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Flying Operations

C-5 SPECIAL OPERATIONS

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This document is new and must be completely reviewed.

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Chapter 1

GENERAL

1.1. Overview. This addendum provides mission planners and aircrews the guidance necessary to plan and accomplish special operations missions. Information in this addendum has been incorporated from AFM 3-5, *Combat Control Team Operations*, AFI 13-217, *Assault Zone Procedures*, and Joint Chiefs of Staff (JCS) Pub 3-05 and 3-05.1. Use this addendum in conjunction with the flight manual, the joint command standard operating procedures (SOP), and mission operating directives. Training should be planned and executed to meet joint tasks, conditions, and standards (TCS) when applicable.

1.2. Mission Description. Airlift aircraft provide a means by which forces in support of special operations missions can be inserted or extracted. Special operations missions may be covert, clandestine or overt in a low to medium threat environment. Enemy defensive positions are avoided and hostile detection opportunities are minimized. Low-level or terrain masking flight is often used during ingress to, and egress from, the objective area to counter anticipated threats.

1.3. Key Terms Explained.

1.3.1. Airborne Radar Approach (ARA). ARA is a non-precision approach procedure constructed and directed by the radar navigator and flown using onboard radar, inertial, GPS, and other navigation aids to locate a runway which is not supported by conventional navigation aids or lighting.

1.3.2. Air Refueling Entry Point (EP). A point approximately 20 NMs from the rendezvous initial point (RZIP). The EP is an extension of the course before the RZIP to the air refueling control point (ARCP). Actual distances between points may vary due to requirements and airspace availability. Both the receiver and tanker utilize the EP, RZIP, ARCP course, separated by a 1000' altitude differential.

1.3.3. Aviators Night Vision Imaging System (ANVIS). Helmet mounted night vision devices, which amplify ambient light. ANVIS devices are required for all night SOLL II operations. Commonly referred to as Night Vision Goggles (NVGs) which includes AN/AVS-6 and AN/AVS-9.

1.3.4. Blind Drop Zone (DZ). An unlit, unmarked DZ that may be used when it is not feasible to mark the DZ. The pilot and map navigator confirm DZ location and release point. In order to perform this type drop, consideration must be given to ambient light and weather.

1.3.5. Day Employment. Single-ship operations requiring a high degree of skill including comprehensive mission planning and contour flying at the optimum altitude (no lower than 300 feet modified contour) with off-course maneuvering.

1.3.6. JUDY. Term used by the receiver pilot to indicate the receiver will complete the rendezvous. The tanker will establish contact refueling airspeed and proceed down track..

1.3.7. Minimum Illumination Operations. Operations are not normally conducted in a totally blacked-out environment; however, mission requirements may dictate that aircrews land without

landing lights on runways marked with visible lighting. For landings on unlit or infrared (IR) lit runways, crews must be SOLL II qualified, use NVGs, and utilize aircraft IR landing lights.

1.3.8. Night Employment. Operations conducted at night, with or without NVGs. Crewmembers are trained in a wide range of special tactics including airdrops to DZs with nonstandard markings. Landing zones may be marked in accordance with AFI 13-217 AMP-3 (minimum is the "box") or AMP-4. Blacked-out drops will only be conducted by SOLL II qualified crews. No Box (AMP-4) landings will only be accomplished by SOLL II crews certified in unlit runways operations.

1.3.9. Reception Committee Leader (RCL). The leader of a group who makes the ground arrangements and controls the air reception. The RCL selects a site that is secure, accessible and permits safe delivery of incoming personnel or materiel.

1.3.10. Rendezvous Initial Point (RZIP). A point located approximately 30 NMs before the ARCP. Actual distances between points may vary due to requirements and airspace availability.

1.3.11. TALLY HO. Term used by the tanker pilot to indicate there is visual contact with the receiver and will maneuver for the join-up. Receiver aircraft will maintain heading after receipt of TALLY HO call, until rendezvous is complete. If receiver aircraft is in a turn, they will continue turn to intercept and rollout on a down track heading.

1.4. Command, Control, and Communications.

1.4.1. Command Relationships. Normal command relationships are detailed in Chapter 2 and the USTRANSCOM and USSOCOM Command Arrangements Agreement.

1.4.2. Crew Duty Time (CDT) Limitations. Refer to Chapter 3 for basic crew duty time limitations. SOLL II crews should normally be considered basic crews and SOLL II tactical events should not be planned to occur after the 12-hour point in the crew duty day. SOLL II tactical events are defined as operations utilizing NVGs, during hours of darkness to include all items mentioned in this addendum.

1.4.3. Communications.

1.4.3.1. En route. Normal communications for safe flight and command and control will be used unless mission security dictates otherwise. However, during covert or clandestine operations, secure communications will be used as much as possible.

1.4.3.2. Objective Area. Non-voice coordinated signals and authentication procedures are desired for both aircrews and ground party.

1.4.3.3. Time and message coordination. A time check should be coordinated 2 hours before the time over target (TOT) or time of arrival (TOA). Messages or "go/no-go" decisions may be broadcast in the blind at pre-coordinated times.

1.5. Mission Planning.

1.5.1. General. Planning will be accomplished in accordance with Chapter 16 of this instruction. SOLL II crews may base their minimum flight altitude on 500' above the highest obstacle within a corridor 3 NMs from centerline.

1.5.2. Planning considerations.

1.5.2.1. Aircrews must devote a minimum of 1-day to mission analysis and route study before the day of the flight. Additional planning days are not required for successive flights over the same route provided crewmembers remain the same. Multiple routes may be planned and flown without additional planning days provided no changes are made to the route or objective area.

EXCEPTION: Flight Engineers and loadmasters need not stand down before local SOLL II training flights.

1.5.2.2. Select points that can be readily identified using NVGs based on moon illumination data and topography. A feasibility study should be done in accordance with Chapter 16 of this instruction.

1.5.2.3. Select altimeter update points throughout the route to ensure flying accurate, safe altitudes. Compare radar and pressure altimeters to a known elevation. Update altimeters as close as possible to the objective area; if an update is impossible, use lowest forecast altimeter setting.

1.5.2.4. Select and label intermediate navigation checkpoints along the route between turn points.

1.5.2.5. Draft low-level routes on chummed TPC or JOG charts. A Sectional chart may be used to de-conflict the low-level route and for en route map reading by the Radar Navigator and the pilots. From IP to LZ or DZ, a JOG is required (if available) in addition to the TPC. The Map Navigator shall conduct map reading with a chummed TPC or JOG.

1.5.2.6. A C-5 tactical fuel plan AF Form 4050, **Tactical Mission Fuel Planning (C-5)**, is required on all airdrop and SOLL II missions. Canned fuel plans in the local area are allowed as long as they accurately depict the flight profile. Navigators are responsible for this fuel plan in coordination with the aircraft commander.

1.6. Mission Briefings.

1.6.1. Briefing Policy. Conduct briefings before all operations. Augment briefings with aircrew brochures, mission flimsies, target study materials, and visual aids. Base briefings on the particular mission, crew capabilities, crew rest, and other pertinent factors.

