire mission. Do not depart an airfield without the approval of the squadron commander or operations officer.

18.7.2.2.4. A 105mm round-case separation is not a hot gun situation. The projectile may remain in the barrel with the breach closed. If no attempt was made to fire the round, the brass case may be returned to the ammunition rack. Otherwise it will be treated as a failure to fire and the case jettisoned. When returning with the projectile in the barrel, use the applicable hot gun route to avoid overflight of populated areas. No touch and go landings are permitted and the aircraft must be returned to the hot cargo area. Request command post notify maintenance and EOD to meet the aircraft.

18.7.2.2.5. 25mm Inadvertent Firing **(AC-130U).** If an attempt is made to rotate rounds after the 25mm gun has jammed, there is a potential for cracks in the safing cam and firing lever to cause inadvertent firing, even with the safing pin installed. If a 25mm gun stoppage occurs and it is determined that a gun malfunction (not the ASHS or conveyor) caused the stoppage, then hot gun procedures must be performed even if the safing pin is installed. If no rounds are in the gun, normal jammed gun procedures apply. With the safing pin installed and rounds in the gun, an attempt to clear the weapon may be attempted provided the pilot has directed the FCO to go fixed on the gun and the pilot can keep the gun pointed at the impact area until the weapon is cleared. If the weapon can be cleared, the crew may apply jammed gun procedures. If the gun cannot be cleared, hot gun procedures apply. **Contingency operations only:** Crews are authorized to continue operations only when mission requirements dictate, provided the safing pin is installed and the 25mm ASHS has been isolated. As soon as practical, attempt to clear the weapon using the procedures in this paragraph or recover using hot gun procedures.

18.7.3. Parking with Munitions. If required to park with munitions on board, comply with distances in Table 18.1. These separation distances are the minimum required between explosives loaded aircraft and any inhabited building, civilian aircraft or civilian/joint use runway. All explosives loaded aircraft should be parked in an approved, properly sited aircraft parking location (i.e., hot cargo) if available. Calculations were based on a standard combat load.

Table 18.1. Parking Restrictions with Munitions On-board.

MUNITION TYPE	CLASS	SEPARATION DISTANCE
105MM HE (with or without other munitions)	1.1	1250 feet
Any mix of 105MM TP, 40MM & 25MM	1.2.2	194 feet
105MM TP	1.2.2	167 feet
40MM	1.2.2	167 feet
25MM	1.2.2	162 feet
M206 Flares	1.3	75 feet (wingtip clearance)

18.7.4. Emergency Procedures with Ammunition. Fire:

18.7.4.1. Notify aircraft commander/crew.

18.7.4.2. Notify fire department.

18.7.4.3. Fight fire and remove munitions, if possible. Note time fire envelops munitions.

18.7.4.4. All non-essential personnel will withdraw to 2,500 feet. Crewmembers fighting the fire will withdraw to 2,500 feet when fire envelops munitions, or after arrival of

firefighters, whichever occurs first. If the NEW exceeds 500 lbs. with 105 MM HE on board, non-essential personnel must withdraw to 4,000 feet.

18.7.4.5. For fire with only division 1.3 munitions (markers, flares, and 105mm clearing rounds) on board, non-essential personnel must withdraw to 600 feet. NOTE: Withdraw distance requirements are contained in AFMAN 91-201.

18.8. Marker Flare Launching Procedures. All marks will be launched on command of the pilot/co-pilot.

18.8.1. Use the following procedures:

18.8.1.1. "LM, P/Co-pilot (CP) standby to launch marks"

18.8.1.2. "In-progress LM" – Ensure jettison location is open and mark is prepared according to appropriate launch preparation procedures. Rotate base plate to ARMED at this time.

18.8.1.3. "LM standing by to launch marks" – Reply when ready to jettison mark.

18.8.1.4. "LM, P/CP launch marks, now" – For MK 25, push in port plugs and jettison mark. For MK 6, pull igniter plug and jettison mark. ***NOTE:*** P/CP allow approximately 10 seconds for the LM to arm each MK 25.

18.8.1.5. "Mark(s) away" - Mark(s) jettisoned. ***NOTE:*** MK 25 flares burn for approximately 13 minutes, if more flares are needed the CP and LM should pre-coordinate for further launches.

18.8.1.6. These procedures will be followed for other illuminated targets used by the TV Operator.

18.8.2. The TV operator will not track a flare at night. Holding the area around the flare and keeping the TV camera(s) constantly moving is acceptable when assisting the IR operator in acquisition or storing the flares as targets. The indication of a light or flare causing damage to the TV system is a halo effect around the light source itself and/or a comet-like trail (H-Model) is produced as the camera(s) are moved around the light or flare.

18.9. Target Area Laser Operations. The AC-130 has capabilities for illuminating the target area. The following paragraphs contain information discussing operation of the airborne laser illuminator systems. ***NOTE:*** Aircrews will use J-Laser terminology when talking with air and ground forces (Attachment 7).

18.9.1. Planning Considerations. When planning joint operations with either ground parties and/or other aircraft, a clear understanding of illumination procedures must be made prior to mission execution. This can reduce unnecessary radio transmissions and loss of situational awareness.

18.9.1.1. Not used

18.9.1.2. Consider the use of flash-burn procedures (5-10 seconds of laser illumination or IR pointer) for friendly identification and/or target confirmation versus extended usage.

18.9.2. Laser Surface Danger Zones (LSDZ) are the designated region where laser radiation levels may exceed the maximum permissible exposure level. LSDZs are a function of altitude, slant range-to-target and specific buffer angle.

18.9.2.1. Deleted.

18.9.2.1.1. Deleted.

18.9.2.1.2. DELETED

18.9.2.2. Deleted.

18.9.2.2.1. Deleted.

18.9.2.2.2. Deleted.

18.9.2.3. AC-130H Laser Target Designator and Range Finder (LTD/RF)/AC-130U Common Laser Designator Rangefinder (CLDR). The 1.57 µm wavelength is eye safe at the exit aperture and may be used in both live- and dry-fire areas. The 1.06 µm tactical mode will only be used in combat or on laser approved ranges. If ground parties are present they will be advised prior to lasing any target in the 1.06 µm tactical mode. At no time will the 1.06 µm tactical mode be used in dry fire areas.

18.10. Search Methods/Techniques. The three search methods are parallel, random cut, and spiral search. Navigator direction, sensor direction, and sensor/INS guidance are techniques to search LOCs. When using these methods, the sensor operator should only advise the pilot of significant changes in direction of the LOC. Terminology used for these methods is contained in Attachment 8.

18.10.1. Parallel. Parallel search is appropriate for LOCs in the open when searching for larger targets. It is the fastest but least thorough means of searching an LOC. During parallel search the sensor operator should position the sensor to provide guidance to the pilot so they can keep the aircraft in a favorable position to fire along the LOC at anytime. Using the sensor angle display, aircraft heading, and video presentation the sensor operators should keep the LOC in front of the aircraft at approximately 30-40° forward, and 30-40° down, unless rolling-in on a point. They should also advise the pilot of any major upcoming changes in direction of the LOC. (AC-130H) The primary sensor operator should give normal consent when performing reconnaissance and drop consent if the LOC is lost in the weather, vegetation, or during defensive maneuvering.

18.10.2. Random Cut. Random cut is appropriate for searching short sections of LOCs or small areas while trying to remain unpredictable. It is the most time consuming search method. If random cut is to be used effectively the sensor operators must remain oriented. If able, during mission planning the tactical crew should discuss the manner in which the navigator will direct the crew throughout the area, and who and how the targets will be stored. In some instances the pilot may be able to visually maintain the search pattern which would free all sensors for detailed searching.

18.10.3. Spiral. Spiral search is used to search dense wooded areas, curvy LOCs or an LOC that is hard to see with the sensors due to excessive foliage, crossover, or terrain. It is the most thorough means of searching an LOC and is appropriate when searching for ambushes or smaller targets. Spiral search is usually time-consuming, and caution should be used when

spending extended periods of time in one area. Spiral search can be performed using two primary techniques:

18.10.3.1. INS Target Storing. This is the preferred technique. It is performed by starting at a known hold point with both sensors searching along the LOC approximately 500-1000 meters (depending on terrain). One of the sensor operators will hold a point. That position is stored, and confirmed that it held the new position. The process is repeated until the entire area is searched.

18.10.3.2. Sensor-to-sensor. This technique is performed by starting at a common point along the LOC. The primary sensor moves out along the LOC and thoroughly searches approximately 500-1000 meters (depending on the terrain), and holds a point. The secondary sensor will then conduct an extensive search from the start point out to approximately 500-1000 meters beyond the primary sensor's hold point. The FCO will swap primary and secondary sensors and the search will continue along the LOC using this leap-frog procedure.

18.10.4. NAV direction. This technique is performed by the navigator giving the pilot headings and maintaining the aircraft in the proper position relative to the LOC. The pilot disregards his/her Heads-Up Display (HUD)/Attitude Direction Indicator (ADI) guidance and follows the navigator's directions. An advantage of this technique is it allows all sensors to search for targets or threats to the aircraft.

18.10.5. Sensor direction. This technique is performed by the sensor operator giving the pilot headings that maintain the aircraft in the proper position relative to the LOC. It can be used during parallel search, repositioning the aircraft between points, or to conduct escort.

18.10.6. Sensor/INS guidance. This technique is achieved by using the MC system to provide guidance information to the HUD/ADI. This technique requires minimum crew coordination and maintains the aircraft in the most favorable position to acquire and fire on a target. Any LOC visible to a sensor operator or programmed in the INS may be searched using these techniques. If the sensor operator needs to concentrate on a specific area during the search or the LOC is visually lost for any reason (cannot be immediately reacquired), the sensor operator will return aircraft guidance to navigator direction or INS guidance. The sensor operator may elect to have the pilot maintain the orbit and disregard guidance while manually reacquiring the LOC. (AC-130H) The primary sensor should give normal consent when performing reconnaissance and drop consent if the LOC is lost in the weather, vegetation, or during defensive maneuvering. ***NOTE:*** Sensor guidance and direction are both very effective techniques to perform reconnaissance, but the aircraft position along the LOC is only important when the likelihood exists that the crew will need to engage targets. If not, these techniques can also be used to simply search an area.

18.11. Tactical Considerations.

18.11.1. Laser Ranging. The primary means to update target elevation is the LTD/RF (AC-130H) or the LTD/ERF (AC-130U). The crew will coordinate on procedures to update the target elevation during tactical planning. The TV operator will lase when directed by the FCO and cleared by the pilot, notifying the crew of the laser's status over MAIN interphone. No clearance or crew notification is required for the use of the ELRF (AC-130H)or the ERF (AC-130U) for target elevation updates. This should be continually accomplished if there is

a significant change of terrain or if the aircraft moves to a different target location. This is an area of major concern in mountainous terrain, due to varying slant ranges and target elevations. (AC-130U) APQ-180, Air Ground Ranging mode overrides the LTD/ERF during ranging operations.

18.11.2. Cargo Door. Due to structural stress and airspeed limitations encountered during some aircraft defensive maneuvers, the cargo door will be kept closed in high threat environments. In certain non-maneuvering flight situations (i.e., search and rescue missions) consideration may be given to flying with the cargo door open.

18.12. Defensive Tactics.

18.12.1. Specific defensive procedures are contained in AFTTP 3-1.AC-130.

18.12.2. Practice Defensive Maneuvers. All crewmembers will be advised of the time period when they may expect threat maneuvers. This simulated threat time will provide maximum safety to prevent personnel injury during the rapid changes of aircraft position. Crewmembers should be prepared for abrupt maneuvers during any phase of flight and should remain strapped in whenever flight duties do not require them to move about the aircraft. During training, defensive maneuvers should not feature sustained zero G profiles.

18.13. Collateral Missions.

18.13.1. Strike Coordination and Reconnaissance. Refer to AFTTP 3-1 Volume 1, *General Planning Considerations* and AFTTP 3-1.AC-130, *Tactical Employment, AC-130.* When working with ground parties, gunship crews will not give weapons release authority unless authority is delegated to the gunship.

18.13.2. Combat Search and Rescue (CSAR). The AC-130 should act as On-Scene Commander (OSC) until relieved. Reference OSC checklist (Attachment 10).

18.14. AAR General. NATO publication ATP 56(B) Parts 1 and 2 provide the basic guidance for refueling terminology and procedures. Crews will refer to the aircraft technical order for expanded receiver guidance and procedures.

18.14.1. DELETED

18.15. Policy. The following policies apply to all air to air refueling conditions regardless of emission control or type of rendezvous:

18.15.1. Minimum crew requirement. AAR qualified pilot, co-pilot certified in AAR pre-contact, navigator certified in AAR and a flight engineer certified in AAR (or in training under the supervision of an instructor).

18.15.2. Use manual boom latching procedures only during fuel emergencies and contingency operations. ***EXCEPTION:*** Manual boom latching procedures are authorized for all AAR operations with the KC-10A if the tanker's independent disconnect system is operational. ***WARNING:*** During AAR operations, do not make any HF radio transmissions or ECM emissions. Infrared Counter Measures (IRCM) pods may be left in OPERATE mode.

18.16. Formation Procedures General. Formation is defined as aircraft maneuvering with respect to a common leader exercising mutual support for a common objective. For specific tactical formation employment reference AFTTP 3-1.31. This section prescribes basic formation

procedures. They are a guideline, primarily designed to be used in VMC. IMC procedures are employed in extraordinary circumstances when IMC is encountered inadvertently or when the mission demands IMC penetration.

18.16.1. Limit formations to three aircraft.

18.16.1.1. Dissimilar Formations. Deployment operations may require different MDS AFSOC aircraft to fly together in formation. The AFSOC standard is the 2,000 foot visual trail. The minimum lateral spacing for different MDS aircraft will be 500 feet. If flight in visual conditions is not possible, use pre-briefed IMC procedures to provide separation between aircraft. The lead aircraft will direct wingmen to assume IMC spacing well prior to the formation entering the weather. For formation AAR use geometries and positioning described in ATP 56(B). ***WARNING:*** When flying alternate formations it may be necessary to modify inadvertent weather penetration procedures.

18.16.2. Command and Control. Clear lines of command must be established during formation flight. This does not prevent other formation members from suggesting a course of action. Personnel in the following roles will be identified during mission planning and will be annotated on the flight orders (unless noted otherwise):

18.16.2.1. Airborne Mission Commander (AMC). The individual responsible for the overall safe and effective employment of air assets. Required where mission complexity dictates. The AMC should not be a primary crewmember. When communicating to the rest of the formation as the airborne mission commander, use that call sign.

18.16.2.2. Formation Commander. Required on every formation mission. The designated commander of a formation of aircraft and responsible for successful completion of the formation's portion of the mission. Usually chosen from the Aircraft Commanders involved in the mission (usually the lead pilot). The pilot of the lead aircraft (if not the airborne mission commander) is empowered to conduct the mission as planned including any planned alternates and immediate actions necessary for formation safety. The airborne mission commander has the responsibility to direct all other changes to the mission. The formation commander works closely with the AMC (if one is utilized) to accomplish the overall mission. The formation commander is usually designated DMC in missions employing a dedicated AMC.

18.16.2.3. Deputy Mission Commander. Required on all missions employing a dedicated AMC, on all multi-element formation missions, and on all single-element formations of three aircraft or more. The DMC assumes command if conditions prevent the AMC from controlling the mission. The DMC may be a primary crewmember, and is usually the Formation Commander on AMC controlled missions.

18.16.2.4. Formation Lead. The lead aircraft in a formation flight. Responsible for proper mission execution and other immediate action events during a formation flight.

18.16.3. Specified Times. The mission commander determines the sequence of events and mission times based on staff input, fuel requirements, user needs, taxi distances, briefing requirements, etc.

18.16.4. Pre-takeoff Procedures:

18.16.4.1. Taxi (formation taxi is optional). Minimum taxi interval is one aircraft length.

18.16.4.2. Runway Positioning. Aircraft alternate sides with nose to tail clearance. If feed-on method is used, subsequent aircraft move into takeoff position as preceding aircraft start takeoff roll. This method is used when runway length or gross weight demands the entire runway be used or maximum power be applied prior to brake release.

18.16.5. Takeoff:

18.16.5.1. Interval. Minimum takeoff interval between aircraft in VMC is 15 seconds.

18.16.5.1.1. If the weather does not allow a VMC departure the formation will depart single ship, minimum one minute separation, and rejoin after VMC conditions are attained. If VMC cannot be attained fly radar/TACAN in-trail.

18.16.5.2. Application of Power. To prevent damage to succeeding aircraft, do not advance power above flight idle until takeoff roll is started. Use a smooth application of power to achieve takeoff torque. If full power is required prior to brake release ensure adequate separation or use feed-on method. Lead will pre-brief takeoff power settings.

18.16.5.3. Abort During Takeoff. If an aircraft aborts during takeoff roll, the navigator will immediately transmit on inter-plane frequency and the copilot on primary ATC frequency (after completing emergency procedures requiring immediate action) the formation position and the word "Aborting" three times. For example, "Number 1 aborting, Number 1 aborting, Number 1 aborting." The aborting aircraft will clear the runway as expeditiously and as safely possible. Succeeding aircraft will hold until the runway is clear. If takeoff run has already been started by succeeding aircraft, they will abort and clear the runway.

18.16.6. En Route. In the ATC environment, all aircraft not in a standard formation (standard formation is defined as less than 1 mile horizontal separation and less than 100 feet vertical, IAW FAA) will be fully lighted as required by AFI 11-202V3.

18.16.6.1. At night, lead will announce unplanned airspeed changes of greater than 15 knots, unless briefed otherwise.

18.16.6.2. Aircraft aborting after assembly will notify lead and turn away from the formation and rejoin at the end or proceed to a suitable recovery field. Aircraft within flight will reposition as briefed.

18.17. Formation AAR.

18.17.1. Weather Minimums. Rendezvous closure will not be continued inside 1 SM unless visual contact is established with the tanker. AAR will not be continued when in-flight visibility is deemed insufficient for AAR operations. Lead is responsible for weather avoidance during the rendezvous until.1/2 NM from contact. Any aircraft in the formation may advise the formation of inclement weather on the refueling track.

18.17.2. Lead will direct the formation to either a right echelon or in-trail (IMC), stacked up 500 feet, prior to the entry point or air refueling initial point. Lead will call out the base altitude and occupy that altitude while maintaining 1000 feet separation between the highest receiver and lowest tanker.