1.6.2. Formal Briefing. An airland mission briefing is required before any mission or when directed by mission directive or other competent authority and for subsequent missions when aircrew member substitutions have been made or mission operating procedures change from the original briefing

1.6.3. Joint Mission Briefing (Team Brief for Airdrop/Hot Refuel). The nature of special operations missions dictates that the team and aircrew and mission planners coordinate the plan in the isolation phase of the mission, before mission execution.

1.6.4. Specialist Briefings. Conduct specialist briefings to detail operating procedures or special interest items. The mission commander determines the requirement for specialist briefings and these briefings are conducted after the mission briefing for the following personnel:

1.6.4.1. Pilots (conducted by aircraft commander).

1.6.4.2. Navigators (conducted by radar navigator).

1.6.4.3. Loadmasters (conducted by primary loadmaster). This briefing may be conducted at show time for unilateral training.

1.6.4.4. Hot refuel supervisor (conducted by person accomplishing supervisor duties).

1.6.4.5. If the time lapse between the specialist briefing and scheduled launch exceeds 5 hours or follow-on missions over the same routes are planned, an update briefing is required for participating pilots and navigators. Give briefing before launch or just before follow-on mission.

1.6.4.6. Supplement the briefing guide in Chapter 16 of this AFI as required. Add the following areas when appropriate:

1.6.4.6.1. Air traffic control (ATC) procedures.

1.6.4.6.2. Cockpit (lighting, taping, circuit breakers, etc.) and aircraft (exterior lighting, cargo compartment lighting, IR lenses, etc.) preparation.

1.6.4.6.3. Crew Coordination (low-level navigation, approach, airdrop, landing, interphone procedures, etc.).

1.6.4.6.4. ARA procedures.

1.6.4.6.5. Inertial navigation system (INS) GPS, and FMS-800 procedures.

1.6.4.6.6. Backup approach procedures.

1.6.4.6.7. Ground operations (taxi, parking plan, onload/offload, scanning responsibilities, etc.).

1.6.4.6.8. Lighting plan.

1.6.4.6.9. NVG emergency procedures (inadvertent instrument flight rules [IFR], sudden light exposure, battery or goggle failure).

1.6.4.6.10. User requirements.

1.6.4.6.11. Weather (lowest forecast altimeter, ceiling, moonrise/set and illumination, sunrise/set).

1.6.4.6.12. What ifs.

1.6.4.6.13. Aircraft and classified material destruction requirements.

1.6.4.6.14. Air Refueling Procedures (as required).

1.6.4.6.15. Emergencies.

1.6.4.6.16. Escape and Evasion Plan of Action (EPA).

1.6.5. Critique and Debriefing. The AC and the entire crew will debrief the mission.

1.7. Navigation. See AFI 11-2C-5V3, *C-5 Operations Procedures*, Chapter 16.

1.8. Crew Complement. See AFI 11-2C-5V3, *C-5 Operations Procedures*, Chapter 3.

1.9. Special Operations Restrictions.

1.9.1. General

1.9.1.1. Runway and taxiway restrictions. In accordance with AFI 11-2C-5V3 Chapter 5 and AFI 13-217, *Assault Zone Procedures*. Runway lighting will be IAW AFI 13-217, with either AMP-3 or AMP-4 depending on crew qualification. The IR strobe for AMP-3 lighting is optional.

1.9.1.2. Low-Level planning/execution. Chapter 16 of this instruction will be used as a guide with an exception that minimum flight altitudes will be based on 500' above the highest obstacle in a corridor 3 NM from planned route of flight for SOLL II crews. If deviations occur to place the aircraft outside the planned route corridor, climb to either MSA or ESA, as appropriate for the amount of deviation, until established back on course. Climb to MSA for all pilot seat changes. Always fly at the highest altitude consistent with safety, realistic training, and simulated or real threats.

1.9.1.3. NVG Failures. If NVG failure occurs while in the low-level structure for any one of the following persons: pilot, copilot or map navigator, climb to the route segment minimum safe altitude (MSA). For NVG failure occurring between any two of the above crewmembers, climb to the low-level route's emergency safe altitude (ESA).

1.9.1.4. SOLL II Unlit (AMP-4) Runway Operations. Requirements are: 1) certified crew, 2) both aircraft IR landing lights operational, 3) runway reception team to ensure runway is clear (an operational control tower fulfills this) and 4) visual 'on-course' verification at 2 NM on the ARA approach 5) F4949 NVGs for all pilots and map navigator, and 6) HH GPS unit for crew situational awareness and accurate INS updates or a FMS-800 modified aircraft.

1.9.2. Handheld (HH) GPS Use on SOLL II missions. SOLL II crews will utilize a HH GPS unit to the maximum extent possible for all phases of flight. The intended use of the HH GPS unit is to enhance crew situational awareness. Approved GPS units on the C-5 for flights below 10,000' MSL include the KLX-100 and the Trimble 2100. The GPS will not be used as a sole means of determining aircraft position, but can be used for updating INS positions if the GPS position can be verified by another means (i. e. radar, NAVAID, visually). GPS use on SOLL II missions falls primarily with the navigators. See AFI 11-2C-5V3, chapter 5 for more information on HH GPS use. HH GPS units are N/A for FMS-800 modified aircraft.

1.9.3. Weather:

1.9.3.1. En Route (low-level). VFR-If IMC is encountered, maneuver over or around the weather, or abort the mission. If unable to maintain visual flight, execute emergency weather penetration by turning IFF to emergency, declare an emergency, and obtain necessary block airspace. Contingency or combat operations may require modification of this procedure.

1.9.3.2. Terminal: 1500 feet ceiling, 3 NMs visibility; crosswind - 15 knots maximum, tailwind - 13 knots maximum.

9.3.3. An operational TACAN or radar beacon may be on the field to provide an external means of determining an accurate position on final approach. If no navigational aid reception is received by the descent point, the aircraft will not descend unless their position is positively identified and the aircraft is within 3/4 NM of centerline.

1.9.4. Cargo compartment seating:

1.9.4.1. 436th Airlift Wing (AW) special operations aircrews may utilize the C-5 cargo compartment seating when carrying recognized Special Operations Forces (SOF). This approval is for employment phases of operational and training missions. Final determination rests with the aircraft commander.

1.9.4.2. The following restrictions apply when special operations forces are transported in the cargo compartment:

1.9.4.2.1. All personnel seated in the cargo compartment must be secured by using one of the following methods:

1.9.4.2.1.1. Personnel inside vehicles will be secured either with vehicle seatbelts or Swiss seats (maximum vehicle shipping weights will not be exceeded).

1.9.4.2.1.2. All personnel seated on the cargo compartment floor will be secured with user provided seatbelts or personnel restraint systems. An alternate method for securing personnel in the cargo compartment during operational missions is to use an aircraft tie-down strap.