18.17.2.1. If visibility is 2 NM or greater. Wingmen maintain a loose visual, 300 feet nose-to-tail clearance and 150 feet lateral wingtip clearance until lead calls AAR

complete. Lead will make this call on air refueling frequency when established in a loose visual position on the tanker's left wing. After lead calls AAR complete, number two is cleared to pre-contact. Number two calls AAR complete on air refueling frequency when established on lead's left wing. After number two AAR complete, number three is cleared to pre-contact. Number three will call AAR complete when established on lead's left side. ***WARNING:*** Do not cross behind an aircraft in pre-contact/contact.

18.18. Interphone System. The highly complex systems and the large number of crewmembers may cause confusion and loss of mission effectiveness if coordination and discipline are not stressed at all times. Communications on MAIN interphone/HOT XMT will be limited to mission related items during checklists, taxi, munitions upload/ download, weapons delivery, AAR, takeoff, approach and landing.

18.18.1. All crewmembers will monitor MAIN interphone (AC-130H - and HOT RCV). Conduct all challenge and response checklists on MAIN interphone or HOT XMT. MAIN intercom will serve as the primary means of communication between crewmembers except as noted below:

18.18.1.1. During AAR, AC-130U pilots will select HOT MIC on P1, and AC-130H pilots will select HOT XMT.

18.18.1.2. Pilots and Lead Gun will monitor P2 during tactical operations.

18.18.1.3. The NAV, FCO, EWO, and TV/IR will use P2 for normal communications.

18.18.1.4. The FE, LM, and Aerial Gunner (AG) will use P1 for normal communication between their stations. The lead gun will advise the flight engineer of gun status over P1. During 105 MM operations the "Gun Ready" call will be made by the FE to the crew over MAIN interphone.

18.18.1.5. Use the CALL system, if able, to alert the crew to threats and aircraft emergencies requiring immediate attention.

18.18.1.6. All crew positions will use their respective ISO nets and LOCAL when available for additional crew coordination or training.

18.18.1.7. . A minimum of one gunner will remain on interphone during two engine shutdown for ordnance loading/downloading procedures.

18.19. Air-to-Surface and Air-to-Air Training. AFI 11-214 describes minimum weather requirements for training.

18.19.1. Aircraft bank will be limited to 60 º and pitch is limited to +/- 15 º.

18.19.2. Air-to-surface minimum weather will be sufficient to allow the crew to visually observe the round to impact. ***EXCEPTION:*** AC-130U using procedures found in 18.19.5.

18.19.2.1. The AC-130H will not shoot in IMC with ground personnel in peacetime.

18.19.3. AFI 13-212, *Range Planning and Operations*, is the parent instruction for all AF ranges. Wings/Groups will publish range procedures for frequently used weapons ranges IAW AFI 13-212V1 and Chapter 10 to this instruction.

18.19.3.1. Not used.

18.19.3.2. If not using an AF range gunship crews will use the component/Host Nation range procedures.

18.19.4. VMC Range Clearing.

18.19.4.1. Visually clear the target area and weapon safety footprint areas on AF Class B and Class C ranges before live firing.

18.19.4.2. Visually clear the target area and weapon safety footprint areas at non-AF ranges.

18.19.5. AC-130U Range Operations in IMC.

18.19.5.1. On an AF range the crew will use a Class A only; however, the range does not need to be a scoreable range. Range control clearance to fire is assurance the target area and weapon(s) safety footprint is clear. At a non-AF range the crew will be under the control of a Range Control Officer (RCO) on the ground for the range in use. Procedures will be established to insure safety prior to using the range and approved by the RCO. For frequently used ranges publish these procedures in Chapter 10. As a minimum:

18.19.5.1.1. Perform Sensor/Sensor calibrations as required, and perform slaving checks of the radar to the primary INS.

18.19.5.1.2. Monitor GUARD and maintain two-way radio contact with the RCO. The Army also requires two separate radios and frequencies. A cellular phone is not acceptable.

18.19.5.1.3. The only sensor authorized is the APQ-180 radar in Trainable (TRN), Fixed (FXD), or Semi Automatic (SEMI) in Direct (DIR) or Offset (OFS) target mode with the 105 MM, 40 MM and use PIPP to tweak and periodically check the accuracy. When shooting in OFS target mode a ground party RCO will observe and adjust fire.

18.19.5.1.4. The 25MM may be fired, if required for training, if the gun was tweaked prior to IMC and the copy tweak was live fire checked to the radar.

18.20. Tweak and Live Fire Operations.

18.20.1. A sensor alignment checklist will be completed prior to any live fire training.

18.20.2. Peacetime. A tweak will be completed prior to live fire training with ground personnel.

18.20.2.1. If there has been a gun boresight, sensor harmonization, gun replacement, or IR removal/replacement then Medium Field Of View (MFOV) will be used until shots begin to fall within Narrow Field of View (NFOV) parameters. Do not attempt to perform combat tweak or sensor offset shooting with autotrack engaged.

18.20.2.2. **(AC-130U)** The Q39 (MTV) will not fire the 25mm at night with less than 50% IR selected as the primary mode.

18.20.2.3. **(AC130U)** When shooting in Semi-Auto (SEMI), Manual (MAN), or Override (ORIDE) during training, the pilot will cease fire and have the FE safe the gun(s) when aircraft bank angle is less than 10º or greater than 45º.

18.20.2.3.1. **(AC-130U)** The only gun position inhibit in ORIDE is the firing envelope. It is possible that a gun could move out of position during firing if a malfunction occurs.

18.20.2.3.2. **(AC-130U)** In ORIDE, the MC gun positioning checks are bypassed. The gun position must be checked with the LWCP and/or manual readout assemblies. Failure to do so may result in damage to the airplane or injury to personnel.

18.20.2.3.3. **(AC-130U)** Aircrews need to be aware of the potential hazard and pay close attention during live fire operations in ORIDE. The Pilot will have accurate Primary Aimline (PA) and computed impact point aiming cues in SEMI/ORIDE and FXD/ORIDE. The FCO should check commanded/actual gun angles prior to each shot.

18.20.2.3.4. **(AC-130U)** MAN/ORIDE mode will not be used during live-fire training with ground parties. Fire no closer to ground parties than 1,000 meters during live-fire training in SEMI/ORIDE and FXD/ORIDE.

18.20.2.3.5. **(AC-130U)** The TV Operator will not engage Ground Point Track while attempting to fire with the All Light Level Television (ALLTV).

18.20.2.4. Deleted.

18.20.2.5. Deleted.

18.20.2.6. Deleted.

18.20.2.6.1. Deleted.

18.20.2.6.2. Deleted.

18.20.2.6.3. Deleted.

18.20.2.7. Deleted.

18.20.2.7.1. Deleted.

18.20.2.7.2. Deleted.

18.20.2.7.3. Deleted.

18.20.2.8. A minimum of 1,000 feet altitude separation from the highest known trajectory or danger area will be used for combined live fire operations with ground artillery, mortar, or helicopter fire. Helicopters firing 30 mm, .50 cal, or 2.75‖ rockets have a 5,000 feet AGL danger area. Helicopters using 7.62 mm only have a 3,000 feet AGL danger area.

18.20.3. Danger Close. JP 3-09.3 defines danger close as the 0.1% probability of incapacitation based on Joint Munitions Effectiveness Manual (JMEM) data. For targets inside the 0.1% probability of incapacitation, the ground commander or authorized controller (fire support officer, team leader, etc.), must accept responsibility for risk to friendly forces IAW JP 3-09.3 by passing his initials and stating, ―"CLEARED DANGER CLOSE". If the mission is preplanned, the ground commander or designated representative should pre-brief acceptable minimum engagement distances. AFTTP(I) 3-2.6 (JFIRE) is the source document for all danger close distances.

18.20.3.1. Peacetime Restrictions. The following restrictions apply to all peacetime training missions. These do not apply anytime the ground forces commander requests fire support under CJCSI 3121.10 or any other Standing Rules of Engagement for US Forces.

18.20.3.2. Crews will select a tweak target a minimum of 750 meters away from all ground parties to compensate for untweaked system accuracy and fragmentation effects. Once the tweak is complete and the fire control system has been verified accurate (impacts are within 5 mils of aimpoint), crews will fire no closer to ground parties with the visual sensors than 600 meters with 105 MM HE, white phosphorous (WP) and high fragmentation (HF), 400 meters for all 25 MM and 105 MM Target Practice (TP), and 300 meters for all 40 MM. AC-130U live fire with the APQ-180 strike radar, and AC-130H with the APQ-150 beacon tracking radar, will fire no closer to ground parties than 650 meters with the 105 MM and 500 meters with the 25MM/40MM.

18.20.3.3. Use no-fire zones if the ground party is within 700 meters for the 105 MM PGU-43/B (TP) round and 2000 meters for the 25 MM PGU-23/B (TP) round. This restriction includes 25 MM TP/high explosive incendiary mix. To determine the no-fire headings, compute the bearing from friendly position to target, subtract 60º for beginning of no-fire zone and subtract another 60º for end of no-fire zone. AC-130U MC no-fire radials are plus and minus 30º from the friendly position to target bearing.

18.20.4. Combat and Contingency. If unable to perform a tweak prior to reaching the target area, the first round should be placed as far as practical from friendly positions. Subsequent rounds can then be brought onto the target. This will reduce the hazard to friendly ground forces when firing untweaked weapons.

18.20.5. Coordinate whether or not the FCO will continue to update the tweak or allow the sensor operators to continually use sensor offset without updating the tweak.

18.20.5.1. Once the offset/correction has been identified the sensor operator will not aim direct unless directed by the FCO, or when trying to redefine the correction.

18.20.6. ***WARNING:*** Any crewmember detecting an unsafe condition during live fire will call "CEASE FIRE." Firing will not resume until the unsafe condition is corrected.

18.20.7. ***WARNING:*** During peacetime, do not point a loaded and armed weapon at a friendly position. Failure to heed this warning could cause injury or death to friendly ground forces if inadvertent gun firing should occur.

18.20.8. ***WARNING:*** Do not load or fire the 105 MM in moderate or greater turbulence.

18.21. Prestrike. The prestrike phase begins prior to the combat entry point and includes activities prior to target acquisition. In most cases these duties apply from before combat entry until past the combat exit point.

18.21.1. Pilot Duties:

18.21.1.1. Assign a crewmember to monitor/run the mission execution checklist and inform advice the crew of situation updates.

18.21.1.2. Ensure the aircraft is configured for combat entry.

18.21.1.3. Complete the Prestrike checklist as appropriate.

18.21.1.4. Scan for threats.

18.21.2. Copilot Duties:

18.21.2.1. Coordinate with ATC and/or Ground Control Intercept (GCI) controllers as appropriate (Attachment 11).

18.21.2.2. Assist with navigation and threat avoidance.

18.21.2.3. Assist the navigator in coordination with other aircraft (e.g., tankers, fighter escorts, etc.) and tactical control agencies.

18.21.2.4. Scan for threats to the aircraft.

18.21.2.5. Coordinate with the FE on monitoring aircraft systems.

18.21.2.6. AC-130U. Update and verify the Tactical Situation Map (TSM).

18.21.3. Fire Control Officer Duties:

18.21.3.1. Ensure fire control system altitude and employment nominals are accurate.

18.21.3.2. Assist with navigation and in contacting tactical control agencies as required.

18.21.3.3. Assist navigator in completing information for in-flight target briefings.

18.21.3.4. Coordinate the plan of attack with the crew to include tactics/weapons and type of ammunition.

18.21.3.5. AC-130U. Update and verify the TSM.

18.21.4. Navigator Duties:

18.21.4.1. Navigate the aircraft and keep the crew advised of the aircraft position.

18.21.4.2. Prior to reaching the designated working area, contact the tactical controlling agency to obtain essential mission updates.

18.21.4.3. Deconflict and coordinate mission activities with other aircraft.

18.21.5. Electronic Warfare Officer Duties:

18.21.5.1. Complete all equipment checks, preset the defensive equipment, and go on watch prior to entering a threat area.

18.21.5.2. Monitor compliance with defensive ROEs.

18.21.5.3. Assist the navigator in avoiding threat areas.

18.21.5.4. Record defensive information.

18.21.5.5. Coordinate with the Direct Support Operator (DSO).

18.21.5.6. AC-130U. Update and verify the threat information on the TSM.

18.21.6. Loadmaster, Flight Engineer, and Scanner Duties:

18.21.6.1. The loadmaster, flight engineer, and scanners will be in position to perform scanner duties prior to entering any threat environment as established in mission planning.

18.21.6.2. The FE and copilot will coordinate on monitoring the aircraft systems.

18.21.6.3. The loadmaster will ensure the gun deck/cargo compartment lights are set to minimum lighting and all external light leakage is eliminated.

18.21.7. Sensor Operator Duties:

18.21.7.1. Complete all equipment checks and check/set pulse repetition frequency (PRF) codes as required.

18.21.7.2. AC-130U. Set up BDA recorders.

18.21.8. All Other Crewmembers:

18.21.8.1. Monitor tactical control frequencies.

18.21.8.2. Prepare for combat entry as appropriate.

18.22. Strike. The strike phase consists of the portion of the mission in the employment area. Only duties which differ from the prestrike phase are listed below.

18.22.1. Pilot Duties:

18.22.1.1. Configure the aircraft for weapons delivery.

18.22.1.2. Select appropriate tactics, weapon, and ammunition.

18.22.1.3. Direct the arming and safing of the guns when appropriate to ensure safety and mission execution.

18.22.1.4. Prior to firing during CAS/Troops in Contact (TIC) missions, ensure the range and bearing from the friendly location(s) to target(s) complies with appropriate requirements.

18.22.1.5. Receive target confirmation and clearance to fire from the navigator.

18.22.1.6. Pilot will not attempt to fire the 105MM until the flight engineer makes the "GUN READY" call.

18.22.1.7. AC-130U. Confirm correct sensor/gun/fire control channel and modes from the fire control data block in the HUD or B/U HUD prior to arming guns.

18.22.2. Fire Control Officer Duties:

18.22.2.1. Coordinate with the navigator for primary navigation duties in the target area.

18.22.2.2. Coordinate target validity with the navigator and sensor operators.

18.22.2.3. Verify friendly location relative to the target.

18.22.2.4. Prior to firing during CAS/TIC missions, ensure the range and bearing from the friendly location(s) to target(s) complies with appropriate requirements. Relay the range and bearing from the friendly location(s) to the target(s) to the pilot.

18.22.2.5. Coordinate with the aircraft commander on tactics, weapons, and ammunition selection if other than pre-briefed.

18.22.2.6. Record BDA information.

18.22.2.7. Assist the navigator in communications.

18.22.2.8. AC-130U. When the correct sensor/gun/fire control channel and modes are set in the fire control system state "FCO is ready, Channel A and/or B."

18.22.3. Navigator Duties:

18.22.3.1. Maintain communications with tactical control agencies for mission requests and clearance to fire.

18.22.3.2. Complete a target briefing for new targets or fire missions as required.

18.22.3.3. Confirm the target location, identity, gun/sensor combination, validity with respect to the ROEs and issue final clearance to fire.

18.22.3.4. Coordinate with the FCO for primary navigation.

18.22.3.5. AC-130U. Operate the strike radar as required for mission execution. Do not attempt to fire the 105MM until the flight engineer makes the "GUN READY" call.

18.22.4. Sensor Operator Duties:

18.22.4.1. The primary sensor(s) will:

18.22.4.1.1. Track the target or friendly forces as directed by the FCO.

18.22.4.1.2. Give consent as required. Do not attempt to fire the 105MM until the flight engineer makes the "GUN READY" call.

18.22.4.1.3. Call ordnance impact as required.

18.22.4.1.4. Fire on the targets as directed by the FCO.

18.22.4.1.5. Assist the navigator in communications.

18.22.4.2. The secondary sensor will:

18.22.4.2.1. Backup the primary sensor operator and/or fire control officer as required.

18.22.4.2.2. Search for additional targets as required.

18.22.4.2.3. Search for threats to the aircraft as required.

18.22.4.2.4. Fire on the targets as directed by the FCO.

18.22.4.2.5. Assist the navigator in communications. ***NOTE:*** AC-130U. During IMC conditions be prepared to handle all communications with ground forces in order to allow the navigator to identify friendlies and/or fire on targets.

18.22.5. Flight Engineer Duties:

18.22.5.1. Arm and safe the gun(s) as directed by the pilot.

18.23. Post-strike. The post-strike phase of the mission begins at the combat exit point. Only duties which differ from the prestrike phase are listed below.

18.23.1. Pilot Duties:

18.23.1.1. Initiate the Post-strike checklist.

18.23.2. Navigator Duties:

18.23.2.1. Assume primary navigation duties.

18.23.2.2. Relay appropriate command and control information to inbound aircraft and provide in-flight reports as required.

18.23.3. Sensor Operator Duties:

18.23.3.1. Collect all BDA material and classified material as required, and prepare for the intelligence debrief upon landing.

18.24. Intelligence Gathering. Every crewmember that flies a tactical mission will debrief the intelligence section immediately after the mission.

18.25. Tactical Recoveries. Options are to enter the traffic pattern via an initial, downwind, base, straight-in, or perpendicular to the runway. During hostile activity, the pilot can control several factors that may reduce the time in a threat envelope. These are altitude, arrival and departure flight path, proximity to the airfield, and proximity to known threats. The approach must be unpredictable. Comprehensive mission planning and knowledge of the threat location, density, and capability will dictate the specific tactics to be employed. The recommendations below are some examples; however, ingenuity is the key in determining what type of approach to fly. ***NOTE:*** All tactical approaches will be to a normal landing.

18.25.1. Random steep approach. This maneuver is based on a modified 360 degree overhead approach to a normal landing. Conditions may require that the example random steep approach described below be modified to satisfy local conditions (Figure 18.4.).

18.25.1.1. Establish initial at approximately 4,500 feet AGL and accomplish the before landing checklist.

18.25.1.2. When approximately one-third of the distance down the runway, extend 100 percent flaps and commence descent while beginning a 360 degree turn to final.

18.25.1.3. Maintain 140 knots indicated airspeed or approach speed, whichever is higher, until wings level on final. Plan the approach to remain within two miles of the airfield and to enter no less than a ¼ mile and not more than a one mile final. The maneuver can be modified to enter on other than an initial; i.e., 270 or 90 degree overhead. In these cases change the initial altitude according to the pilot's judgment.

18.25.2. Random shallow approach. These maneuvers are based on approaching the airfield from various directions at low en route altitude (e.g., 300 feet AGL) and en route airspeed with the descent/before landing checklist accomplished. The random shallow straight in and random shallow abeam are two examples of random shallow approaches (Figure 18.5. and Figure 18.6.).

18.25.2.1. Begin a level slowdown maneuvering to approach speed at a predetermined point. While remaining at low altitude, maneuver the aircraft to enter a point on final no less than ¼ mile from the runway, accomplish the before landing checklist, and complete the landing IAW the flight manual.

18.25.2.2. The pilot may elect to make a climbing slowdown to normal traffic pattern altitude. Maneuver the aircraft to enter no less than a ¼ mile final, accomplish the before landing checklist, and complete the landing IAW the flight manual.

Figure 18.4. Random Steep Approach.

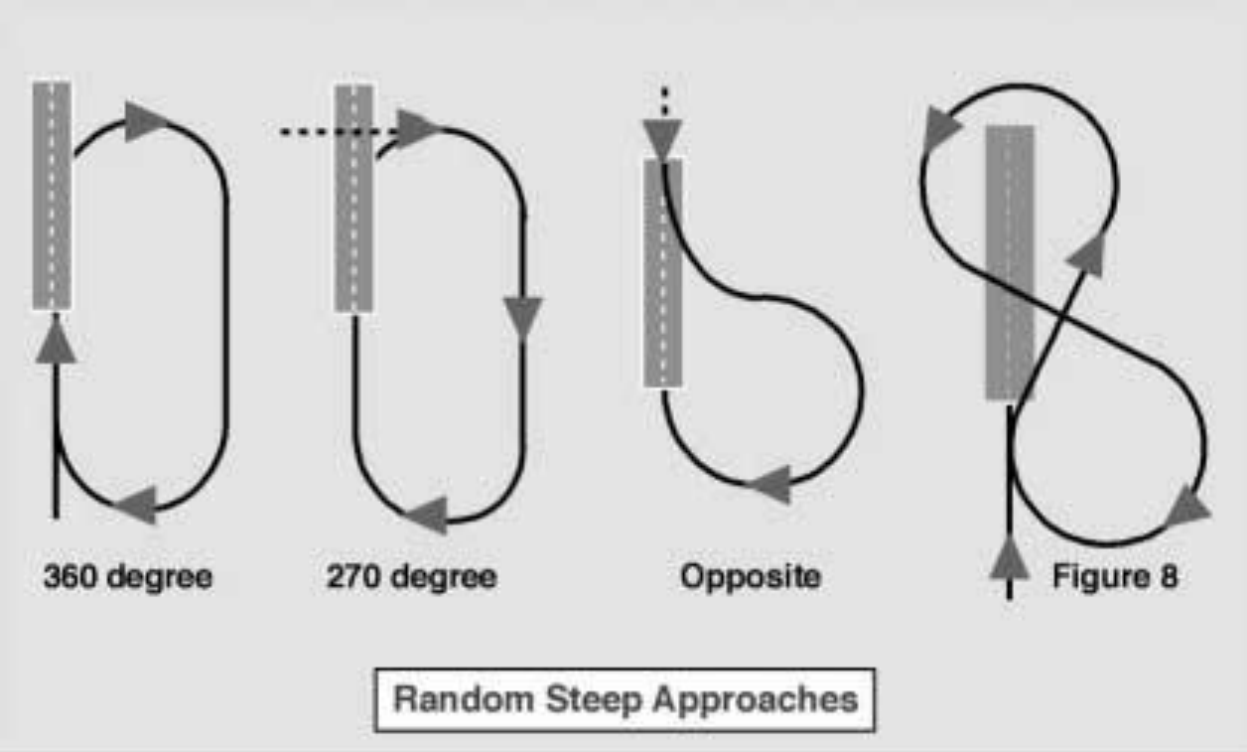


Figure 18.5. Random Shallow Straight-in Approach.

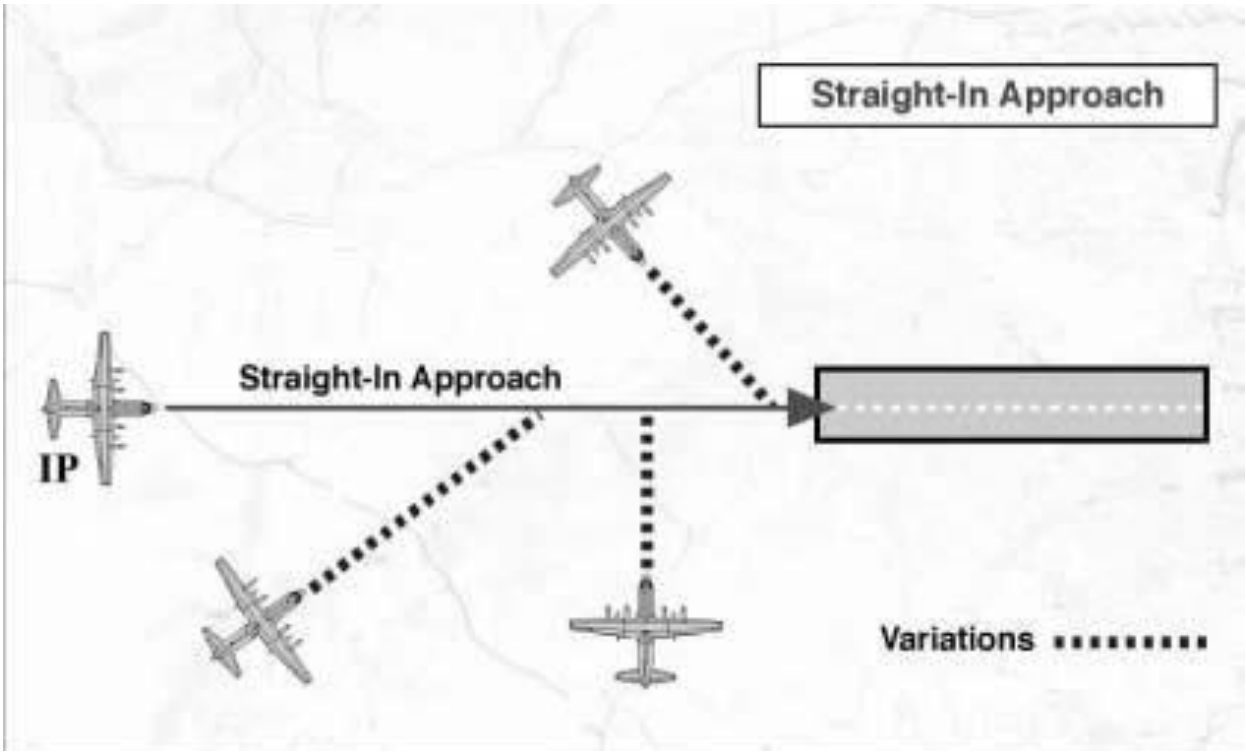
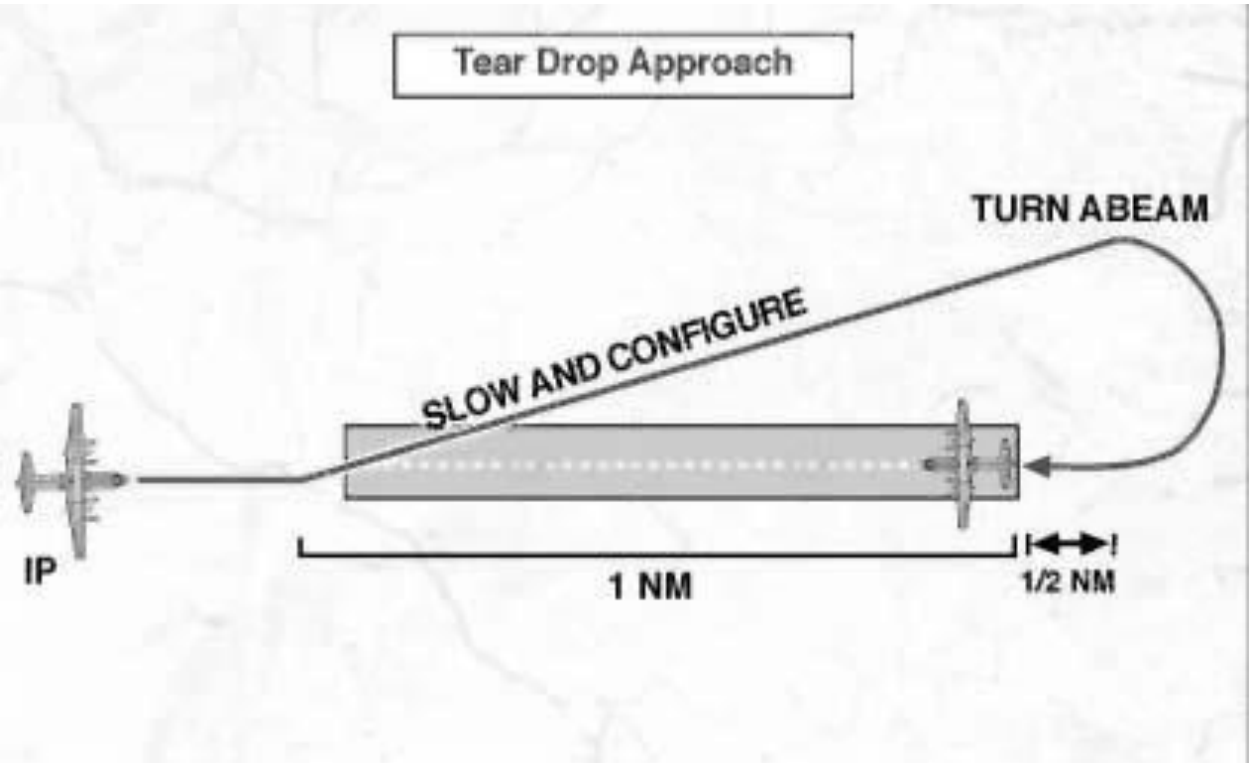


Figure 18.6. Random Shallow Tear Drop Approach.



18.26. Self Contained Approaches (SCA). SCA procedures may be used for approaches to conventional airfields. Comply with local ATC restrictions and host nation agreements, as appropriate.

18.26.1. AC-130H SCAs are flown to a Minimum Descent Altitude (MDA) and Missed Approach Point (MAP). AC-130U Automatic Instrument Landing Approaches (AILAs) are SCAs flown to a decision altitude (DA).

18.26.2. Weather minimums. All SCAs must be conducted in VMC unless HQ AFSOC/A3 approves IMC operations. Comply with the AFSOC supplement to AFI 11-202, Volume 3. If approved, IMC SCA minimums will be no lower 300 feet and 1 SM.

18.26.2.1. DELETED

18.26.3. MDA/DA. To compute MDA/DA for VMC or approved IMC operations, add 300 feet to the Touchdown Zone Elevation (TDZE).

18.26.4. Missed Approach. The MAP (AC-130H) will be at 1 NM distance to go on the mission computer at MDA. AC-130U missed approach will be executed at DA if landing criteria are not met.

18.26.5. SCA Construction. Use the most current sources for topological, point obstruction, and airfield information. Consider using radar reflectors, radar beacons, or existing airfield NAVAIDS to increase the reliability of the approach.

18.26.5.1. Obstacle Clearance. The location of terrain and obstructions will dictate the glide slope and altitude profile used. Along the planned ground track, maintain a minimum of 300 feet above the highest obstacle within 1 NM between the MIA and the

MDA/DA. Cross-check the SCA template against terminal area charts, radar, and available NAVAIDS. Use the following procedures to analyze obstacles:

18.26.5.1.1. Draw the horizontal obstacle clearance template, depicted in **Figure 18.8**, on a 1:250,000 or larger scale chart, if available. The template begins 0.3 NM either side of LZ centerline at the touchdown point, extending outward to 1 NM either side of centerline at 3 NM from the touchdown point. The template will encompass all terrain 1 NM either side of centerline from the planned descent point extending to 1 NM beyond the planned descent point (For example, a 3.2 NM planned descent point requires a 4.2 NM long template). If the planned descent point is less than 2 NM from the touchdown zone, then the standard 3 NM template will not require extension. Refer to **Figure 18.7** SCA Horizontal Obstruction Template. NOTE: These are minimum distances and may be increased. Consider such factors as the availability of radar or IR targets and recent NAVAID performance.

18.26.5.2. Significant and critical obstacles. Using current large-scale charts, airfield diagrams, airfield sketches, approach plates, and imagery, locate significant obstacles within the boundary of the horizontal template. Significant obstacles are those within 300 feet of the desired glide slope. Determine the HAT for each obstacle by subtracting TDZE from the MSL elevation of the obstacle. For each obstacle, plot the along-course distance from touchdown and HAT on the critical obstacle graph as shown in **Figure 18.9** Critical Obstacle Chart. An obstacle is considered critical if it falls above the reference line for the planned glide slope or its extension along the depicted baseline.

18.26.5.2.1. For each critical obstacle identified, preplan and brief a specific means of avoidance to be used during the approach. The following examples may be used separately or in combination:

18.26.5.2.1.1. Use a steeper glide slope. Glide slopes exceeding 4.0º should be carefully considered due to the high rate of descent required.

18.26.5.2.1.2. Move the touchdown point further down the runway.

18.26.5.2.1.3. Increase MDA/DA.

18.26.5.2.1.4. Establish an intermediate step-down altitude above the MDA at which the aircraft will level off until positive separation from the obstacle is assured.

18.26.5.2.1.5. Change the approach to the opposite end of the runway, crossing runway, parallel runway, etc.

18.26.5.2.2. Draw the relative position of each critical obstacle on the template and annotate its distance-to-go, distance abeam final course centerline, and height (AGL and MSL).

18.26.5.3. Missed Approach and Departure. For planning, allow a minimum of 0.3 NM along track error and 0.3 NM cross track error at the MAP. Assume IMC when choosing the missed approach/departure flight path. Construct a horizontal obstacle clearance template beginning at the MAP and incorporating the planned missed approach/departure flight path. Use TDZE as the MSL start point for the missed approach. If the terrain along this flight path (including the above errors) rises at a rate greater than 200 feet/NM,

refer to the performance manual to verify that three-engine climb out will clear terrain. Use the three-engine climb angle in place of glide slope (refer to formula below).

Table 18.2. Example Horizontal Obstacle Clearance Formula.

Angle of Climb = Rate of Climb (ft/min) x 0.5652 GS (knots)

18.26.5.3.1. The horizontal obstacle clearance template for climb out extends from the approach end of the runway out to 1.0 NM past level off at the initial escape en route altitude. The lateral limits of the climb out template are the same as for the straight-in approach.

18.26.5.3.1.1. If any critical obstacles are identified, consider using turns during climb out to avoid them. Ensure that the three-engine climb path provides sufficient clearance from obstacles and terrain along the flight path.

18.26.5.4. SCA Vertical Template Construction. Starting at the touchdown zone, construct a glide slope using the desired gradient (feet/NM) to a point along the final approach course (or transition path, if applicable) where it intercepts the planned approach altitude (refer to **Figure 18.10**). Annotate the glide slope MSL and AGL altitudes for each 1 NM distance-to-go increment out to the planned descent point.

18.26.6. In-flight Crew Coordination Measures. All available sensors will be used to locate the runway and notify the aircraft commander upon acquisition. Evaluate the navigation solution to ensure the most reliable navigation data is being integrated. The navigator and the pilot not flying the approach will monitor the CARA and barometric altimeters to verify terrain clearance. To better monitor and direct the SCA, the navigator may deviate from the 'Before Landing' Checklist and wait to re-position the seat for landing until the pilot executing the approach calls the landing field in sight.

18.26.6.1. AC-130H:

18.26.6.1.1. The navigator will brief the approach during the Before Landing Checklist to include: inbound course, descent point, glide slope, MDA, MAP, significant obstacles, and missed approach instructions. All available navigation equipment will be used to provide centerline guidance. The navigator will provide the pilot with centerline advisory calls and altitude guidance during the approach down to the MAP or until field is called in-sight.

18.26.6.2. AC-130U:

18.26.6.2.1. The navigator will brief the approach during the Before Landing Checklist to include: inbound course, descent point, glide slope, DA, significant obstacles, and missed approach instructions. Advise the pilot any time GPS is not in the navigation solution. The navigator will provide the pilot with centerline advisory calls and altitude guidance during the approach down to the DA or until field is called in-sight. Inform the pilot when the course is active, when the glideslope is active, and when cleared to begin descent to DA.

18.26.6.2.2. Select ADC for the altitude source and enter the current altimeter setting received from the tower. If GPS is not integrated, or if the navigation solution is otherwise inaccurate, update the aircraft position and recalculate/store the AILA using a sensor sight point, radar mark centered on the near runway point, or enter best available coordinates immediately prior to executing AILA guidance.

18.26.6.2.3. The navigator should monitor the approach using RBGM or WHX modes of the radar as well as the TSM and horizontal situation indicator on the BMC multifunction display. Level off and execute missed approach procedures if the glide slope commands a descent below the intermediate altitudes. Pay particular attention to the impact of wind and ground speeds on obstruction clearance capability in the event of missed approach/go around.

Figure 18.7. SCA Horizontal Obstruction Clearance Template.

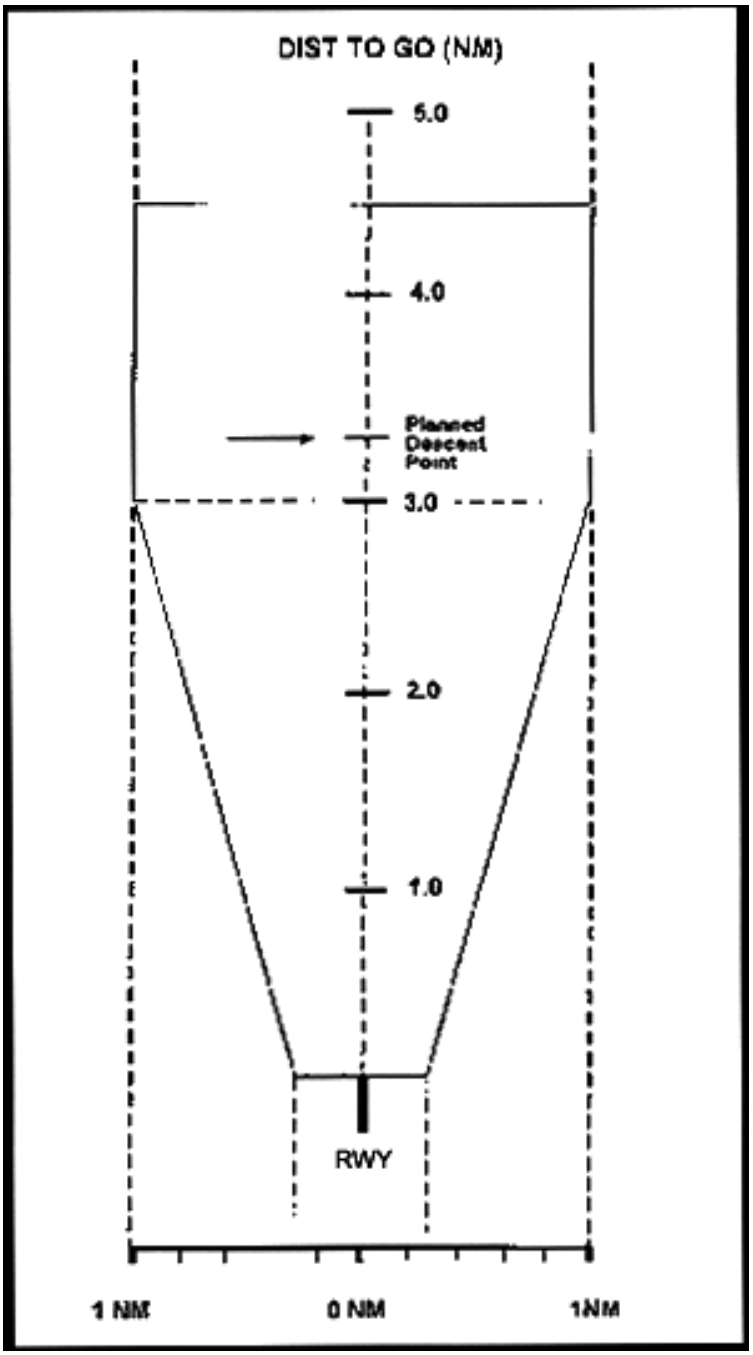


Figure 18.8. SCA Horizontal Obstruction Clearance Template (Example).