1.9.4.2.2. Maximum flight altitude without portable oxygen equipment is FL 250. If mission profile dictates altitudes above FL 250, the user will provide adequate oxygen systems for all user personnel.

1.9.4.2.3. A minimum of two loadmasters will be seated in the cargo compartment anytime user forces are carried in the cargo compartment. Position one LM near the crew entry door and one by a troop door during takeoff and landing. Maintain interphone contact at all times.

1.9.4.2.4. Numbers of personnel carried in the cargo compartment will be dependent on the cargo load and ability to safely egress the aircraft in the event of an emergency. FASTROPES may be installed at the troop doors to facilitate egress from the aircraft.

1.10. Mission Kits. Additional equipment is necessary to prepare the aircraft and crewmembers for a special operations employment mission. The following minimum equipment is required:

1.10.1. Aircraft Kit (minimum):

1.10.1.1. Tape (pressure sensitive, reflective, anti-skid, etc.).

1.10.1.2. "Y" interphone cords, as required.

1.10.1.3. Porthole covers.

1.10.1.4. Extra infrared (IR) lens covers.

1.10.1.5. NVG compatible instrument lighting.

1.10.1.6. HH GPS (if aircraft is not modified with FMS-800).

1.10.2. Aircrew Kit (minimum):

1.10.2.1. Survival vests (one per crewmember)*.

1.10.2.2. Flak vests (one per crewmember)*.

1.10.2.3. Aircrew weapons*.

- 1.10.2.4. Nuclear, biological, chemical warfare kit*.
- 1.10.2.5. Aircrew eye and respiratory protection equipment (AERP) equipment*.
- 1.10.2.6. NVGs (one per crewmember).
- 1.10.2.7. Helmets.
- 1.10.2.8. Chemlights: IR, multicolored.

*When required by mission operations directive (MOD)

1.11. NVG Pre-flight. Each NVG must be thoroughly pre-flighted:

- 1.11.1. Check NVGs IAW technical orders to ensure proper operation. Crews must check NVGs in an NVG test lane or 20/20 test unit before use. Obtain extra batteries as spares.

1.12. Aircraft Preparation.

- 1.12.1. The following equipment should be operational. Aircraft commanders will assess the impact of the loss of any equipment listed below and determine mission requirements.

- 1.12.1.1. Radar (both pilot and navigator scope operational).
- 1.12.1.2. Both radar altimeters.
- 1.12.1.3. All landing and taxi lights with appropriate IR filters.
- 1.12.1.4. Three INSs (fully operational with FSAS).
- 1.12.1.5. NVG compatible instrument panel lighting and IR landing light covers.
- 1.12.1.6. Secure voice radios (if mission requirements dictate).
- 1.12.1.7. 100 total CGU-1/B 5,000 lb. tie-down straps, 50 MB-2 chains and devices, and 110 total MB-1 chains and devices.
- 1.12.1.8. HH GPS (if aircraft is not FMS-800 modified).

- 1.12.2. Ensure aircraft configuration is as directed in the MOD. Check forward and aft doors, and kneeling system for proper operation.

- 1.12.3. Loadmasters will ensure special equipment is aboard and inventoried as required for the mission. Items below identified by an asterisk (*) apply when less than a fully qualified crew is available (i.e. SOLL II loadmaster only). Every attempt should be made to configure the aircraft before departing home station.

- 1.12.3.1. Winch hatch cover*.
- 1.12.3.2. Modified kneeling collars.
- 1.12.3.3. Extra snatch block*.
- 1.12.3.4. (2) C-5 winches (heavy duty not acceptable)*.
- 1.12.3.5. Extra shoring kit*.
- 1.12.3.6. Tape (1" and 3" LAPES, 1" masking).

- 1.12.3.7. Chemical lights (mini and 6", colors and quantity as required).
 - 1.12.3.8. Paratroop retriever bars (2) (required on aircraft for emergency egress).
 - 1.12.3.9. Emergency escape breathing devices (as required for troops in cargo compartment).
 - 1.12.3.10. Landing gear sequence panel covers.
 - 1.12.3.11. Window covers for troop and cargo compartments.
 - 1.12.3.12. Flashlights (IR lens).
 - 1.12.3.13. Omnidirectional roller conveyer shoring (6 total, ¾" x 12" x 8', place shoring on omni rollers as required)*.
 - 1.12.3.14. PA systems (check for proper operation of all)*.
 - 1.12.3.15. Anti-skid (check condition of floor and replace as necessary)*.
 - 1.12.3.16. 10,000 lb. tie-down straps.
 - 1.12.3.17. 5,000 lb. tie-down straps*.
 - 1.12.3.18. Emergency egress FASTROPES.
 - 1.12.3.19. Specialized Cargo Compartment lighting fixtures (as required).
- 1.12.4. In addition to the normal aircraft preflight, each crewmember has specific tasks to prepare the aircraft for a SOLL II mission. These tasks will be accomplished before combat entry point.
- 1.12.4.1. Pilot and Copilot. The NVG compatible instrument lighting provides primary illumination for flight instruments. The following lights should be extinguished during C-5 missions to enhance the crew's night vision:
 - 1.12.4.1.1. Rolled out lights—Seat belt, No Smoking, landing light extended, inboard elevator system 3 and system 2, and other annunciator/caution lights as required.
 - 1.12.4.1.2. Light bulbs from the landing gear handle - remove both
 - 1.12.4.1.3. Lights to be taped over or covered with NVG filter glass: Go-Around (G/A) light on attitude director indicator (ADI), pilot and copilot leg alert lights may be lightly taped over (can see through), if B model tape over combined-altitude radar altimeter (CARA) low-altitude warning light, and other lights as required.
 - 1.12.4.1.4. 10-amp circuit breaker on pilot's overhead panel (floodlights) will be pulled. CBs as applicable, will be pulled on FMS-800 aircraft to ensure proper display lighting.
 - 1.12.4.2. Navigator and Engineer. Panel lights should be as low as possible. Green utility or 'phantom' lights should be used when available. The engineer will roll out the "press open" lights. Tape over additional lights as necessary. Navigator will install HH GPS unit, perform preflight, load the flight plan, and have another crewmember check waypoints in the HH GPS for accuracy (N/A on FMS-800 aircraft).
 - 1.12.4.3. Loadmaster (LM):
 - 1.12.4.3.1. Tape the following:

- 1.12.4.3.1.1. Landing gear sequence panels.
- 1.12.4.3.1.2. Forward and aft LM control panel lights.
- 1.12.4.3.1.3. Jump signal lights (as required).
- 1.12.4.3.1.4. Emergency exit lights.

NOTE:

Do not disarm emergency exit lights.

- 1.12.4.3.1.5. Aerial Delivery System (ADS) control panel lights (roll or tape) (Tape panel lights during blacked-out equipment airdrops).
- 1.12.4.3.1.6. Courier compartment hatch.
- 1.12.4.3.2. Open the following circuit breakers:
 - 1.12.4.3.2.1. Power Transfer - Forward and AFT LM control panels.