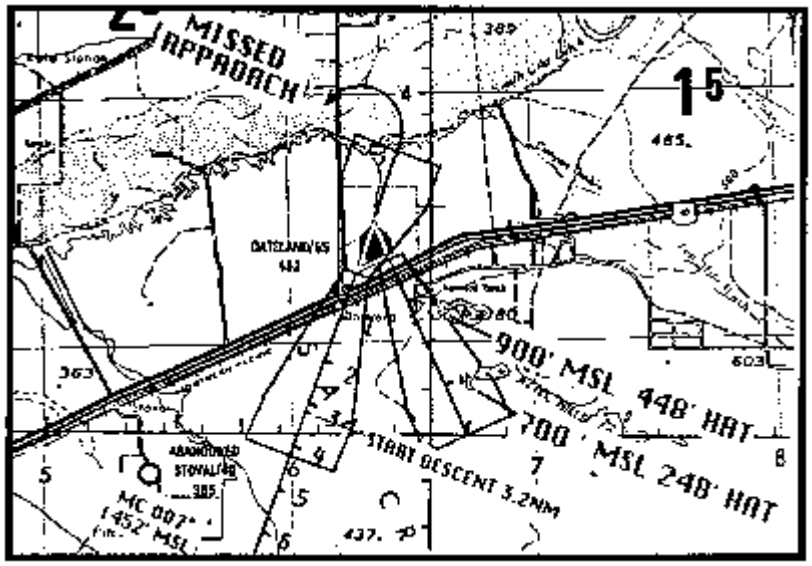


Figure 18.9. Critical Obstacle Chart.

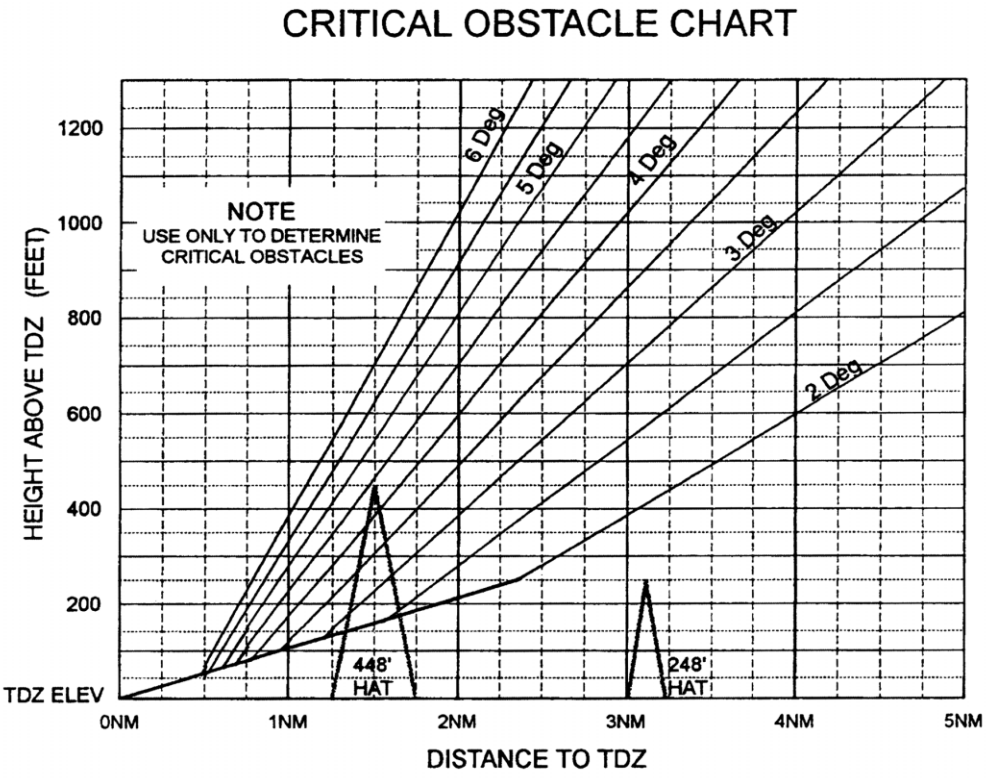
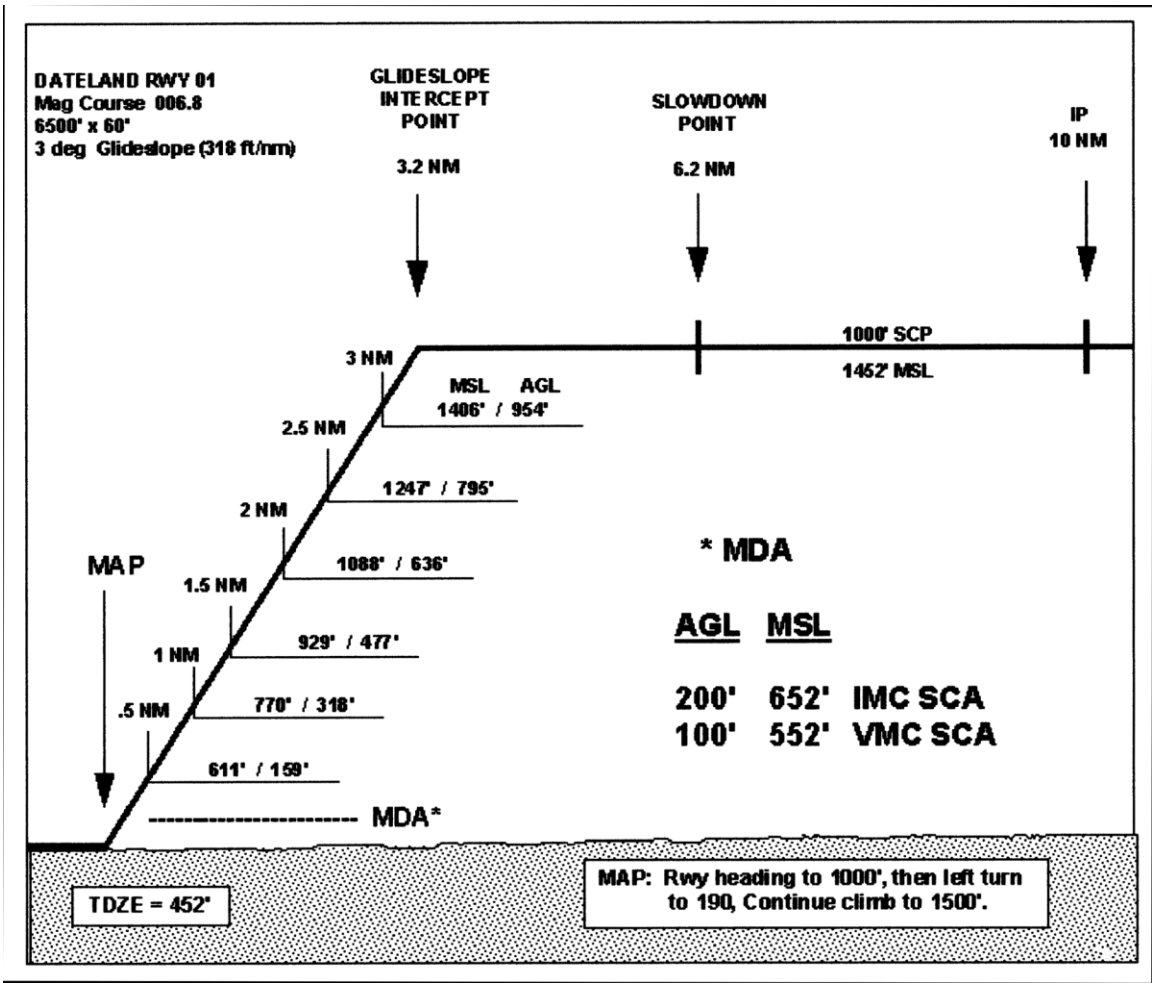


Figure 18.10. SCA Vertical Template.



18.27. NVG Takeoff and Landing Procedures. ***NOTE:*** Low Altitude environment is defined as 1,000' above the highest obstacle within 3 NM.

18.27.1. General: NVG takeoff and landing procedures are designed for departures and recoveries from overseas airbases or Forward Operating Locations with marginally secure airfield perimeters. NVG use during taxi, takeoff, approach, and landing is situational dependent, but may be necessary to reduce risk to the aircraft and/or airfield. NVG takeoffs can be made into low altitude operations, but will normally be made following IFR or tactical departure procedures. Recoveries can also be performed from the low altitude environment, but will most likely be a transition from high altitude to place the aircraft on final approach, properly configured, in a position to identify the Landing Zone and complete the landing. NVG approaches are standard instrument or SCA procedures modified to be flown on NVGs. Covert Recoveries (CR)are standard Random Steep, Random Shallow, Overhead, and Downwind procedures modified to be flown on NVGs. In all cases, normal checklists will be used.

18.27.1.1. Crew Qualification Requirements for NVG Takeoff and Landing Operations: Pilots, copilots, and flight engineers require NVG airland certification.

18.27.1.2. Runway marking will be IAW AFI 13-217.

18.27.1.3. The PIC will preflight and carry one spare NVG set and batteries.

18.27.1.4. Check for bleed through on the infrared lights prior to takeoff. Use the minimum lighting required, even when using covert lights.

18.27.1.5. NVG landings require one pilot's radar altimeter to be operational. The navigator's radar altimeter will be operational for training flights. Blacked-out landings require either the IDS to be operational, or INS and GPS in the navigation system solution.

18.27.1.6. Ensure both interior and exterior lights are correctly set and are as dim as possible commensurate with safety and visibility.

18.27.1.7. All crewmembers, especially the pilots, must be extremely vigilant in the use of instruments to back up visual maneuvers performed while using NVGs. The resulting loss of visual acuity and depth perception could result in a dangerous flight condition if aircraft attitude, bank angle, AGL altitude, descent rate, etc., are not confirmed with the aircraft instruments. All visual maneuvering will be backed up with the navigation system and all available sensors.

18.27.2. General Planning Considerations:

18.27.2.1. Threat Analysis. The possible threat is the most important factor in determining the type of departure and recovery, including the route of flight to and from the LZ. For CRs, the type and direction of recovery should be varied (threat and airspace permitting) to avoid a predictable recovery pattern from day to day.

18.27.2.2. Confirm the local altimeter setting that will be used for the landing.

18.27.2.3. Approach Path and Glide Slope Construction. See Section 18H of this instruction. Plan to intercept a 3 degree glide slope unless terrain or obstructions dictate a different glideslope. Avoid using glide slopes greater than 5 degrees, due to high descent rates. Slowdown to approach speed normally occurs approximately 3 NM prior to glide slope interception. For Covert recoveries, slowdown as briefed for the particular procedure.

18.27.2.3.1. The NAV will construct an approach plate for the SCA using the AF Form 4118 (SCA Planning Form), or an OG/OGV approved planning form.

18.27.2.4. Chart Preparation. Use the largest scale chart available from 10 NM inbound. A 1:50,000 chart is preferred, but in no case will it be smaller than 1:250,000. The navigator should select update points for the navigation system and altimeter. Chart construction will include the following additional items: the Initial Point (IP) or Initial Approach Fix (IAF), slowdown points, descent point, and the missed approach, departure, and go-around paths. Ensure update points for the navigation system and altimeter are annotated. It is of utmost importance to have sufficient, reliable position and altitude update points prior to the IP (or IAF) and final run-in.

18.27.2.5. NVG Airland Briefing. During the tactical mission briefing, coordinate crew duties and discuss all aspects of the NVG portion of the mission to include aircraft and airfield lighting configuration, specific crew communications during normal and emergency procedures, transfer of aircraft control, and maneuvers to be flown.

18.27.3. Taxi Operations. When taxiing on NVGs, extreme caution must be exercised since obstacles are hard to see and depth perception is reduced. Other aircraft, vehicles, and personnel may be operating blacked out. A thorough study of the airfield environment during mission planning is essential. Use the following procedures to ensure obstacle clearance and safe taxi operations:

18.27.3.1. Use as many NVG equipped scanners as practical.

18.27.3.2. Reduce and monitor taxi speed closely.

18.27.3.3. Accomplish checklists with the aircraft stopped while in congested areas.

18.27.3.4. When possible, use all available sensors to assist taxi operations.

18.27.3.5. When in doubt, use external observers (deplane crew members if necessary) to ensure obstacle clearance during taxi.

18.27.4. Takeoff Procedures. Pilots should maintain a good instrument cross check throughout the takeoff and departure. Be prepared to transition to instruments similar to an IMC takeoff. After takeoff, continue to clear for terrain and obstacles using NVGs.

18.27.4.1. At rotation speed, the pilot rotates the aircraft to establish a positive nose-up attitude. The copilot will raise the flaps on command of the pilot. As an additional safety measure, the Flight Engineer will have NVGs immediately ready during takeoff and climb-out to help clear for terrain and obstacles.

18.27.4.2. During the departure, the navigator will provide direction as necessary to keep the aircraft on course. Use all available sensors to clear for terrain and obstacles on the departure route.

18.27.5. IFR or SCA Approach Procedures. Fly standard procedures to place the aircraft on final approach.

18.27.6. Covert Recovery (CR) Procedures. The CR approach and landing is a visual maneuver backed up with the navigation system and all available sensors. CRs, Random Steep, Random Shallow, Overhead, and Downwind procedures in Section 18G are modified as follows:

18.27.6.1. A slowdown point will be planned and briefed for Random Steep and Random Shallow approaches. Pilots will call their own slowdowns for Overhead and Downwind approaches.

18.27.6.2. A full SCA Plate for landing runway is required.

18.27.6.3. Final approach course will be programmed into the navigation system.

18.27.6.4. The NAV will make standard SCA altitude calls and glideslope advisories as described in 18.27.7.3.

18.27.6.5. On a CR, if both pilots do not have the landing zone environment in sight by wings level on final, execute a go-around.

18.27.7. Approach Execution:

18.27.7.1. General. Each pilot should ensure both NVG batteries are operational during the Descent Checklist. Accomplish a thorough approach briefing prior to commencing

approach to include comprehensive missed approach/go-around procedures. Coordinate use of the IR and TV sensors to aid in locating the LZ, clearing for hazardous terrain and obstacles, and confirming the runway is clear of obstructions.

18.27.7.2. Low Altitude Operations: A SCA or random shallow should usually be the planned recovery from the low altitude environment. Maintain enroute profile until descent for landing. The copilot's and navigator's radar altimeters should remain set at enroute altitude setting until the slowdown. At slowdown, the radar altimeters may be reset as briefed.

18.27.7.3. Navigator Coordination:

18.27.7.3.1. The navigator will make distance calls at every mile inside ten miles and every half mile inside three miles (or as briefed), unless distance to the LZ is displayed on the pilot's instruments.

18.27.7.3.2. When glidepath guidance is provided to the pilot's flight director system, the navigator will call "Cleared to intercept glideslope." If not, follow procedures in 18.27.7.3.3.

18.27.7.3.3. At glideslope interception on an SCA, the navigator will state "Begin Descent," and repeat the desired initial descent rate. The navigator will provide glidepath advisories on SCAs and CRs with reference to the navigation system, the navigator's pressure altimeter, and the radar altimeter. These calls will be made at 1/2 NM intervals until reaching the "100 feet" call. State deviations in excess of 150 feet explicitly. The navigator also advises the pilot if the aircraft is correcting to or diverging from glidepath, using the term "Rapidly," if appropriate. As a guide, the following criteria may be used for glideslope deviation calls:

18.27.7.3.3.1. Slightly above or below: 50 feet.

18.27.7.3.3.2. Above or below: 100 feet.

18.27.7.3.3.3. Well above or below: 150 feet.

18.27.7.3.4. The navigator will call 100, 50, 25 and 10 feet above touchdown.

18.27.7.3.5. When executing a go-around or departure, the navigator will call out passing 100, 200, and 300 feet AGL.

18.27.7.4. Before Landing Checklist. Initiate the Before Landing Checklist at the point identified during mission planning. Slow to approach speed at this planned point. Depending on the type of landing, the flight engineer or copilot will extend the IR and/or overt landing and taxi lights. If the pilot determines there is sufficient illumination, he/she may call for aircraft lights out. Ensure 100 percent flaps (if used) are set prior to reaching glide slope intercept. Complete the Before Landing Checklist, but delay turning on NVG taxi and landing lights until directed by the pilot. Once established on approach speed, crosscheck drift and groundspeed to determine a predicted descent rate and to crosscheck crab.

18.27.7.5. Setting Radar Altimeters. Prior to slowdown, the pilot should set 10 feet to help judge the last few feet above the runway. At slowdown, the navigator should set

300 feet to guard against shallow glideslopes. CAUTION: AC-130U. The Q-39 (MTV) will be stowed prior to landing.

18.27.8. Descent:

18.27.8.1. Do not descend below 300 feet AGL until the LZ environment is identified visually and confirmed by both pilots. Whoever identifies the LZ first will call out "ZONE IN SIGHT," its clock position, and any discrepancies noted (i.e., any lights out, etc.). Both pilots will then confirm the zone and use all available resources to crosscheck the alignment for the proper heading. ***WARNING*:** On blacked out runways (AMP-4), a go-around point will be identified during mission planning. ***NOTE:*** The IR sensor is helpful in LZ identification and aircraft alignment, but it will not be used as a primary flight reference during the SCA.

18.27.8.2. The non-flying pilot will continue to monitor airspeed, descent rate, and bank angle. ***WARNING:*** Use of a 5-degree glideslope can cause descent rates in excess of 1000 feet per minute. Extreme care must be taken to break high descent rates with application of power prior to touchdown. In no case will a descent below 300 feet AGL be initiated prior to 2 NM to touchdown. This would cause the glideslope to be too shallow.

18.27.9. Go-Around and Departure Procedures. Pilots will initiate a go-around at the MAP (or pre-briefed location for visual approaches) if the runway is not in sight, a safe landing cannot be accomplished, or if directed. The latest go-around point for visual approaches is based on total landing distance and is that point at which the aircraft may land and safely stop on the runway.

18.27.9.1. The navigator will advise the pilots upon arrival at the MAP and repeat the MSL altitude and initial heading required when the go-around is executed.

18.27.9.2. The flying pilot will initiate the go-around and ensure a positive rate of climb is attained and verified by the non-flying pilot. Transition to instruments as necessary and be alert for visual illusions. ***WARNING:*** Pilots are more susceptible to spatial disorientation during NVG go-arounds and departures.

18.27.10. Loss of NVGs and Spatial Disorientation:

18.27.10.1. Airborne. If the pilot or copilot loses use of their NVGs inside of 1 NM, perform a go-around.

18.27.10.1.1. If the flight engineer loses use of NVGs, land at the discretion of the aircraft commander. Use other crewmembers and all available sensors as necessary to clear for hazards and confirm the landing zone.

18.27.10.1.2. After takeoff, continue the climb out and follow the appropriate procedures for loss of NVGs.

18.27.10.2. On the Ground. The pilot will determine whether to continue the takeoff roll as applicable. The copilot should be prepared to turn on overt lighting at the direction of the aircraft commander in case of NVG failure during takeoff or landing roll.

18.27.10.3. The non-flying pilot must be ready to immediately take control of the aircraft if the flying pilot experiences spatial disorientation or an NVG malfunction. When

necessary, take the appropriate action required regardless of qualification. Situation permitting, start a climb to at least minimum safe altitude (MSA) until the pilot experiencing the problem is ready to assume flying or non-flying pilot duties.

18.27.11. Overt Landings Following NVG Landings. If the sortie will continue with non-NVG VFR traffic patterns, the Post Low altitude checklist (if applicable) and the Touch and Go checklist will be accomplished.

18.27.12. NVG Option Landing Procedures. Maneuver the aircraft to be wings level and configured at a minimum of 300 feet AGL and 1 NM final for a SCA or AMP-4 CR. Pilots will call the zone in sight as they turn final and navigator/flight engineer will make standard altitude advisory calls on descent.

Chapter 19

FORMS ADOPTED AND PRESCRIBED

19.1. Deleted.

19.2. Deleted.

*BURTON M. FIELD, Lt Gen, USAF
DCS, Operations, Plans and Requirements

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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TO 11A10-26-7, *Specialized Storage and Maint Procedures Pyrotechnic Signals*, 23 April 2012

Prescribed Forms

AFSOC Form 88, *Dedicated Crew Chief Trip Report*

AFSOC Form 97, *AFSOC Aircraft Incident Report*

Adopted Forms

AF Form 15, *USAF Invoice*

AF Form 70, *Pilot's Flight Plan and Flight Log*

AF Form 315, *USAF AV Fuels Invoice*

AF Form 457, *USAF Hazard Report*

AF Form 651, *Hazardous Air Traffic Report*

AF Form 847, *Recommendation for Change of Publication*

AF Form 1297, *Temporary Issue Receipt*

AF Form 2282, *Statement of Adverse Effect – Use of Government Facilities*

AF Form 4053, *INS Flight Plan and Log*

AF Form 4063, *Pilot Information Card*

AF Form 4064, *C-130 Takeoff and Landing Data Card*

AF Form 4108, *C-130 Fuel Log*

AF Form 4116, *C-130 Navigation Flight Plan and Log*

AF Form 4118, *SCA Planning Form*

AF Form 4119, *C-130 Fuel Planning Worksheet*

AF Form 4125, *Range Control Chart*

AF Form 4139, *Special Operations C-130 In-Flight Refueling Worksheet*

DD Form 175, *Military Flight Plan*

DD Form 175-1, *Military Weather Brief*

DD Form 1385, *Cargo Manifest*

DD Form 1801, *DoD International Flight Plan*

DD Form 1854, *US Customs Accompanied Baggage Declaration* or

CF6059B, *Customs Declaration*

DD Form 2131, *Passenger Manifest, and*

DD Form CF 7507, *General Declaration (Outward/Inward)*

Abbreviations and Acronyms

AAR—Air to Air Refueling

ACC—Air Combat Command

ACM—Additional Crewmember

ADI—Attitude Direction Indicator

ADIZ—Air Defense Identification Zone

AETC—Air Education Training Command

AF—Air Force

AFE—Aircrew Flight Equipment

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFPD—Air Force Policy Directive

AFRC—Air Force Reserve Command

AFSOC—Air Force Special Operations Command

AFTO—Air Force Technical Order

AFTTP—Air Force Tactics Techniques and Procedures

AG—Aerial Gunner

AGL—Above Ground Level

AILA—Automatic Instrument Landing Approach

AIMS—Airlift Implementation and Monitoring System

AMC—Air Mobility Command

AMC—Airborne Mission Commander

ANG—Air National Guard

AOC—AFSOC Operations Center

AOR—Area of Responsibility

APC—Aircraft Performance Calculator

APU—Auxiliary Power Unit

ARCP—Air Refueling Control Point

ASHS—Ammunition Storage and Handling System

ASRR—Airfield Suitability and Restrictions Report

ATC—Air Traffic Control

ATO—Air Tasking Order

ATOC—Air Terminal Operations Center

AWL—Above Wing Level

BAI—Back-up Aircraft Inventory

BDA—Battle Damage Assessment

BMC—Battle Management Center

C—Centigrade/Celsius (degrees)

C2—Command and Control

C3—Command, Control, and Communications

CAS—Close Air Support

CC—Commander

CCT—Combat Control Team

CD–ROM—Compact Disc Read Only Memory

CEOI—Command Electronic Operating Instruction

CF—Customs Form

CFP—Computer Flight Plan

CHOP—Change in Operational Control

CHUM—Chart Updating Manual

CLDR—Common Laser Designator Rangefinder

COMAFSOF—Commander Air Force Special Operations Forces

COMSEC—Communications Security

CONUS—Continental United States

CP—Command Post

CP—Co-pilot

CR—Covert Recovery

CSAR—Combat Search and Rescue

CSS—Concurrent Servicing Supervisor

CVR—Cockpit Voice Recorder

DA—Decision Altitude

DCS—Decompression Sickness

DER—Departure End of Runway

DFA—Detection Free Altitude

DFDR—Digital Flight Data Recorder

DH—Decision Height

DIR—Direct

DMC—Deputy Mission Commander

DNIF—Duty Not Involving/Including Flight

DoD—Department of Defense

DOT—Department of Transportation

DR—Dead Reckoning

DSN—Defense Switching Network

DSO—Direct Support Operator

DV—Distinguished Visitor

EA—Electronic Attack

EAR—End Air Refueling

ECM—Electronic Counter Measures

ELRF—Eye-safe Laser Range Finder

EOD—Explosive Ordnance Disposal

EP—Emergency Procedure

EP—Evaluator Pilot

ER—Exceptional Release

ERF—Eye-Safe Range Finder

ER—Exceptional Release

ERO—Engines Running Onload/Offload

ETA—Estimated Time of Arrival

ETCAS—Enhanced Traffic Alert and Collision Avoidance System

ETD—Estimated Time of Departure

ETE—Estimated Time Enroute

ETP—Equal Time Point

EWO—Electronic Warfare Officer

F—Fahrenheit (degrees)

FAA—Federal Aviation Administration

FC—First Copilot

FCF—Functional Check Flight

FCG—Foreign Clearance Guide

FCIF—Flight Crew Information File

FCO—Fire Control Officer

FDP—Flight Duty Period

FE—Flight Engineer

FIH—Flight Information Handbook

FIR—Flight Information Region

FL—Flight Level

FLIP—Flight Information Publication

FOD—Foreign Object Damage

FP—First Pilot

FS—Flight Station

FSAF—First Suitable Airfield

FXD—Fixed

GCAS—Ground Collision Avoidance System

GCI—Ground Controlled Intercept

GDA—Gun Depression Angle

GDSS—Global Decision Support System

GLA—Gun Lag Angle

GMT—Greenwich Mean Time

GPS—Global Positioning System

GS—Ground Speed

HAT—Height Above Touchdown

HATR—Hazardous Air Traffic Report

HE—High Explosive

HERK—Hostile Environment Repair Kit

HF—High Frequency

HQ—Headquarters

HUD—Heads-up Display

IAF—Initial Approach Fix

IAW—In Accordance With

ICAO—International Civil Aviation Organization

IDS—Infrared Detection Set

IFF—Identification Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

INS—Inertial Navigation System

IP—Initial Point

IP—Instructor Pilot

IR—Infrared Sensor or Operator

IRCM—Infrared Counter Measures

JSOAC—Joint Special Operations Air Component

LM—Loadmaster

LOC—Line of Communication

LPU—Life Preserver Unit

LRC—Logistics Readiness Center

LSAF—Last Suitable Airfield

LSDZ—Laser Surface Danger Zone

LTD—Laser Target Designator

LTD/RF—Laser Target Designator and Range-Finder

LUT—Local User Terminal

LZ—Landing Zone

MAJCOM—Major Command

MAN—Manual

MAP—Missed Approach Point

MEP—Mission Essential Personnel

MC—Mission Computer

MC—Mission Contributing

MC—Mission Copilot

MDA—Minimum Descent Altitude

MDS—Mission Design Series

ME—Mission Essential

MFOV—Medium Field of View

MHz—Megahertz

MM—Millimeter

MNPS—Minimum Navigation Performance Specifications

MOA—Memorandum of Agreements

MP—Mission Pilot

MSA—Minimum Safe Altitude

MSL—Mean Sea Level

MTI—Moving Target Indicator

NAV—Navigator

NAVAID—Navigational Aid

NC—Non-Current

NDB—Non Directional Beacon

NEW—Net Explosive Weight

NFOV—Narrow Field of View

NM—Nautical Mile

NOHD—Nominal Ocular Hazard Distance

NOPAC—North Pacific

NORTHCOM—United States Northern Command

NVG—Night Vision Goggle

OB—Order of Battle

OCONUS—Outside Continental United States

OFP—Operational Flight Program

OFS—Offset

OG/OGV—Operations Group Standardization/Evaluation

OPCON—Operational Control

OPREP—Operations Report

ORE—Operational Readiness Exercise

ORI—Operational Readiness Inspection

ORIDE—Override

ORM—Operational Risk Management

OSC—On-Scene Commander

P—Pilot

PA—Primary Aimline

PA—Privacy Act

PEX—Patriot Excalibur

PF—Pilot Flying

PFPS—Portable Flight Planning System

PIC—Pilot in Command

PIPP—Projectile Impact Point Prediction

PM—Pilot Monitoring

POK—Passenger Oxygen Kit

PRF—Pulse Repetition Frequency

RA—Resolution Advisory

RCC—Rescue Coordination Center

RCO—Range Control Officer

RCR—Runway Condition Reading

ROE—Rules of Engagement

RSC—Runway Surface Covering

RVR—Runway Visual Range

SAD—Sensor Angle Display

SAR—Search and Rescue

SARSAT—Search and Rescue Satellite

SATCOM—Satellite Communication

SCA—Self-Contained Approach

SCNS—Self-Contained Navigation System

SEAD—Suppression of Enemy Air Defenses

SEMI—Semi-automatic

SID—Standard Instrument Departure

SIF—Selective Identification Feature

SLA—Sightline Angle

SOC—Special Operations Command

SOF—Special Operations Forces

SPINS—Special Instructions

SPR—Singe Point Refueling

STS—Special Tactics Squadron

T.O.—Technical Order

TA—Traffic Advisory

TACAN—Tactical Air Navigation

TAS—True Airspeed

TCAS—Traffic Collision Avoidance System

TDZE—Touchdown Zone Elevation

TDY—Temporary Duty

TIC—Troops in Contact

TIT—Turbine Inlet Temperature

TOAT—Total Outside Air Temperature

TOLD—Takeoff and Landing Data

TP—Target Practice

TRANSEC—Transmission Security

TRN—Trainable

TRP—Target Reference Points

TSM—Tactical Situation Map

TSOC—Theater Special Operations Command

TV—Television Sensor Operator

UARRSI—Universal Aerial Refueling Receptacle Slipway Installation

UHF—Ultra-High Frequency

UNQ—Unqualified

USAF—United States Air Force

USAFWS—USAF Weapons School

USSOCOM—United States Special Operations Command

VFR—Visual Flight Rules

VHF—Very High Frequency

VOR—VHF Omnidirectional Radio

VMC—Visual Meteorological Conditions

Vr—Refusal speed

WIC—Weapons Instructor Course

WP—White Phosphorous

WPT—Waypoint

Terms

AFKAI— Contains the worldwide USAF voice call sign list and the specific assignment of each to USAF, JCS, Army, Navy, unified and specified commands, and certain Executive, State Department, and DoD activities.

Air to Air Refueling (AAR)— Airborne fuel onload by receiver aircraft.

Air Refueling Control Point (ARCP)— The planned geographic point over which the receiver arrives in the precontact position with respect to the assigned tanker. For Helo AR, the planned geographic point or coordinates over which the tanker arrives abeam the receiver and assumes formation lead.

Air Refueling Control Time— The planned time that the receiver and tanker will arrive over the ARCP.

Air Reserve Components (ARC)— Units of the Air Force Reserve (AFRC) or Air National Guard (ANG).

Airborne Mission Commander (AMC)— The individual given the responsibility to accomplish part of the overall operation. When a formation is used to conduct the operation, this individual is in overall command of all formation aircraft.

Basic Proficiency— Crews or crewmembers qualified and current to fly the unit aircraft only on non-mission sorties.

Basic Mission Capable— Crews or crewmembers qualified and current to perform some portion of the unit mission, but who do not maintain mission ready status.

Boomer— Gunship slang referencing a re-ignition of propellant gasses after a projectile leaves the muzzle.

Border Clearance— Those clearances and inspections required to comply with federal, state, and local agricultural, customs, immigration, and immunization requirements.

Category I Route— Any route that does not meet the requirements of a category II route, including low level and overwater routes.

Category II Route— Any route on which the position of the aircraft can be accurately determined by the overhead crossing of a radio aid (NDB, VOR, TACAN) at least once each hour with positive course guidance between such radio aids.

Chalk Number— A number on an aircraft to identify and designate its position for loading and unloading.

Combat Control Team (CCT)— A team of AF personnel organized, trained, and equipped to establish and operate navigational or terminal guidance aids, communications, and aircraft control facilities in support of mission operations.

Combat Entry Point— A geographical point inbound to the objective area where the hostile environment is penetrated.

Combat Offload— Method by which palletized cargo is offloaded without Materials Handling Equipment (MHE).

Command and Control Center (C3)— An agency used by a commander to plan, direct, or control operations. Each C3 provides supervision, guidance, and control within its assigned area of responsibility. For the purpose of this instruction, C3s include the AFSOC Command Center, AMC Command Center, Command Post (CP), Air Mobility Elements (AME), Airlift Coordination Centers, Combat Control Teams (CCT), AFRC Headquarters Command Post (AFRC HQ CP), NGB Field Support Center, and ARC wing or group operations centers and command posts.

Commander Air Force Special Operations Command (COMAFSOC)— The Commander of Air Force Special Operations Command.

Commander Air Force Special Operations Forces (COMAFSOF)— The commander designated by USCINCSOC for CONUS deployments or by theater SOC/CCs for overseas deployments, who is responsible for management of Air Force Special Operations Forces (AFSOF) within a theater, a geographic area, or a designated operation. The COMAFSOF is responsible to USCINCSOC for management of CONUS-deployed AFSOF or to the respective SOC/CC for management of AFSOF theater-assigned AFSOF and is responsible to

COMAFSOC for monitoring and management of AFSOF operating within the specific area of responsibility.

Computed Air Release Point (CARP)— A computed air position at which the release of personnel, equipment, containers, and bundles is initiated to land on a specific point of impact (PI).

Conference HOTEL— The name of the communication conference available to assist aircrews in coping with in-flight emergencies and conditions that require expertise in addition to that available on board the aircraft.

Contingency Mission— A mission operated in direct support of an operation plan, operation order, disaster, or emergency.

Deadhead Time— Duty time accrued by crewmembers in a passenger or ACM status.

Drop Zone Controller (DZC)— An individual on a drop zone required to monitor all airdrop operations except airdrop of Special Forces.

Element— A subdivision (normally 3 aircraft) flying in formation.

Equal Time Point (ETP)— The point along a route at which an aircraft may either proceed to the first suitable airport or return to the last suitable airport in the same amount of time based on all engines operating (see Chapter 11).

Firing Zone— The area on the ground in which the bullets will impact. Its size is determined by the boresighted gun pattern and bullet dispersion.

Forward Operating Base (FOB)— An airfield without full support facilities used during mission operations for an undetermined and sometimes extended period of time.

Hazardous Cargo or Materials— Explosive, toxic, caustic, nuclear, combustible, flammable, biologically infectious, or poisonous materials that may directly endanger human life or property, particularly if misused, mishandled or involved in accidents (AFJI 11-204, AFMAN 24-204, TO 11N-20-11).

Hot Gun— A situation when a live round or rounds cannot be cleared from a weapon in flight, the gun cannot be mechanically and electrically rendered safe, and a probability of inadvertent firing exists.

Hung Ordnance— Any ordnance or stores that fail to release, jettison, or fire and cannot be removed from the weapon prior to landing (ALE-40/47 chaff or flare squibs that fail to fire are not considered hung ordnance).

Inert Ordnance— Ordnance with the explosive or incendiary material removed or ordnance designed for training.

Initial Point— A point near drop zones or landing zones over which final course alterations are made to arrive at the specified zone.

Integrated Tasking Order— The Republic of South Korea's version of the US Air Tasking Order.

Interfly— Intermixing of crewmembers from different units in the same aircrew or unit aircrews flying aircraft assigned to another unit.

Jammed Gun— A gun containing ammunition that cannot be cleared from the gun in flight, but can be rendered mechanically safe, no probability of inadvertent firing exists.