NOTE:

Do not open during "blacked-out" airdrop operations; the jump signal lights will not work.

- 1.12.4.3.2.2. Curb Lights - All.
- 1.12.4.3.3. Ensure that chem lights are positioned (30-minute advisory):
 - 1.12.4.3.3.1. Position (1) mini blue chem light to each paratroop door handle.
 - 1.12.4.3.3.2. Position (1) mini blue chem light to the crew entrance door mechanical lock and emergency egress control handle.
 - 1.12.4.3.3.3. Position (5) mini blue chem lights to the aft side of the fwd stringer of the flight station and troop compartment ladders, if they will be used after the lights are out. Place the chem lights at equal intervals to ensure safe passage during blacked-out conditions.
 - 1.12.4.3.3.4. Position mini chem lights (blue or IR) in the cargo compartment, as needed for onload or offload.
 - 1.12.4.3.3.5. Utilize specialized cargo compartment lighting kit as available and mission requirements dictate.

NOTE:

If the cargo compartment is unoccupied, the steps in the 6-minute advisory checklist may be accomplished at the 20-minute advisory.

- 1.12.4.4. Passenger manifests may be kept by user personnel provided their unit maintains a copy. The troop commander is responsible for validating passenger information. A cargo manifest or load plan with accurate weights and a shipper's declaration must accompany the load. For redeployment, helicopter weights and center of gravity (CG) may be calculated from weight and balance records.

1.13. Transition to Minimum Lighting Operations.

1.13.1. Before low-level entry accomplish the descent and combat entry checklist. Ensure radar altimeters are on and set to 50 feet below the planned en route AGL altitude.

1.13.2. Aircraft are normally configured for minimum lighting operations before departure. For missions of longer duration, the final configuration may be accomplished in flight. Cockpit preparation shall be completed at least 30-minutes before the combat entry point.

1.14. Mission Procedures.

1.14.1. En Route:

1.14.1.1 Altimeter update points should be planned for the en route portion of the mission.

1.14.1.2. Either the pilot or the copilot flies the aircraft on instruments. INS should be selected for display on the pilots' horizontal situation indicator (HSI).

1.14.1.3 The pilot not flying the aircraft maintains an outside scan, identifies checkpoints, and ensures clearance from terrain obstructions and other aircraft.

1.14.1.4. The pilot safety observer (jumpseat pilot) is the overall safety observer. As a minimum, crosscheck the pilot and copilot instruments with emphasis on barometric altimeters and radar altimeter, assist in clearing for other aircraft, checkpoint identification, and obstruction avoidance.

1.14.1.5. The radar navigator is responsible for navigation, terrain clearance and time control. Use INS and map reading in coordination with the map navigator to ensure precise navigation and terrain or obstruction clearance. Give appropriate time advisories (1-hour; and 30-, 20-, and 6-minute advisories; and 2-minutes before each turn point). The radar navigator is responsible for positioning. The radar navigator assists in identifying the LZ using INS, GPS, TACAN, or radar beacons; monitors the approach; ensures the objective area has not been misidentified; and announces significant drift and wind shear information. The radar navigator announces the distance to go commencing at 1 mile to begin descent, states "1 mile to descent" and "begin descent" along with a recommended descent rate.

1.14.1.6. The map navigator map reads and backs up the radar navigator on all duties.

NOTE:

Use all available aids (e.g. INS, GPS, predominant landmarks, and radar) to remain position oriented. Use preplanned landmarks to crosscheck INS accuracy.

1.14.1.7. The loadmaster prepares for minimum light operations by the completion of the 20-minute advisory. Lights will be turned off by the completion of the 6-minute advisory.

1.14.1.8. Plan to give the approach briefing before the 20-minute advisory. Complete the approach checklist no later than the 6-minute advisory. Set the radar altimeters to the MAP's AGL altitude, derived from the ARA plate, during the approach checklist.

1.14.2. NVG Airland Operations:

1.14.2.1. Normally, the slowdown should be completed no later than 10 NMs before touchdown. This can be adjusted for time control or operational requirements. At the slowdown point, configure the aircraft with gear and 40 percent flaps, while slowing to approach speed +20 knots indicated airspeed (KCAS). Complete the before landing checklist and transfer aircraft control to the pilot who will be flying the approach.

1.14.2.2. ARA Approach Procedures:

WARNING

Do not initiate a descent until the aircraft position is positively identified and adequate terrain clearance is assured. It is essential for the aircrew to verify and update (if required) the INS units before beginning the approach to ensure the best possible course guidance into the LZ.

1.14.2.2.1. General:

1.14.2.2.1.1. Approach plate must depict AGL and mean sea level (MSL) altitude.

1.14.2.2.1.2. Approach plate must depict terrain from 10 NMs out to 2 NMs past touchdown zone and 2 NMs either side of centerline.

1.14.2.2.1.3. Approaches will normally use a 2.83-degree glideslope. However, terrain, airfield conditions and mission requirements will dictate the exact glideslope used. The glideslope should be constructed to intercept the runway at the beginning of the touchdown zone.

1.14.2.2.1.4. Distance to go on the approach should be based on the beginning of the touchdown zone.

1.14.2.2.2. Procedures:

1.14.2.2.2.1. The radar navigator provides recommended MSL altitude and drift calls each mile on final. Additional calls (drift, half-mile calls) can be made at the pilot's request. The radar navigator deletes altitude calls when the jumpseat pilot begins radar altitude calls. The ARA must place the aircraft in a position to land by the MAP. TOA must be within ± 30 seconds.

1.14.2.2.2.2. The map navigator primarily should concentrate on map reading and course guidance into the LZ. The map navigator may assist the pilots in initial acquisition of the LZ.

1.14.2.2.2.3. When identifying the landing zone, either unlit or "box and one", the first crewmember (the pilot making the landing or the jumpseater) will state (crew position) "has the box" or "has the LZ" only. The second crewmember to sight the landing zone will state (crew position) "has the box at" or "has the LZ at" (state clock position). The original identifying crew member then acknowledges the accuracy of the stated clock position stating "that checks" or "negative", as appropriate.

1.14.2.2.2.4. At the "1 mile to descent" call; lower flaps to landing and slow to approach speed. At the descent point, establish a rate of descent based on actual ground speed. It is essential the airspeed, trim, power, and descent rate be established before transfer of aircraft control. The pilot flying acknowledges the radar navigator's altitude calls by responding with the deviation in altitude (i.e. 50 high). After the pilot who will be landing assumes

on final approach. The pilot not flying will call deviations in airspeed and actual sink rate.

1.14.2.2.2.5

pilot sights the LZ and assumes control of the aircraft. For right seat landings, the pilot will fly making the landing will verbally confirm they have the LZ in sight before descending out of the environment when the aircraft commander is not accomplishing the landing.

Pilots must be in the left-seat upgrade process before accomplishing landings from the left or right seats.

confirms LZ acquisition, positions switches, and aids the pilot in accomplishing checklists. and confirm landing configuration. During the approach and landing phase, the jumpseat 20 feet, and 10 feet (e. g. "radar 500", "radar 400", etc.). The jumpseat turns on IR landing the ground speed in 20-knot increments beginning at 80 knots.

airfields require the utmost in crew coordination and flying skills. Situations may develop, not descend below MDA until the touchdown zone is in sight. Execute a go-around or

1.14.2.2.2.7.1. The aircraft is not stabilized on the glideslope and approach speed at 1

1.14.2.2.2.7.2. The AC does not have the touchdown zone in sight at the MAP.

1.14.2.2.2.7.4. When advised by any flight deck crewmember or the controlling agency.

1.14.2.2.2.7.6. For No Box landings on runways of less than 7,000 feet and the aircraft

1.14.2.2.2.7.7. For No Box landings if course position cannot be verified at 2 NM before feet AGL on the approach.

The pilot flying will immediately start a climb while continuing to fly runway heading. The pilots. Special attention must be given to power settings, airspeed control, pitch attitude,

climb rates, and terrain clearance. A racetrack pattern or diversion to a recovery base will be accomplished following a go-around.

1.14.2.2.2.9. Touch-and-goes. The pilot flying will maintain runway alignment. The pilot not flying will reset flaps and trim and call "flaps and trim set." The jumpseat pilot and flight engineer will back-up the pilot flying on throttle setting. Use of the go-around attitude subsystem (GAAS) is recommended. During acceleration and takeoff, the pilot not flying should monitor outside as the pilot flying transitions from outside references to instruments.

1.14.2.2.2.10. Unlit (No Box) Landings (AMP-4).

1.14.2.2.2.10.1. When accomplishing No Box landings the map navigator will state "threshold" when crossing over the threshold.

1.14.2.2.2.10.2. For No Box landings on runways 7,000 feet or less, the radar navigator will compute the time to travel the 1,500 feet from the threshold to the latest touchdown point (based on groundspeed). If the aircraft has not touched down in the allotted time, the radar navigator will call "time".

1.14.2.2.2.10.3. For No Box landings on runways greater than 7,000 feet, the latest touchdown point may be increased to greater than 1,500 feet, depending on aircraft landing data.

1.14.2.3. Ground Operations.

1.14.2.3.1. The ground scenario determines specific aircrew actions to allow the aircraft to turnaround in minimum time. Coordinate on/offload points, taxi routes, and marshaling plan with the user or ground mission commander before mission departure. On/offload procedures must be thoroughly understood by the aircrew and user personnel. Static load training is required if blacked out on/offloading will be accomplished. Red light or min light on/offloading does not require static load training.

EXCEPTION: Blacked out unilateral training with a single vehicle does not require static loading.

1.14.2.3.2. Although the user mission commander has the responsibility for the load and personnel, the primary loadmaster is responsible for safely on/offloading the aircraft.

NOTE:

Use extreme caution when taxiing on NVGs. Limited visibility may require the scanner to deplane to aid in clearing the aircraft during turns.

1.14.2.3.3. During landing roll and once below 20 knots, troops and crew may move around the cargo compartment to prepare for offload.

1.14.2.3.4. Aft cargo doors may be opened and the aft ramp positioned to truck bed during taxi operation. Offloads will be done in accordance with the SOLL II checklist.

1.14.2.3.5. The forward visor may be opened simultaneously with the scanner departing the airplane.

1.14.2.3.6. On illumination of the nose landing gear kneeled light, the forward ramp may be opened to drive-in. Offloading operations may commence when the forward ramp is positioned to drive-in. Continue kneeling the aircraft until all cargo is offloaded.

1.14.2.3.7. Forward ramp and door closing operations may be conducted concurrently with the unknocking checklist.

1.14.2.3.8. MH/UH-60 helicopters may be carried with 3/4 fuel in main and full aux tanks. AH/MH-6 helicopters may be carried with 3/4 fuel in main and aux tanks. MH-47 helicopters can have no more than 1/2 fuel in any tank.

1.14.2.3.9. During kneeling operations, all cargo restraints may be removed provided the brakes are set and the brakeman is in position.

1.14.2.3.10. Up to eight user-personnel may be seated in the courier compartment. This seating is based on prior coordination with the aircraft commander, required need (i.e. C2 for users), and space available in the troop compartment.

1.14.2.3.11. During offloads, MH/UH-60 and MH/AH-6 helicopters and other equipment may be manually positioned on the cargo floor to a point approximately 3 feet from the ramp crest without use of the cargo winch.

1.14.2.3.12. Blacked-out on/offloading of personnel and equipment may only be conducted with specially trained units and equipment approved for blacked-out operations.

1.14.2.3.13. Unacceptable Operations and Procedures:

1.14.2.3.13.1. Removal of all cargo restraints during taxi.

1.14.2.3.13.2. Exceeding certified gross weight restrictions for any item of cargo.

1.14.2.3.13.3. Offloading helicopters using toe brakes for restraint down the forward ramp.

EXCEPTION: Real world deployments if the cargo winch becomes inoperative.

1.14.2.4. Minimum Lighting Takeoff. Complete all briefings and prepare for departure while on/offload operations are in progress. The radar navigator will provide a departure briefing that includes departure headings, pertinent terrain features, and altitudes for obstacle and terrain clearance. Utilize IR landing lights to assist in maintaining runway alignment.

1.14.3. SOLL II Airdrop Procedures. Map Navigator is responsible for conducting the airdrop. All other procedures will be in accordance with AFI 11-2C-5V3 Chapter 19.

1.15. Airborne Radar Approach (ARA) Construction.

1.15.1. The radar navigator is responsible for constructing an airborne radar approach (ARA) plate for any mission requiring an approach and landing under NVG operations. The ARA plate must depict AGL and MSL approach or descent altitudes. It must also depict the terrain starting 10 NMs from touchdown to 2 NMs past the field, out to 2 NMs either side of centerline. The normal ARA is planned for a 2.83-degree glideslope. However, terrain, airfield conditions, and mission requirements will dictate the actual glideslope planned and used. Construction of the plate is a two-part process: First, build an obstacle clearance zone (requires a vertical cross-section and lateral limit depiction), and second, draw the actual ARA graph.

1.15.2. Use the following procedures to construct an obstacle clearance buffer zone.

1.15.2.1. Establish a safety zone margin (minimum of 1.5 NMs along and across track) based on estimated INS accuracy, availability of update points, etc. This gives you a buffer zone during the approach, either side of centerline, ensuring obstacle clearance if on proper glideslope. Keep in mind a normal approach requires the aircraft to be within .5 NMs of centerline at the MAP. A segmented leg altitude may be required between the IP and the glideslope intercept altitude on the ARA to ensure obstacle clearance.