Joint Special Operations Task Force (JSOTF)— A joint task force composed of special operations units from more than one Service, formed to carry out a specific special operation or prosecute special operations in support of a theater campaign or other operations. The joint special operations task force may have conventional non-special operations units assigned or attached to support the conduct of specific missions.

Live Ordnance— Combat type ordnance incorporating explosive or incendiary material to include flares.

Load Message— An operational immediate message electronically transmitted from departure station listing pertinent traffic and operational data.

Low Level— Operations, other than landings, approaches, and transitions, conducted below 1,000 feet above ground level.

Maintenance Codes:—

Fully Mission Capable (FMC).

Partially Mission Capable (PMC).

+ M (Maintenance).

+ S (Supply).

+ B (Both).

Not Mission Capable (NMC).

+ M (Maintenance).

+ S (Supply).

+ B (Both).

Military Authority Assumes Responsibility for Separation of Aircraft—A condition whereby the military services involved assume responsibility for separation between participating aircraft in the air traffic control (ATC) system.

Minimum Safe Altitude (MSA)— MSA is an intermediate altitude which will provide terrain clearance in VMC or IMC.

Mission Ready— Crews or crewmembers fully qualified and current to perform the unit mission.

Night Vision Goggles (NVG)— Self-contained, battery-operated devices that amplify light to enhance night vision.

Offset Aiming Point (OAP)— A reference, other than the actual target, used for aircraft positioning.

Operating Weight— Basic aircraft weight plus weight of crewmembers, crew baggage, steward's equipment, emergency and extra equipment.

Operational Control (OPCON)— Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission.

Payload— The combined weight of passengers, baggage, and cargo carried on a mission.

Point of Impact (PI)— The point on the drop zone where the first airdropped parachutist or cargo item lands or is expected to land.

Popeye— In air intercept, a code meaning, "In clouds or area of reduced visibility." In gunship air-to-surface, a code meaning a visual sensor is no longer able to track the target due to clouds or area of reduced visibility.

Quick Turn— A set of procedures designed to expedite the movement of selected missions by reducing ground times at en route or turnaround stations.

Self-Contained Approach (SCA)— An approach conducted using self-contained, onboard navigation systems.

Serial— Any number of aircraft under a commander, usually conveying a unit to a landing, extraction, or drop zone.

Special Tactics Squadron (STS)— Air Force special operations combat control and pararescue forces.

Standby Force, Aircraft, or Crews— Designated aircraft and crews capable of being launched in less than the normal alert-to-takeoff time period.

Station Time (Air Force)— A specified time at which aircrew, passengers, and material are to be in the aircraft and prepared for flight. Passengers will be seated and loads tied down. Aircrews will have completed briefing and aircraft preflight inspection prior to station time. Normally, station time will be 30 minutes prior to takeoff time.

Station Time (Airborne)— A specified time when parachutists will be seated in the aircraft with seat belts fastened. This time normally will be 5 minutes prior to Air Force station time.

Supported Forces— Space-required passengers consisting of US and foreign military members who are on board an AFSOC aircraft as an integral part of the mission being performed.

Supporting Forces— Space-required passengers consisting of US and foreign military members, DoD civilians, and US civilian employees under contract to the DoD, who directly support the mission or deployment of an AFSOC unit.

Tactical Control (TACON)— Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of combatant command.

Time of Fall— The time in seconds for a projectile to travel from the gun muzzle to the target.

Time Over Target (TOT)— The actual time an aircraft is at a geographic point or area carrying out an assigned mission.

Tweak— A computation performed either manually or by fire control computer to correct for errors in weapon or sensor alignment and to solve for the ballistic wind. The purpose of performing a tweak is to cause ordnance to impact on target.

Zero Fuel Weight (Actual)— The actual zero fuel weight of an aircraft plus the weight of the cabin load (cargo, passengers, troops, and munitions).

Zero Fuel Weight (Maximum)— That weight expressed in pounds where an addition to the aircraft gross weight can be made only by adding fuel in wing tanks. This value is referred to as "Limiting Wing Fuel."

Attachment 2

CRITICAL INFORMATION

A2.1. Combat Readiness, Tactical Training, Or Combat Efficiency Status.

A2.1.1. Any additions or changes in equipment that alters unit or force operating capabilities.

A2.1.2. Maintenance status of aircraft tactical systems.

A2.1.3. Weapons delivery accuracy.

A2.1.4. Combat configured munitions load and mix.

A2.1.5. Any shortages, whether logistical or personnel, that affect combat readiness or operational capabilities.

A2.1.6. Command and control procedures.

A2.1.7. The security classification or nickname of any classified operation, project, or program.

A2.1.8. The existence of plans held by wing, group, or squadron.

A2.1.9. Threat tactics and countermeasures.

A2.1.10. Exercise scenarios, development, schedules, dates, and objectives.

A2.1.11. Association of call signs with unit designators or aircraft types.

A2.1.12. Unclassified but sensitive information contained in daily message traffic.

A2.1.13. Information on the itineraries of key officials, VIPs, or the purpose of their visit.

A2.1.14. Identification of intelligence sources.

A2.1.15. Any critical lack of intelligence data or collection capability.

Attachment 3

MISSION PLANNING GUIDE

A3.1. General Information.

A3.1.1. Minimum risk routing.

A3.1.2. Tanker information.

A3.1.3. SAFE areas and SAR procedures.

A3.1.4. Alternate airfields.

A3.1.5. Working area charts, photographs, etc.

A3.1.6. Base altitudes.

A3.1.7. Command and control procedures.

A3.1.8. Communication plan.

A3.1.8.1. Call signs and frequencies, including alternatives.

A3.1.8.2. Secure communications; HAVE QUICK procedures.

A3.1.8.3. Specific radio set-up on board the aircraft.

A3.1.8.4. Authentication procedures.

A3.1.8.5. Brevity words.

A3.1.8.6. Comm out procedures.

A3.1.9. ROEs, both offensive and defensive.

A3.1.10. Threat assessment.

A3.2. Ground Forces Information.

A3.2.1. Charts and photographs.

A3.2.2. Ground maneuver plan, including alternatives.

A3.2.2.1. Infil and exfil locations.

A3.2.2.2. Planned routes.

A3.2.2.3. Blocking positions.

A3.2.3. Communication plan (see A3.1.8.).

A3.2.4. Priority of fires information.

A3.2.5. Ground commander's intent for close fire support (e.g., minimum engagement ranges).

A3.2.6. Identify probable targets and assign code words to the same.

A3.2.7. Friendly marking methods.

A3.2.8. Maximum ordnance altitude (Max Ord) of mortars or artillery support.

A3.3. Dissimilar Aircraft Information.

A3.3.1. Communication plan (see A3.1.8.).

A3.3.2. Rendezvous point, time, and altitude.

A3.3.3. Formation procedures.

A3.3.4. Threat ROEs and deconfliction procedures.

A3.3.5. Preplanned Suppression of Enemy Air Defenses (SEAD) procedures.

A3.3.6. Employment area deconfliction procedures.

A3.3.7. Target marking/designating procedures, including backups.

A3.3.8. Fire support procedures for dissimilar aircraft.

A3.3.9. Planned deviations from J-FIRE terminology, when required.

A3.3.10. Emergency procedures.

A3.4. Sensitive Mission Operations. Certain missions require special flight planning procedures or deceptive measures. Mission operating directives, COMAFSOF operations orders, or other tasking orders direct the use of these procedures. Modifications to normal procedures are fully briefed to planners and aircrews prior to execution of the operation. AFSOC/CC or designated COMAFSOF will approve all missions of this type requiring coordination with non-AFSOC agencies prior to execution. The agency tasking the mission will provide the aircrew with comprehensive planning information.

Attachment 4

AC-130 BRIEFING GUIDELINES

A4.1. Mission Planning Briefings. The mission planning portion of the crew, as a minimum, needs this briefing to plan the mission. Specialists normally brief items A4.1.1 through A4.1.3. The squadron planning staff will normally brief the operational information. This guide assumes that crewmembers are fully aware of the theater Standard Operating Procedures (SOPs), Air Tasking Message, ATO, Special Instructions (SPINS), Rules of Engagement (ROEs), and order of battle. For training missions, the pilot usually briefs non-standard operations items.

A4.1.1. Weather, including illumination, End Evening Nautical Twilight (EENT), and Beginning Morning Nautical Twilight (BMNT).

A4.1.2. Communications/Communications Electronics Operating Instructions (CEOI).

A4.1.3. Intelligence updates.

A4.1.4. Basic operations.

A4.1.4.1. Aircraft fuel, munitions, parking, call signs, etc.

A4.1.4.2. Supporting air operations, e.g., tanker information, Combat Air Patrol (CAP), etc.

A4.1.4.3. Ground operations, e.g., maneuver plan, commander's intent, etc.

A4.1.4.4. Mission tasking.

A4.2. Mission Briefing. The aircraft commander will ensure the entire crew is briefed on the following.

A4.2.1. Basic operations.

A4.2.2. Mission chronology. The aircraft commander should ensure information on each target area is briefed in chronological order.

A4.2.2.1. The navigator normally briefs en route portions.

A4.2.2.2. The EWO should brief threats for each area.

A4.2.2.2.1. The DSO should brief additional threat information as required.

A4.2.2.3. The FCO should brief his plan for identifying specific targets and navigation in the target area.

A4.2.2.4. The pilot should brief specific employment tactics including altitude, time on station, munitions, etc.

A4.2.2.5. The pilot should brief crew coordination issues to include TSM/DGU utilization, defensive systems status, and covert illumination usage. The sensor operator (when applicable) should brief the crew on safety parameters of the LTD/ERF or LTD/RF, or ELRF, ATI, and IR Pointer as required. This is not all-inclusive and may be expanded as needed.

A4.2.2.6. The aircraft commander will brief emergency procedures to include individual crewmember responsibilities during takeoff, in-flight, landing, and if required, during air

refueling. Other items as applicable, such as crash landing, ditching, and bailout will be briefed.

A4.2.2.7. The sensor operator (as applicable) will brief use of lasers for the flight.

Attachment 5

J-FIRE NINE LINE CAS BRIEF

Table A5.1. J-Fire Nine Line CAS Brief.

FLIGHT CREW INFORMATION GUIDE

CREW POSITION: As Required

J-FIRE CAS BRIEF (9-LINE)

(Omit data not required; do not transmit line numbers. Units of measure are standard unless otherwise specified. * Denotes minimum essential in limited communications environment. **Bold** denotes read-back items when requested.)

Terminal Controller: "_____ (Aircraft Call Sign), This is _____ (Terminal Controller)"

***1. IP/BP:** "_____"

*2. Heading: "_____ (IP/BP to Target)" (Magnetic)

-Offset: "_____ (Left / Right)"

*3. Distance: "_____ (IP to target in nautical miles / BP to target in meters)"

*4. Target Elevation: "_____" (In feet, MSL)

*5. Target Description: "_____"

***6. Target Location: "_____ (Latitude/longitude or grid coordinates or offsets or visual)"**

7. Type Mark: "_____ (WP, laser, IR, beacon)" Code: "____ (Actual Code)"

- Laser to Target Line: "_____ Degrees"

***8. Location of Friendlies: "_____"**

- Position marked by: "_____"

9. Egress: "_____"

Remarks
(As Appropriate): "_____
(Threats, restrictions, danger close, attack clearance, SEAD, abort codes, hazards)"

NOTE: For AC-130 employment, lines 5, 6, and 8 are mandatory briefing items. Remarks should also include detailed threat description, marking method(s) of friendly locations (including magnetic bearing and distance in meters from the friendly position to the target, if available), identifiable ground features, and danger close acceptance.

"Time on Target (TOT): _____" or

"Time to Target (TTT): Stand by _____ Plus _____, Hack."

Source:	**Date:**
AFI 11-2AC-130V3, JP 3-09.3:	8 Jul 09

Attachment 6

AC-130 CALL FOR FIRE

Table A6.1. AC-130 Call For Fire.

FLIGHT CREW INFORMATION GUIDE	
CREW POSITION: As Required	
AC-130 Call for Fire	
1. Observer/Warning Order:	"_____ , this is _____, fire mission, Over" (AC-130) (Observer)
2. Friendly Location/Mark:	"My position _____ marked by _____" (TRP, Grid, etc.) (Beacon, IR strobe, etc.)
3. Target Location/Mark:	"_____" (Magnetic Bearing and Range in meters; TRP; Grid; etc.)
4. Target Description/Mark:	"_____, marked by _____, over" (Target description) (IR pointer, tracer, etc.)
5. Remarks (as required):	"_____" (Threats, Danger-close restrictions, "At my command," etc.)
NOTES AS REQUIRED:	
1. Clearance: Transmission of the fire mission is clearance to fire. Ground commanders/FSOs pass their initials or state "**Cleared Danger Close**" to accept the risk inherent in ordnance delivery inside danger close distance. This clearance may be preplanned.	
2. At My Command: Add "**AT MY COMMAND**" on line 5. The gunship will call "**READY TO FIRE**" when ready.	
3. Adjust Fire: Only adjust first marking rounds or incorrect target. Adjust from impact by giving range (meters) and cardinal (North, South, East, West) direction.	
DO NOT:	
1. Do not ask the gunship to identify colors.	
2. Do not reference clock positions.	
3. Do not pass run-in headings/no-fire headings.	
4. Do not correct left/right or long/short.	
Source:	**Date:**
AFI 11-2AC-130V3, JP 3-09.3:	8 Jul 09

Attachment 7

J-LASER AND J-CAS COORDINATION

A7.1. When conducting CAS with lasers and pointers, always strive for simple communications. Good preplanning, accurate target location, and reliable communications are essential. The following guidance is from JP 3-09.1. An aircrew guide is provided in Figure A7.1.

A7.2. Normal laser designation time is 20 seconds maximum. The aircrew may request a longer laser on time by saying "LASER ON" and time (e.g., "LASER ON, 30 SECONDS"). The FAC should acknowledge the "LASER ON" call. The FAC may elect to turn the laser on 10 seconds after the "10 SECONDS" call without hearing the "LASER ON" call if problems are expected. ***NOTE:*** The "10 SECONDS" call means the aircrew wants the laser on in approximately 10 seconds. The FAC relays the call to the laser designation officer.

A7.3. The aircrew calls "SPOT" when acquiring the laser spot, confirming to the FAC and the wingman the aircrew sees the designated target.

A7.4. Offset designation procedures may be used in a laser countermeasures environment. Following the "LASER ON" call, a "SHIFT" call will be used to shift laser energy from the offset position next to the target onto the target itself. The "SHIFT" call, when used, can replace the "SPOT" call.

A7.5. The last call in the sequence is "TERMINATE. " The pilot makes this call to turn the laser off.

A7.6. Turning the Laser Off. Minimizing the time a laser is on is important in a laser countermeasures environment and when employing battery operated laser designators. The laser designator operator will turn the designator off:

A7.6.1. When the "TERMINATE" call is heard.

A7.6.2. When the weapon hits the target.

A7.6.3. After 20 seconds (or longer, if required).

A7.7. Night IR Brevity CAS terminology will be followed anytime CAS is conducted with IR pointers. See Figure A7.1.

Table A7.1. J-LASER and J-CAS Brevity Terms.

FLIGHT CREW BRIEFING GUIDE	
CREW POSITION: As Required	
STANDARD LASER BREVITY TERMS	
CALL	**MEANING**
TEN SECONDS	Prepare to start LASER designation in 10 seconds
LASER ON	Designate the target with LASER energy now
SPOT	Aircraft has acquired LASER energy
SHIFT	Call to shift LASER energy from the offset position next to the target onto the target
TERMINATE	Cease LASER designation
NIGHT IR CAS BREVITY TERMS	
CALL	**MEANING**
ROPE	Call made by exception if the terminal controller is to illuminate the aircraft with an IR pointer.
VISUAL	The terminal controller has the attack air-craft in sight, or the attack aircraft has positively identified the terminal controller's or friendly position.
CONTACT	Acknowledges sighting of a specified reference point.
SNAKE	Call made by exception for the terminal controller to jingle the IR beam on the target. This aids in confirming the friendly position and helps the aircrew maintain sight of the target during conditions when the IR beam/mark is difficult to see.
SPARKLE	Terminal controller marks the target with an IR pointer. Also used by AC-130 aircrews to mark with 40mm MISCH.
TALLY	The enemy position/target is in sight.
STEADY	Terminal controller steadies the beam.
STOP	Terminal controller stops the beam.
SOURCE: JP 3-09.1, JP 3-09.3 and AFI 11-2AC130V3	DATE: 1 Feb 03

Attachment 8

AC-130 STANDARD TERMINOLOGY

A8.1. General. The following is a list of standard terminology used by sensor operators. It is important to understand and use these terms in order to standardize aircraft communication

A8.2. Common.

A8.2.1. TV/IR/RADAR's TRACKING. Used to notify crew that the sensor operator is tracking.

A8.2.2. TV/IR's POPEYE. Used to notify the crew that the sensor operator can no longer see the target. This may be due to weather, another aircraft position, smoke or anything that comes between you and the target.

A8.2.3. TV/IR/RADAR's PULLED OFF. Used to notify the pilot that the sensor operator is not tracking due to aircraft position and/or system limitations.

A8.2.4. TV/IR/RADAR's COMPLETE. Used to notify the crew that the sensor operator has completed applicable slaving check operations.

A8.3. Live Fire.

A8.3.1. TV/IR/RADAR's SATISFIED THE RANGE IS CLEAR. Used to notify the FCO that a thorough search of the range has been accomplished.

A8.3.2. NO JOY TV/IR. Used to notify the crew when the primary sensor operator didn't see the round(s) impact the target area. If the other sensor operator observed the impacts they will make a shot call, if not they will also call "NO JOY."

A8.3.3. ACQUISITION/TRACK FAIL. Used to notify the crew when the radar did not PIPP the round.

A8.3.4. NO GUN TV/IR/RADAR. Used to notify the FCO that the sensor operator has tried to fire the gun and after a reasonable amount of time the gun did not fire.

A8.3.5. ____ FORWARD, ____ HIGH. All shot calls will be given in this format. AFT and LOW will be substituted when appropriate. The miss distance in mils will precede the FORWARD, AFT, HIGH, or LOW calls. Informational calls can be added to long burst to inform the pilot which way the rounds moved after the initial impact (i.e., 4 forward, 3 low, moving aft and down across the target).

A8.3.6. WITHIN _____. Used to notify the crew what the miss distance in mils was when performing a shot correction.

A8.3.7. DIRECT. Used to inform the crew of a direct hit on the target.

A8.3.8. TV/IR/RADAR's MOVING TO A NEW TARGET. Used when moving from target to target.

A8.3.9. TARGET IS OBSCURED, MOVING TO A NEW TARGET. Self explanatory.

A8.3.10. (AC-130H) LASER COMING ON. Used to inform the crew that the laser designator is going to be fired.

A8.3.11. LASER ON. Used to notify the crew that the laser designator is on.

A8.3.12. LASER OFF. Used to notify the crew that the laser designator is off.

A8.3.13. SPARKLE ON. Used to notify the crew that the IR pointer is ON.

A8.3.14. SPARKLE OFF. Used to notify the crew that the IR pointer is OFF.

A8.3.15. PILOT, TARGET IS MOVING PARALLEL FORWARD/AFT or PILOT TARGET IS MOVING PERPENDICULAR TOWARDS/AWAY. Used only when firing a fixed gun. Make the initial call to inform the crew on the direction of travel of the mover. This allows the pilot to adjust the guidance accordingly. Once moving target procedures are initiated, subsequent informational calls of PARALLEL FORWARD/AFT and PERPENDICULAR TOWARD/AFT will be made to inform the pilot of directional changes. Additional information calls may be given if there are significant changes in the LOC.

A8.3.16. Sensor Guidance/Direction. Sensor operator's can transition from sensor guidance to sensor direction at anytime using these terms, or from direction to guidance.

A8.4. Guidance:

A8.4.1. PILOT, TAKE TV/IR GUIDANCE. Used to inform the pilot to transition to sensor guidance.

A8.4.2. PILOT, TV/IR IS HOLDING A POINT, TAKE UP AN ORBIT ON IR/TV/RADAR GUIDANCE. Used to inform the pilot you are about to start searching a LOC and the guidance is going to change. Also used to inform the pilot that the sensor has stopped moving and needs the aircraft to roll-in on a point for an orbit.

A8.4.3. PILOT, TV/IR IS MOVING OUT TO THE ____ (give a cardinal direction). Used to inform the pilot the sensor operator is starting a search.

A8.5. Direction:

A8.5.1. PILOT, TAKE TV/IR/NAV DIRECTION. Used to inform the pilot to transition to sensor/navigator direction.

A8.5.2. PILOT, PREPARE TO ROLL-OUT and PILOT, ROLL-OUT NOW. Used to inform the pilot that you are about to roll the aircraft out under TV/IR/NAV direction , or roll the aircraft out immediately under TV/IR/NAV/RADAR direction.

A8.5.3. PILOT, ROLL-OUT ON ____, UNDER TV/IR/NAV DIRECTION. Used to give the pilot the initial roll-out heading, and also a reminder to fly the aircraft under sensor/NAV direction. The pilot will maintain heading until the sensor operator gives a new command or returns to sensor guidance.

A8.5.4. PILOT, TV/IR IS HOLDING A POINT, ROLL-IN ON TV/IR DIRECTION. Used to inform the pilot the sensor has stopped moving and needs the aircraft to either roll-in on a point for an orbit, or momentarily until the aircraft is in position to continue on direction.

A8.5.5. PILOT, ROLL-IN/OUT. Used to command the pilot to roll-in or roll-out immediately. This command is used to position the aircraft in the firing orbit or around a stationary point.

A8.5.6. PILOT, FLY HEADING _____. Used to inform the pilot of a new heading.

A8.5.7. ROLL-IN HARD. Use this command when you want the pilot to turn the aircraft hard into an orbit.

A8.5.8. PILOT, GIVE ME A ___ DEGREE-TURN TO THE LEFT/RIGHT. Used to command the pilot to perform a turn the number of degrees requested to fly the aircraft closer to or farther away from an LOC. Most pilots know to turn as shallow as possible, but to remind them, you may ask for a FLAT TURN. Usually given in 5 or 10 degree increments.

A8.5.9. PILOT, ROLL-IN TO A LOOSE ORBIT. Used to roll the aircraft into an orbit to enable the sensor to search an area or to regain his situational awareness.

A8.5.10. MAINTAIN YOUR ORBIT AND DISREGARD YOUR GUIDANCE. This frees up the primary sensor to search around the area without having to tell the pilot about changes in guidance.

Attachment 9

ELECTRONIC WARFARE OFFICER MISSION PLANNING CONSIDERATIONS

A9.1. Mission Planning Formulas. Paragraph A9.5. provides formulas and methods for determining radar detection.

A9.2. Order of Battle. The EWO will coordinate with intelligence personnel to obtain a current and complete OB for the Area of Operations (AO).

A9.3. Detection. Based on analysis of the OB, the EWO will ensure the planned route of flight minimizes aircraft exposure to the threat and the probability of detection. Consider the following detection factors:

A9.3.1. Active/Passive and acoustical detection.

A9.3.2. Observation posts, border guards, and enemy positions.

A9.3.3. Road, railroad and river lines of communications.

A9.3.4. Military training routes and areas.

A9.3.5. Civil aviation airways and airports.

A9.3.6. Patrol boats, fishing fleets, and shipping lanes.

A9.3.7. Atmospheric ducting.

A9.3.8. Populated areas.

A9.3.9. Satellite surveillance and coverage.

A9.4. Survivability. The EWO will determine aircraft survivability against the threat using the following factors:

A9.4.1. Air defense C2 systems.

A9.4.2. Associated early warning, acquisition, and engagement capabilities.

A9.4.3. Maintenance, training schedules, and operator proficiency.

A9.4.4. Mobility of the threat system.

A9.4.5. Radar range and low altitude capability.

A9.4.6. Engagement envelope of the weapon.

A9.4.7. Accuracy of the guidance and optics.

A9.4.8. Night and adverse weather capabilities.

A9.4.9. Number of missiles and rate of fire.

A9.4.10. Weapon's type of fusing and warhead.

A9.4.11. AC-130 defensive capabilities, SEAD, and Combat Air Patrol (CAP).

A9.5. Radar Detection Formulas. Refer to AFTTP 3-3.AC-130 for specific formulas relating to threat planning.

A9.5.1. DELETED

A9.5.2. DELETED

A9.5.3. DELETED

Table A9.1. DELETED.

A9.5.4. DELETED

A9.5.5. DELETED

A9.5.6. DELETED

Table A9.2. DELETED.

A9.5.7. DELETED

A9.5.7.1. DELETED

A9.5.7.1.1. To determine the notch speeds: 4000 Hz/25.4 = 157.48 then 157.48/2 = 78.7 or 6000 Hz/25.4 = 236.22 then 236.22/2 = 118.1.

A9.5.7.2. DELETED

A9.5.7.2.1. DELETED

A9.5.7.2.2. DELETED

A9.5.7.2.2.1. DELETED

A9.5.7.3. DELETED

Figure A9.1. DELETED.

A9.5.7.3.1. DELETED

A9.5.7.3.1.1. DELETED

A9.5.7.3.2. DELETED

A9.5.7.3.2.1. DELETED

A9.5.7.3.3. DELETED

A9.5.7.3.4. DELETED

Attachment 10

RESCUE PICKUP BRIEF EXPANDED CHECKLIST (15-LINE CHECKLIST) AND ON-SCENE COMMANDER DUTIES AND CONSIDERATIONS (OSC CHECKLIST)

A10.1. General. The information in the 15 – Line briefing need not be provided in order or all at once. Items A10.2.1. - A10.3.1. (Sections A – B, 7 on **Figure A10.1**) are required prior to the execution phase. All other information should be provided as applicable or as capable. Reference A10.7 and **Figure A10.2** for On-Scene Commander Duties.

A10.2. Survivor Information: High priority information provided by OSC/ AMC considered necessary for mission execution.

A10.2.1. Call Sign(s): Fragged call sign of each survivor or Isolated Personnel to include crew position designator. Example: Pilot on F-15E is Zorba 01A and WSO is Zorba 01B.

A10.2.2. Number of Survivors: Ideally, this number will correspond to the number of call signs. However, if call signs are unknown or are incomplete, knowing the number of survivors will help rescue forces better plan the pickup.

A10.2.3. Location(s): The location of each survivor in Lat/Long, UTM/MGRS grid, or range and bearing from a known point (SARDOT, waypoint, etc.). Provide the coordinates/range and bearing in the original, format as received from the source (HOOK 112 GPS coordinates, wingman's overflight, etc.). Also, provide the source of the location by circling the appropriate descriptor (GPS, Map, Flyover, Other). For example, if an aircraft flew over the survivor and recorded the position, circle flyover. If given GPS coordinates from the survivor, circle GPS. The source of information can be critical when loading into navigation systems due to the different datums and navigation system defaults. Having the information in its original format will limit errors induced by various conversions that are handed down from one controlling agency to another.

A10.2.4. Condition/Injuries: Most important is can they walk or not? Answer YES or NO. This will assist the recovery vehicle in determining the amount of time the ground team will need. If time permits, provide additional information concerning the type and extent of injuries.

A10.2.5. Equipment: PRC-90, PRC-112, or other type of radio? PRC-112 code number? Signaling devices available to survivor?

A10.2.6. Authentication Complete? YES or NO and how the authentication was accomplished (ISOPREP data, letter of the day, etc.). Inform rescue forces of authentication information previously used and compromised, to include ISOPREP data, SAR word, letter, or number of the day.

A10.3. Recovery Area Information: Only item A10.3.1. of this section is considered necessary for mission execution.

A10.3.1. Threats: Survivor area threats which will affect the recovery vehicle or RESCORT. Include enemy foot soldiers, tanks/armored vehicles, known or suspected chemical/radiation hazards, anti aircraft artillery, surface to air missiles, etc., Include enroute threats during ingress and egress if known.

A10.3.2. Elevation: Provide the MSL altitude (to nearest 1000 ft) of the survivor location if known. Elevation is critical if above 4000 ft MSL and/or surface air temperature is 25 degrees Celsius or greater. These factors are used for calculating the recovery vehicle's power available and power required for various hover heights.

A10.3.3. Description: Some possible descriptors: flat, rocky, hilly, sloped, 80 foot trees, valley, ridgeline. For example, "Zorba 01B is on the south slope of an east/west running ridgeline halfway up in rocky terrain."

A10.4. RESCORT Plan: If RESCORT is available, this information will be passed to the recovery vehicle prior to mission execution if available/required. This information is not critical but may help increase situational awareness and avoid confusion or unnecessary radio calls during execution, especially if RESCORT and the recovery vehicle(s) are not familiar with each other's operating procedures.

A10.4.1. IP: Provide the initial point, anchor point, or hold point beyond which the recovery vehicle(s) will not go until the pickup brief is complete to the satisfaction of the recovery vehicle flight lead. This could be a preplanned waypoint, a landmark, range/bearing, etc. Ingress/egress routes should avoid exposure to threats to the recovery vehicle. Use spider points/routes if available.

A10.4.1.1. Ingress Route: Provide the ingress route from the rescue vehicle's present position to the IP.

A10.4.1.2. Egress Route: Provide an egress route from the survivor location to a planned exit point, FEBA/FLOT crossing, etc.

A10.4.2. Ordnance: What type of munitions will be used at what points during the ingress, pickup, and/or egress? How close to rescue forces will munitions be employed? Specify how to coordinate fire if RESCORT is blind on the recovery vehicle(s).

A10.4.3. Tactics: RESCORT patterns or any other tactics which may need to be coordinated with the recovery vehicle(s).

A10.5. Recovery Vehicle Plan: This information will be provided by recovery vehicle flight lead to RESCORT if available.

A10.5.1. Tactics: Provide any recovery vehicle formation tactics to include formation spread to be used during the ingress, pickup, and egress. RESCORT should know where recovery vehicle wingman will be at all times to allow weapons employment while minimizing the chance of fratricide. Inform RESCORT of the intent to execute simultaneous survivor recoveries and the hold point for the wingman if applicable. Provide any mission impacting limitations such as no hover capability due to power limitations.

A10.5.2. Comm/Signaling Procedures: Coordinate the following for the survivor area: the passing of specific OSC duties from RESCORT to the recovery vehicle and back, who has control of the survivor frequency, and who is responsible for coordinating survivor signaling and when.

A10.6. Additional Items/Questions: Before execution allow for questions or additional information inputs by RESCORT or the recovery vehicle(s). This is the catch-all to ensure mission-essential information does not get left out.

A10.7. On-Scene Commander's Duties and Considerations: These duties and considerations should be followed during both combat and training rescue situations. Along with these considerations the gunship crew will utilize the OSC checklist provided in this attachment (**Figure A10.2**).

A10.7.1. Pre-mission Considerations:

A10.7.1.1. Physical description of persons/aircraft/vehicles and cause of distress (bailout/midair/fire/sinking/crash).

A10.7.1.2. Trip route/last known position/time of last sighting.

A10.7.1.3. Physical and mental condition/age/known health problems of persons.

A10.7.1.4. Search area specifics.

A10.7.1.5. Weather.

A10.7.1.5.1. Prior to search and at time of loss.

A10.7.1.5.2. Forecast for search area.

A10.7.1.5.3. Weather hazards.

A10.7.1.6. Communications.

A10.7.1.6.1. C2 (air-to-air, air-to-ground, OSC).

A10.7.1.6.2. Survivor's communication capabilities (radio, visual).

A10.7.1.7. Search progress.

A10.7.1.7.1. How long survivor missing?

A10.7.1.7.2. Number/type of other SAR forces.

A10.7.2. On-Scene Considerations:

A10.7.2.1. Distress condition: ejection, mid air, bailout; crash landing; on fire, sinking, etc.

A10.7.2.2. Time and cause of incident.

A10.7.2.3. Position yourself to observe ejection and keep chute in sight.

A10.7.2.4. If aircraft or chute is not in sight do not descend below last known altitude (the C9 parachute sink rate is approximately 1000 ft/minute, automatic opening at 14,000 ft above MSL).

A10.7.2.5. Fix position of ejection/bailout/crash landing by all available navigation aids and visual references.

A10.7.2.6. Note winds at altitude, large disparities may exist between ejection position and survivor(s) position.

A10.7.2.7. Report bailout to ATC, GCI, AWCS, or other controlling agency, maintain communications with controlling agency for further assistance.

A10.7.2.8. Establish an On-scene Commander (OSC). OSC should direct search/coordination efforts of all aircraft until rescue forces arrive. Keep control agencies updated of progress.

A10.7.2.9. If unable to locate survivor(s) begin search procedures.

A10.7.2.10. Do not transmit crew members' names to controlling agencies, use call-sign only.

A10.7.2.11. Establish an orbit that allows positive eyes-on and line-of-sight communications with survivors.

A10.7.2.12. If tactical environment permits, listen for emergency beacon and attempt to establish contact with downed crew on 243.0 or 282.8.

A10.7.2.13. If possible determine location(s) of survivors(s), pass to controlling agency.

A10.7.2.14. Determine the number and condition of survivor(s) (are they mobile or do they require assistance for evacuation). Pass to controlling agency.

A10.7.2.15. Reassure survivor(s) that SAR efforts are under way.

A10.7.2.16. Coordinate with the controlling agencies to clear the airspace around accident.

A10.7.2.17. Establish a common altimeter setting and coordination frequency for all on-scene aircraft.

A10.7.2.18. For multi-ship formations establish a low orbit for direct observation and a high orbit for radio relay and fuel conservation.

A10.7.2.19. For IFR operations do not fly lower than the MEA, MSA, or minimum vectoring altitude unless authorized by Chapter 18 of this instruction.

A10.7.2.20. For VFR operations do not fly lower than authorized by Chapter 18 of this instruction, host nation procedures, or other governing directives.

A10.7.2.21. Conserve fuel and determine an appropriate bingo for return to base or the nearest divert field. Other aircraft should pass their loiter time to OSC.

A10.7.2.22. Coordinate for tanker support if required/available.

A10.7.2.23. Film landing site if able.

A10.7.2.24. Determine altitude terrain and weather conditions in local pick up area.

A10.7.2.25. Determine if survivor(s) are taking care of their survival needs, provide advice as appropriate.

A10.7.2.26. Determine and pass information concerning the environment to controlling agency to include: wind direction and velocity, prevailing weather (rain, snow, fog, etc), wave height and direction, barometer readings, air and sea temperature, natural and manmade hazards (cliffs, power lines, etc).

A10.7.3. Prior to Arrival of Rescue Forces:

A10.7.3.1. Prepare survivor(s) for pickup.

A10.7.3.2. Have survivor(s) prepare appropriate signaling devices (signal mirror and hand held smoke flare - day time, strobe light and hand held night flare - night time).

A10.7.3.3. Aid rescue forces in locating survivor(s).

A10.7.3.4. Handoff OSC duties to rescue forces.

A10.7.4. Prior to OSC Handoff/Departing (Hand OSC Off to Follow-On Aircraft Prior to Bingo Fuel):

A10.7.4.1. Brief downed crew member(s) on new OSC call sign.

A10.7.4.2. Ensure new OSC has positive contact with downed crew member(s).

A10.7.4.3. Brief new OSC on all pertinent events (downed crew condition, pickup status, other players, etc.).

A10.7.4.4. If no other aircraft are available for handoff, prepare downed crew for bed-down.

A10.7.4.5. Battery conservation techniques.

A10.7.4.6. Provide an estimated time for further contact or pickup.

A10.7.4.7. If downed crew is taken by local governmental authorities immediately pass all available information to controlling agencies.

A10.7.5. Hurlburt Field/Common Frequencies:

A10.7.5.1. Destin Coast Guard interagency frequency – 157.15.

A10.7.5.2. International hailing/distress frequency – 156.8(P)/156.45(S).

A10.7.5.3. HF distress frequency – 2182.0.

A10.7.5.4. HF coordination frequencies – 3023/5680 (not normally monitored unless pre-coordinated).

Table A10.1. 15-Line Briefing Guide.

15 – LINE BRIEF
NOTE: Items 1 – 7 are required prior to execution phase
A. SURVIVOR INFORMATION:
1. CALL-SIGN:
2. NUMBER OF SURVIVORS:
3. LOCATION(s) (lat/long, grid, range/bearing from SARDOT)
3. CONDITION / INJURIES: Walking? YES / NO / UNKNOWN
4. EQUIPMENT: (comm./signal)
5. AUTHENTICATION COMPLETE: YES / NO
METHOD:
B. RECOVERY AREA INFORMATION
1. THREATS:

2. ELEVATION:
3. DESCRIPTION:
C. RESCORT PLAN:
1. IP:
2. INGRESS: EGRESS:
3. ORDNANCE:
4. RESCORT TACTICS:
D. RECOVERY VEHICLE PLAN:
1. RESCUE TACTICS:
2. COMM/SIGNALING PROCEDURES:
E. ADDITIONAL ITEMS/ QUESTIONS:
SECRET (WHEN FILLED IN)

Table A10.2. OSC Checklist Guide.