1.15.2.2. Vertical cross-section buffer zone (**Figure 1.1.**). Draw a line from touchdown point (A) back along the centerline to point (B). The distance of the line will equal the safety zone margin, e.g. if the safety zone margin is 1.5 NMs, distance from (A) to (B) is 1.5 NMs. From (B), extend a line parallel to the planned glidepath, intersecting the planned ARA pattern altitude at (C). Again from (B), proceed up the parallel line to determine point (D), which is 200 feet above the threshold elevation. The vertical limit of the buffer is the connecting points (A), (D), and (C).

1.15.2.3. Lateral limits of the buffer zone (**Figure 1.2.**). Draw a line perpendicular to track at point (C). The line extends either side of track a distance equal to the safety margin. Draw another line perpendicular to track at point (A). This line extends to either side a distance of 1 NM. Connect the outer edges of the lines to establish the lateral limits of the buffer zone.

1.15.2.4. If any obstruction penetrates the obstacle clearance zone before the MAP, use a steeper glidepath or move the touchdown point further down the runway. An obstruction that penetrates the portion of the buffer zone between the MAP and the touchdown point will not effect the planned glidepath if it can be visually avoided.

1.15.2.5. Distance to go on the ARA plate is based on the beginning of the touchdown zone.

1.15.2.6. For planning purposes, the ARA MDA should correspond to the HAT at the missed approach point for the planned glideslope. For approaches to AMP-3 marked runways (box and one) the ARA MDA is the higher of either the HAT on the planned glideslope at two NM or 600 feet HAT. The missed approach point is two NM before the touchdown point. For approaches to an unlit runway (AMP-4), the ARA MDA is the higher of either the HAT on the planned glideslope at one NM or 300 feet HAT. The missed approach point is one NM before the touchdown point. The lower minima for unlit runways are authorized only for SOLL II crews who have been trained and certified for landing on unlit runways.

Figure 1.1. Vertical Cross Section Template.

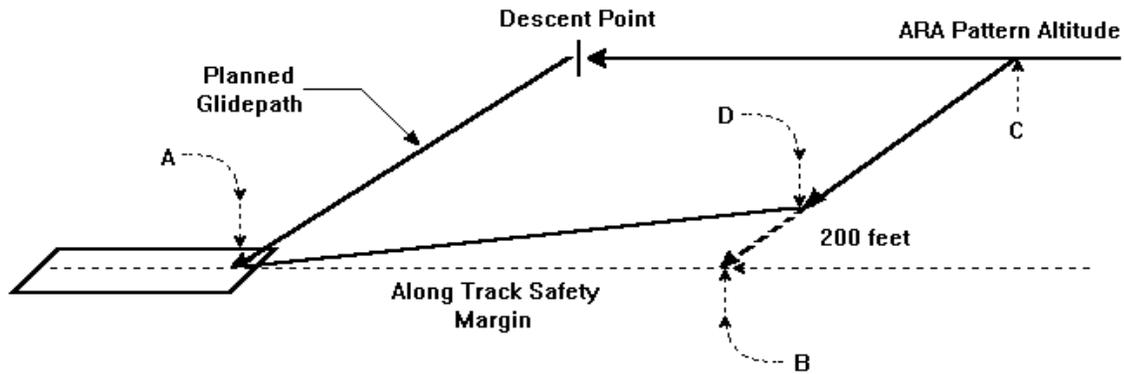
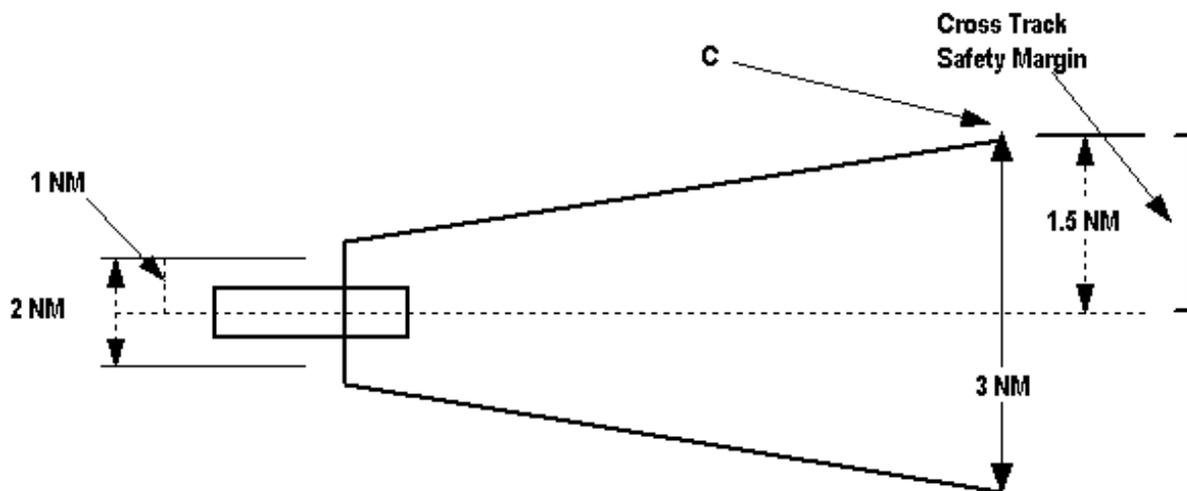


Figure 1.2. Lateral Cross Section Template.



1.16. Air Refueling Procedures.

1.16.1. General. These procedures are extracted from AFI 11-2KC-135V3 Addenda C, and supplement procedures in technical orders (T.O.) 1-1C-1 and 1-1C-1-23.

1.16.2. Mission Planning. Planning will be in accordance with current directives. The mission briefing should be conducted with both the receiver and tanker crews present. However, as a minimum, pass the refueling track, refueling altitude, rendezvous time (RZCT), air refueling control time (ARCT), call signs, frequencies, secure and non-secure communication, tanker and receiver departure times, number of receivers, scheduled offload and alternate refueling track (if applicable). Actual distances between points may vary due to requirements and airspace availability.

1.17. Rendezvous Procedures.

1.17.1. General. AR tracks as depicted in Figure 1.3 and Figure 1.4. Standard rendezvous method for special operations air refueling will be a tanker overtaking receiver procedure. If the tanker is unable to accomplish an overtaking rendezvous and the receiver has the tanker in sight, the receiver can initiate the rendezvous with a JUDY call.

1.17.2. Rendezvous Procedures:

1.17.2.1. Communication. These procedures will be conducted radio silent to the maximum extent possible, using standard visual signals. If radio silence must be broken, use a secure means. Unless otherwise specified, aircraft will monitor primary AR frequency, in the secure mode, from 30-minutes before the RZCT until A/R exit. All necessary communications (emergency actions) while actually air refueling will be in the non-secure mode. The first aircraft to obtain visual contact will call JUDY or TALLY HO, as appropriate, over AR primary frequency (secure). The aircrew hearing the call will acknowledge by turning their anti-collision/strobe lights off for a 10-seconds, then back on and continue on course at normal refueling airspeeds (during daylight, the response will be a wing rock). Additionally, during training and exercise sorties, the aircraft responding to a visual sighting call will respond with numeric call sign and altitude (i.e. "80, 14,000") on A/R secure.

1.17.2.2. Timing. The tanker and receivers will cross the RZIP at the RZCT. Due to the planned airspeed differential on the leg from the EP to the RZIP, the tanker should arrive at the EP slightly behind the receiver, and in position to accomplish the overtaking rendezvous.

1.17.2.3. EP. Receivers will be established at the rendezvous altitude NLT the Entry Point (EP). Receivers will fly at 250 KCAS from the EP to the RZIP to arrive at the RZCT (the tanker will be flying 310 KIAS for the rendezvous). The tanker will plan on passing 1000 feet above (required) and off the left wing (optimally) of the receiver during the rendezvous. Once passing abeam of the receiver, the tanker will slow to AR airspeed.

1.17.2.4. RZIP. Plan to cross the RZIP at normal refueling airspeeds. The receiver and tanker aircrews will visually identify each other using NVGs, if applicable. After join-up, the receiver will complete closure and the flight will proceed down track. Normal A/R procedures apply from this point.

1.17.2.5. NVG Usage. NVG use will discontinue no later than the precontact position for the pilot and copilot.

1.17.3. Emergency and Missed Rendezvous:

1.17.3.1. If no visual contact is established by the RZIP, aircraft will proceed down track to arrive at the ARCP at the ARCT.

1.17.3.2. If visual contact is established while en route to the ARCP, make the appropriate radio call and proceed with a visual join-up and the air refueling.

1.17.3.3. If no contact before the ARCP, the receiver will enter a left-hand holding pattern using AR airspeed and plan to cross the ARCP at 8 minute intervals (or as briefed) from the planned ARCT ("Rule of Eights"). The tanker will not turn on rendezvous equipment unless requested by the receiver. Once the JUDY or TALLY HO call is made the aircraft hearing the call will turn toward the ARCP and proceed down track. The aircraft making the call will effect the join-up.

1.17.4. Control Time Adjustments:

1.17.4.1. Revised ETA Prior to RZIP. If the tanker is notified of revised receiver ETA before crossing RZIP, the tanker will adjust timing to make the receiver's new RZCT.

1.17.4.2. Revised ETA after RZIP. If notified after passing RZIP, the tanker will delay at ARCP and adjust timing to make an overtaking enroute rendezvous at the ARCP based on new ARCT.

NOTE:

If receiver does not or cannot make radio contact with tanker to pass new RZCT, then receiver will arrive at ARCP at the original ARCT plus intervals of 8 minutes (rule of 8).

1.17.4.3. Post-Strike Procedures. For missions without a firm RZCT/ARCT, a control time window will be established. This provides tanker with a NET/NLT RZCT time for rendezvous. Tankers will arrive at RZIP no later than the earliest possible control time. If there is no receiver, tanker will proceed to ARCP and hold, using two-minute legs, left hand turns. Receiver, when en route to A/R and NLT 10 minutes from RZIP, will call the tanker (SECURE) with revised RZCT. Tanker will adjust orbit to make an en route rendezvous at the RZIP at new control time.

1.18. Post-Air Refueling Procedures. The receiver will signal completion of air refueling by turning on the upper anti-collision light. The receiver will descend to the bottom of the block and rejoin, if applicable. When rejoined, visually clear to the lead tanker's left. When the lead tanker boom operator has the receivers in sight, the tankers will initiate a right turn to clear the track.

Figure 1.3. Air Refueling Track - Typical

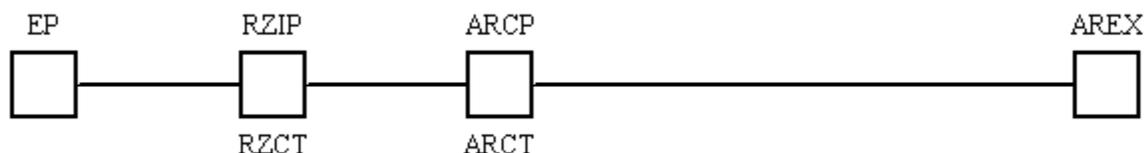
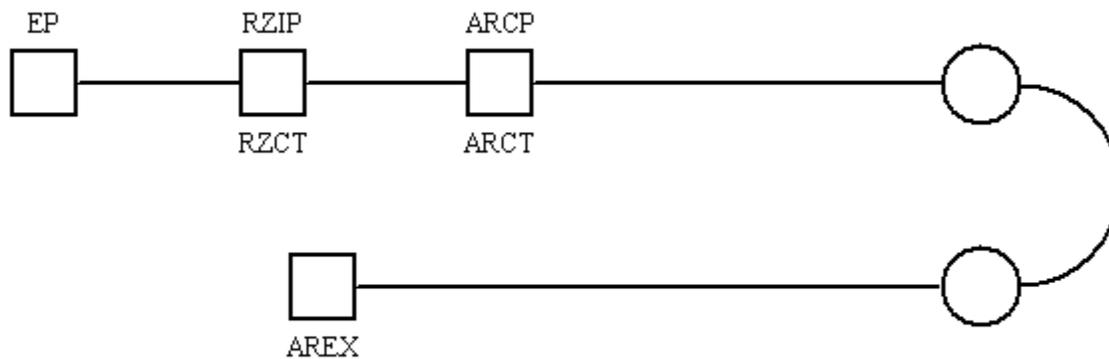


Figure 1.4. Air Refueling Track - Anchor

1.19. Long-Term Waivers. The following waivers permit C-5 SOLL II aircraft to perform special operations missions or training.

1.19.1. AFI 11-202V3, *General Flight Rules*, Paragraph 5.9.5 is waived. Approval to permit night operations to runways not outlined by lights. This waiver applies to NVG approaches only, in accordance with established procedures. Authority is HQ AFFSA waiver #96003, expiration 30 Jun 2001.

1.19.2. AFI 11-202V3, *General Flight Rules*, Paragraph 5.9.6 is waived. A “gear down” report is not required when approaches are made to “nonstandard” airfields during upgrade and continuation training, exercises, or contingency operations. In lieu of this call, the pilot who would normally make the “gear down” call over the radio will make the same call over the interphone. The jump seat pilot will acknowledge this call after confirming the gear are down. Authority is HQ AFFSA waiver #96004, expiration 30 Jun 2001.

NOTE:

When operating in a control zone, these procedures will be coordinated with the local air traffic control agency by a letter of agreement.

1.19.3. **Reduced Aircraft Lighting:** Operations with less than AFI 11-202V3, lighting requirements are limited to operations within the geographic and altitude limits of designated restricted areas during periods when those areas are active. Normal lighting will be displayed outside restricted airspace. Aircraft lighting should be reduced only to the extent necessary to contribute to realistic training.

Chapter 2

C-5 HOT REFUELING

2.1. Hot Refueling Overview. Trained SOLL II crews will utilize these procedures to provide fuel from the C-5 to a variety of receivers. Forward Area Refueling Point (FARP) is a general term covering different operations where fuel is passed from a tanker to receiver in a tactical environment.