OSC CHECKLIST	
1. ESTABLISH OSC. ASAP On Entering AO with AMC or Previous Aircraft	
2. INITIAL CONTACT.	
3. AUTHENTICATION	**NUMBER:**
	QUESTION:
4. Switch Frequencies: 243.0 to 282.8 A/B	
ROE:	Covert/Comm-Out Plan (2 = yes)/Earplug Maximum Hold Down 5 – 7 seconds Do Not Key w/Aircraft Directly Overhead
5. THREATS IN THE AREA	# / Type:
	Location:
	What shot you down?
6. GROUND FORCES	Number:
	Location:

	What did you see in the chute?
	Have they seen you?
7. CONDITION	Injuries/Mobility/Prev Instructions
	Self Aid/First Aid Kit/Vest/Hole Up
8. SIGNALING DEVICES	Do you have GPS (SARDOT) ?
	Find/Have Ready/Devices in Kit/Vest
	Radio Batteries = Estimate Time
	Mirror = Keep Covered Until Ready to Use
SECRET (WHEN FILLED IN)	

Table A10.2. OSC Checklist Guide (continued).

OSC CHECKLIST (Page 2)	
9. FIND SURVIVOR	Squelch Disable/What can survivor see?
	Confirm Location/Cuts w/ SANDY (Secure)
	No wing-rocks over survivor's position
10. BRIEFINGS	A/C: Get RESOCRT to SANDY
	Check-In ALL Players for 15 Line/ EXECUTE Call
11. SURVIVOR	Radio Check-In Schedule
	Delivery of Ordnance Near Survivor
	Prepare for Helo (Helmet on, Smoke Code, Turn Away)
	Stow Gun, DO NOT RESIST, ID Card Ready
	Let Penetrator Hit Ground First
	Any Questions:
12. BED DOWN	Finish Checklist/Reassure Survivor of Rescue
	Guide Survivor Through Hole Up Procedure/Radio Check-In Time
	Battery Conserve Techniques/Immediate Help Procedures
	Night Evasion = Rec HDG/Dist / Rough Terrain 12/1800 paces/NM

13. OSC CHANGEOVER	Survivor Information
	Threats (status)
	CSARTF Assets
SECRET (WHEN FILLED IN)	

Attachment 11

CAS CHECK-IN/OUT PROCEDURES

Table A11.1. CAS CHECK-IN/OUT PROCEDURES.

FLIGHT CREW INFORMATION GUIDE

CREW POSITION: As Required

CAS CHECK-IN BRIEFING

Aircraft: "_____ , this is _____"
(Controller Call Sign) (Aircraft Call Sign)

1. "Identification / Mission Number: _____"

   NOTE: Authentication and appropriate response suggested here. The check-in may be abbreviated for brevity or security ("as fragged" or "with exception")

2. Number and Type Aircraft: _____"
3. Position and Altitude: _____"
4. Ordnance: _____"
5. Playtime: _____"
6. Abort Code: "_____"
   (If Applicable)

CAS CHECK-OUT BRIEFING

Aircraft: "_____ , this is _____, INFLIGHTREP, over"
(Controller Call Sign) (Aircraft Call Sign)

"THIS IS _____, INFLIGHTREP."

"LINE 1 (CALL SIGN): _____."

"LINE 2 (MISSION NUMBER): _____."

"LINE 3 (REQUEST NUMBER / JTAR): _____."

"LINE 4 (LOCATION): _____."
(Lat/long; UTM; BULLSEYE bearing/range)

"LINE 5 (TIME ON TARGET) _____."

"LINE 6 (RESULTS) _____."

"REMARKS (IF REQUIRED) _____
_____."

Source:	**Date:**
AFI 11-2AC-130V3, JP 3-09.3:	8 Jul 09

Attachment 12

AERIAL GUNNER MALFUNCTION ANALYSIS

A12.1. AC-130 Minimum Safe for 25/40/105MM.

A12.1.1. (AC-130U) 25MM:

A12.1.1.1. ARM/SAFE Switch – SAFE

A12.1.1.2. LWCP – MANUAL

A12.1.1.3. ISO SW – I

A12.1.1.4. PIN – INSTALLED

A12.1.2. 40MM (Use also for spent brass bag removal/bag change):

A12.1.2.1. ARM/SAFE Switch – SAFE

A12.1.2.2. LWCP – (AC-130U) MANUAL (AC-130H) OFF

A12.1.2.3. Breechblock Locking Bolt – INSTALLED

A12.1.3. 105MM:

A12.1.3.1. ARM/SAFE Switch – SAFE

A12.1.3.2. LWCP – (AC-130U) LOAD/MANUAL (As Required) (AC-130H) LOAD

A12.1.3.3. BREECHBLOCK – LOWERED

A12.2. AC-130U 25MM Gun Malfunctions, Probable Causes.

A12.2.1. Failure to Fire:

A12.2.1.1. Circuit breakers on PDP #1 popped.

A12.2.1.2. Gun safing pin installed.

A12.2.1.3. Defective firing solenoid.

A12.2.2. Failure to Rotate:

A12.2.2.1. Circuit breakers on PDP #1 popped.

A12.2.2.2. Hydraulics not applied to the ASHS.

A12.2.2.3. Flexible drive shaft sheared.

A12.2.2.4. Round(s) jammed in gun.

A12.3. AC-130 40MM Gun Malfunctions, Probable Causes.

A12.3.1. Failure to Fire:

A12.3.1.1. Circuit breaker(s) popped (No Actuation).

A12.3.1.1.1. (AC-130U) PDP #2.

A12.3.1.1.2. (AC-130H) F.S. 245.

A12.3.1.2. Firing solenoid/wiring defective (No Actuation).

A12.3.1.3. Broken breechblock components.

A12.3.1.4. Defective primer.

A12.3.2. Failure to Extract.

A12.3.2.1. Extractors broken.

A12.3.2.2. Side door open.

A12.3.2.3. Twisted crankshaft.

A12.3.3. Loader Jam:

A12.3.3.1. Improper loading.

A12.3.3.2. Broken catch head mechanisms.

A12.3.4. Failure to Eject:

A12.3.4.1. Short recoil/low propellant charge in round.

A12.3.4.2. Obstruction on the loader tray.

A12.3.4.3. Twisted crankshaft.

A12.3.5. Failure to Chamber:

A12.3.5.1. Improper loading.

A12.3.5.2. Obstruction on loader tray/broken catch head mechanisms.

A12.3.5.3. Fat/dented round.

A12.3.5.4. Worn extractors.

A12.3.5.5. Broken sear.

A12.3.6. Breech Malfunction:

A12.3.6.1. Worn extractors.

A12.3.6.2. Worn breech face.

A12.3.6.3. Worn recoil cylinder.

A12.4. AC-130 105MM Gun Malfunctions, Possible Causes.

A12.4.1. Failure to Fire:

A12.4.1.1. Circuit breaker(s) popped (No Actuation).

A12.4.1.1.1. (AC-130U) PDP #2.

A12.4.1.1.2. (AC-130H) F.S. 245.

A12.4.1.2. Firing solenoid/wiring defective (No Actuation).

A12.4.1.3. Defective percussion mechanism.

A12.4.1.4. Defective primer.

A12.4.1.5. Breechblock not fully raised.

A12.4.1.6. Cannon not in battery.

A12.4.2. Cannon Recoils Beyond limits:

A12.4.2.1. Recoil oil reserve low.

A12.4.2.2. Recoil mechanism out of adjustment.

A12.5. AC-130 25/40/105MM TGM Malfunctions, Probable Causes.

A12.5.1. (AC-130H) Loss of Hydraulic Active Light.

A12.5.1.1. Gun not selected by the FCO.

A12.5.1.2. Mission computer failure.

A12.5.1.3. Not used.

A12.5.1.4. "26 VAC" reference fuse blown (will be illuminated).

A12.5.1.5. Loose/damaged electrical connectors on LWCP/CA/Manifolds.

A12.5.2. Loss of Power to LWCP:

A12.5.2.1. (AC-130U) Check circuit breakers on PDP #1 for 25MM.

A12.5.2.2. (AC-130U) Check circuit breakers on PDP #2 for 40MM. 105MM (RH AC & MAIN DC Busses).

A12.5.2.2.1. (AC-130H) Prime power circuit breaker off.

A12.5.2.2.2. (AC-130H) Circuit breaker on aft fuselage junction box popped.

A12.5.2.3. Loose/damaged electrical connectors on LWCP.

A12.5.3. Gun Drift and Oscillation: ***NOTE:*** After following emergency procedures of the -10 checklist, proceed as follows:

A12.5.3.1. Check Delta "P" connected (All connections).

A12.5.3.2. (AC-130U) Gyro Connected.

A12.5.3.3. Have the FCO select another sensor.

A12.5.3.4. Have the FCO (AC-130U) change modes of fire (AC-130H) select computer fixed.

A12.5.3.5. (AC-130U) Change Fire Control Channels. (AC-130H) Select other mission computer.

A12.5.3.6. If the drift or oscillation continues, the weapon will have to be set to fixed-fixed. Refer to Trainable Gun Mount Manual Operation in –10 checklist (AC-130U) or Manual Operation of the Gun Mount in –5 checklist (AC-130H). ***NOTE:*** Use the error monitor, FCO's resolver readings, and starrett gauges, in that order, to set the gun.

A12.6. AC-130 40MM Rate of Fire Adjustment.

A12.6.1. To determine Rate of Fire:

A12.6.1.1. Load gun with 9 rounds.

A12.6.1.2. Fire selector lever to RAPID FIRE.

A12.6.1.3. Thumb control lever toward the arrow.

A12.6.1.4. Time how long it takes to fire 7 rounds. Acceptable times: 4.2 to 4.7 seconds (90 to 100 S.P.M.). If times are not within limits, proceed with the following steps.

A12.6.2. To Adjust Rate of Fire:

A12.6.2.1. ARM/SAFE Switch – SAFE

A12.6.2.2. LWCP Switch – MANUAL

A12.6.2.3. Breechblock Locking Bolt – INSTALLED

A12.6.2.4. Remove control rod valve lock plate and adjust in small increments.

A12.6.2.4.1. To increase turn rod counter-clockwise.

A12.6.2.4.2. To decrease turn rod clockwise.

A12.6.2.5. Arm gun and recheck rate of fire.

A12.6.2.5.1. If gun is within limits repeat steps A12.6.2.1. - A12.6.2.3. and relock control rod valve lock plate.

A12.6.2.5.2. If gun is not within limits repeat steps A12.6.2.1. - A12.6.2.5.

Attachment 13

HOT REFUELING OPERATIONS

A13.1. General. For AFSOC aircrews, basic hot refueling is the transfer of fuel (refuel or defuel) at sites where all required equipment is provided at the site. AFSOC aircrews qualified in hot refueling may refuel/defuel at fixed-sites, refuel/defuel with approved fuel trucks and receive fuel from a fixed-wing tanker at FARP sites. NVG-qualified AFSOC aircrews may conduct hot refueling operations under NVG conditions. A comprehensive mission briefing and strict compliance with these procedures will ensure an expeditious safe refueling operation. Personnel performing hot refueling operations will have a thorough knowledge of T.O. 00-25-172, specifically section II (Electrostatic Hazards), section III (Bonding), and section VII (Combat or Contingency Operations). Personnel operating refueling equipment during blacked-out operations must be Night Vision Goggle (NVG) qualified. All Air Force personnel involved with hot refueling operations will be trained IAW appropriate command directives. Prior to conducting hot refueling operations, ensure:

A13.1.1. Refueling operations at Air Force hot refueling sites will not be conducted within 200 feet of aircraft parking areas, 50 feet of taxiing aircraft, or 200 feet of inhabited or uninhabited buildings. ***NOTE:*** All hot refueling sites will have a current site survey and meet minimum unobstructed egress distances required by the survey to ensure the aircraft can taxi from the site in the event of an emergency. If the egress distance is less than the required minimum or the egress area is obstructed, tanker/receiver aircraft will perform refueling/defueling in a cold environment only.

A13.1.2. Only current and qualified crewmembers will be allowed to occupy a primary crew position on hot refueling missions. Normally these missions will be conducted with a NVG tactical/operational crew.

A13.2. Minimum Crew Compliment.

A13.2.1. Pilot - 2

A13.2.2. Flight engineer – 1

A13.2.3. Loadmaster – 1. ***NOTE:*** The pilot, copilot, and flight engineer will remain on the flight deck in the event of an emergency taxi, i.e., moving the aircraft. These crew positions are the minimum required to fly the aircraft.

A13.3. Aircraft Commander Duties. The aircraft commander will:

A13.3.1. Ensure approval has been granted by the proper authority prior to conducting hot refueling operations.

A13.3.2. Ensure all crewmembers are briefed on their specific responsibilities.

A13.3.3. Analyze runway availability prior to landing to determine braking action. Unnecessary or heavy braking could delay hot refueling operations.

A13.3.4. Analyze planned hot refueling area for hazards and sufficient taxi clearances.

A13.3.5. Determine fuel requirements to include estimated onload and offload.

A13.4. Flight Engineer (FE) Duties. The flight engineer will:

A13.4.1. Read and ensure compliance with the hot refueling checklist.

A13.4.2. Control fuel distribution and the Single Point Refueling (SPR) drain pump on Universal Aerial Refueling Receptacle Slipway Installation (UARRSI) modified aircraft.

A13.4.3. Coordinate fuel distribution with the loadmaster on Non-UARRSI aircraft.

A13.5. Loadmaster (LM) Duties. The LM is responsible for supervising fuel servicing operations. The loadmaster will:

A13.5.1. Ensure compliance with all safety procedures.

A13.5.2. Immediately inform the pilot and advise the crew on recommended course of action, in the event of a hazardous situation/emergency.

A13.5.3. Ensure all required equipment is on board prior to and after hot refueling operations.

A13.5.4. Operate the ramp and door or paratroop door as required.

A13.5.5. Complete the hot brake/hung flare check prior to commencing hot refueling operations.

A13.5.6. Ensure all personnel are properly briefed on fueling procedures.

A13.5.7. Operate the SPR panel and control fuel distribution with coordination from the flight engineer**.** ***EXCEPTION:*** On UARRSI modified aircraft the flight engineer will control fuel distribution.

A13.5.8. Perform leak check at SPR panel.

A13.5.9. Secure aircraft for departure after all equipment and personnel are aboard.

A13.6. Hot refueling Equipment. The hot refueling mission requires specific equipment and inspections prior to commencing operations. Only equipment approved IAW TO 00-25-172, TO 37A9-7-2-1, and in the System Safety Engineering Analysis (SSEA) shall be used. This equipment is unique in that it provides for an internal bond that is not provided for with conventional refueling equipment. If unapproved equipment is used, the refueling operation must be accomplished without engines running (cold refueling).

A13.6.1. Those personnel who will have direct contact with fueling operations during hot refueling will have the following:

A13.6.1.1. Spare flight gloves.

A13.6.1.2. Extra flight suit or change of clothing, including flight boots.

A13.6.1.3. Full canteen, to be carried on your person.

A13.6.1.4. Sealable water and fuel resistant garment bag to store fuel soaked clothing.

A13.6.1.5. NVGs with spare battery (as required).

A13.6.1.6. Dust goggles (as required).

A13.6.1.7. Survival vest (as required).

A13.6.1.8. Overt/IR chem-lights (as required).

A13.6.1.9. IR compatible flashlight (as required).

A13.7. Weather Requirements. For training operations and exercises, stop fuel servicing when high winds or reduced visibility caused by blowing rain, snow, or sand exists or when an electrical storm is within a five mile radius of the hot refueling site.

A13.8. Safety. Aircrews will adhere to the following guidance to ensure a safe Hot Refueling Operation:

A13.8.1. If a ground is not available at a forward operating location or remote site, aircraft will be bonded to servicing equipment during actual servicing. Bonding will be accomplished by inserting the bonding plug into the receiver aircraft's external receptacle prior to any other action.

A13.8.2. Personnel involved in servicing operations will be trained in portable fire extinguishers and installed equipment fire suppression system operations.

A13.8.3. If hot refueling operations are being conducted at an AFSOC or AMC certified site, a minimum of one 20-pound dry chemical will be located in the immediate vicinity of the aircraft SPR and the fuel servicing equipment. Additionally, a crash fire rescue vehicle will be on standby just outside the fuel servicing safety zone. If a fuel truck is used as the tanker, a large flight line Halon 1211 fire extinguisher will be used in lieu of the 20-pound extinguisher.

A13.8.4. For exercises or contingencies where a crash fire vehicle cannot be provided, a minimum of one 20-pound dry chemical extinguisher will be positioned at the receiver SPR and the refueling source.

A13.8.5. The wear of Gortex is authorized for aircraft servicing with JP-5/8/10, Jet-A, and diesel fuel (including mixed fuel criteria). Personnel will not wear Gortex within 50-feet when servicing aircraft with JP-4 or ground servicing with Mogas.

A13.8.6. General Ordnance Procedures. Aircraft may be hot refueled with live ordnance aboard, however upload/download of ordnance and refueling of aircraft will normally be conducted as separate operations; a separate area should be established at least 300 feet from the hot refueling site. During combat or contingency operations, concurrent refueling and upload / download of ordnance may be authorized when, in the judgment of the mission commander, operational necessity and benefits of reducing ground time outweigh the risks involved.

A13.8.7. Radar, radar altimeters, Doppler or Doppler Velocity Sensor, and ECM equipment will not be operated within the refueling area.

A13.8.8. Any hand-held radios used within the fuel spillage safety zone must be intrinsically safe. HF radio transmissions are not allowed within the fuel spillage safety zone during refueling operations.

A13.8.9. Voice communication contact between the loadmaster and cockpit will be maintained at all times. ***Exception:*** The loadmaster does not have to maintain interphone contact while positioning/repositioning refueling equipment, but will be on interphone any time the refueling nozzle is connected to the aircraft and the switches on the SPR panel are in a position other than off or closed.

A13.9. Aircraft Marshaling:

A13.9.1. When CCT/STS are responsible for primary air traffic control of an airfield, they will marshal and control all aircraft movement into the hot refueling site. If CCT/STS are not available, all aircraft are responsible for self marshaling into the hot refueling site.

A13.9.2. Aircraft commanders must ensure marshaling procedures are thoroughly pre-briefed between all agencies involved prior to hot refueling operations. These procedures must be strictly adhered to at all times, to ensure all safety requirements are met.

A13.10. Emergency Procedures. Emergency procedures are published in the applicable checklist. They will be reviewed by all crewmembers and briefed by the PIC prior to commencing hot refueling operations. All personnel, including ground controllers, will know the ground evacuation plans. Stop all hot refueling operations immediately when a leak, unsafe condition, or system malfunction occurs. Correct the deficiency before resuming hot refueling operations.