2.1.1. During "Hot Refueling" or Hot FARP, some combination of engines between the tanker and the receiver will be running.

2.1.2. During "Cold Refueling", Cold FARP, or "Wet Wing Defueling" (Army terminology) no engines are running on either the tanker or receiver.

2.1.3. Procedures used for either Hot or Cold refueling are exactly the same. All checklists, restrictions, safety procedures, and requirements apply to either type of FARP operation.

2.1.4. Aircraft Configuration. The decision on how the aircraft is configured to accomplish a FARP operation depends on many factors such as tactical situation, FARP location, receiver requirements, etc.

2.1.4.1. Engines-Off Hot Refueling is the usual method of C-5 FARP due to the time spent on the ground. If the aircraft is left in a knelt position, the ability to evacuate a FARP site is delayed, and the aircraft should not be taxied in a knelt configuration (unless absolutely required). In most instances, the aircraft should be unknelt and visor closed during Engines-Off Hot Refueling. If no engines are running on the tanker aircraft, FARP layouts are not restricted. The only limitation is if the layout is directly behind the tanker aircraft, the APU on the side where the SPM is located should not be operated. This limitation does not apply to six point FARP layouts.

2.1.4.2. Engines-Running Hot Refueling provides a quick response to threat conditions should an immediate evacuation of the FARP zone be necessary. During engines-running hot refueling, engines on the non-refueling side of the aircraft may remain running. The aircraft should be unknelt and the visor closed. Under no circumstances will refueling be accomplished behind operating engines or in a position that will impede the forward movement of the aircraft. When the tanker aircraft will have engines running, hose layouts are limited to those in **Figure 2.1**. This is to ensure receivers will not be affected by tanker engine exhaust.

2.1.4.3. Cold Refueling operations have significantly less danger involved because there are no engines running. However, all Hot Refueling procedures and restrictions apply. Configuration of the aircraft will depend on the situation.

2.1.5. The "pre-hot refueling unknelling" and "post-hot refueling kneeling" checklists are for use when the tanker aircraft will refuel in an unknelt configuration with or without the engines running.

2.1.6. The fuel servicing safety zone (FSSZ) is the area within 50 feet of a pressurized fuel carrying servicing component and 25 feet around fuel vent outlets of the airplane.

2.1.7. Forward Area Manifold (FAM) Cart. The FAM cart, which is covered by Technical Order T.O. 37A9-7-2-1, is used to provide an interface between the tanker and receiver aircraft. It is equipped with an engine driven pump and a variety of equipment to facilitate refueling. During FARP, the FAM cart engine may or may not be required. Use of the FAM cart is required to accomplish FARP if a FAM cart is available. When a FAM cart is not available, observe limitations as stated in the FAM cart T.O.

2.1.8. Only specifically designated POL equipment is allowed for FARP operations. This unique equipment provides an internal bond between components that is not provided with conventional POL equipment.

2.1.9. FARP Safety. Because of the inherent dangers associated with the tactical ground refueling of helicopters, safety cannot be overemphasized. Marshalers must be particularly cautious when giving hand and arm signals around moving helicopter blades. Some light-lift helicopters do not provide head and shoulder clearance under certain sections of the rotor disk. Helmets shall be worn when performing duties under rotor disk. Any movement of the helicopters within the refueling area should only be at the direction of qualified marshalers and always under positive control procedures.

2.2. Hot Refueling Requirements.

2.2.1. Crew complement. Only current and qualified SOLL II crewmembers will be designated as primary on hot refueling missions. The minimum personnel to FARP is as follows:

2.2.1.1. Pilot (P).

2.2.1.2. Copilot (CP).

2.2.1.3. Flight engineer (E).

2.2.1.4. Hot refueling supervisor (HRS). Two required for dual FARPs.

2.2.1.5. Hose deployment personnel (HDP). One HDP is required for each receiver point.

2.2.1.6. Single-point receptacle (SPR) monitor (SPM). Two required for dual FARPs.

2.2.2. FARP Restrictions.

2.2.2.1. Radar, radar altimeters, and HF radios will not be operated within the refueling zone. Only intrinsically safe nontactical radios will be operated in the FSSZ during refueling.

2.2.2.2. Refueling will not be performed when the following conditions are present.

2.2.2.1. When airplane wheel brakes indicate an overheated condition.

2.2.2.2. When an electrical storm is within a 5-mile radius of refueling operations, or when high winds present a hazardous condition.

2.2.2.3. All refueling operations will be stopped immediately when a leak, unsafe condition, or refueling system malfunction occurs. The deficiency will be corrected before resuming refueling operations.

2.2.2.4. Fire protection requirements will be in accordance with technical order T.O. 00-25-172, except for remote locations. A crash fire vehicle will be provided on scene when this equipment is available. HQ AFSOC Safety determines this requirement at remote locations.

2.2.2.5. Communication contact between HRS and cockpit will be maintained at all times during refueling operation.

2.2.2.6. Personnel Equipment: All personnel directly involved with refueling operations (HRS, SPR, HDPs) will have:

2.2.2.6.1.1. Helmet (when appropriate).

2.2.2.6.1.2. Dust goggles.

2.2.2.6.1.3. Fire retardant flight suit.

2.2.2.6.1.4. Fire retardant gloves.

2.2.2.6.1.5. Flight boots.

2.2.2.6.1.6. Flashlight (night operations).

2.2.2.6.1.7. Complete change of clothing (required in case they are sprayed with fuel).

2.2.2.6.1.8. Canteen with web belt.

2.2.7. A fireguard is required for all FARP operations. Certain receivers may not deplane a crewmember to act in this capacity. Under these instances, the HRS must ensure a fireguard is available. The fireguard does not need to be HDP qualified, only FARP qualified (additional crewmembers can serve in this position).

NOTE:

Wear of GORE-TEX® garments is authorized for JP-8 refueling only (according to T.O. 00-25-172).

2.3. Pre-Arrival Procedures:

2.3.1. The aircraft commander will:

2.3.1.1. Ensure approval has been granted by proper authority before conducting FARP operations. Refer to FARP site certification and Memoranda of Agreements (MOAs).

2.3.1.2. Ensure all crewmembers are briefed on their specific duties and responsibilities before arrival at the refueling area. Hand signals to be used between tanker and receiver crewmembers will be coordinated before fuel transfer is initiated.

2.3.1.3. Analyze runway available before landing to determine braking action. Unnecessary or heavy braking could delay refueling operations.

2.3.1.4. Analyze planned refueling area for hazards and sufficient taxi clearance.

2.3.1.5. Analyze emergency egress actions for aircraft and personnel.

2.3.1.6. Analyze fuel requirements.

2.3.1.6.1. Estimated offload.

2.3.1.6.2. Minimum fuel necessary to complete mission.

CAUTION

Do not defuel number 2 and 3 main tanks below 4,500 pounds. Failure to comply could result in airplane hydraulic system failure.

2.3.1.7. When available, ensure fire department provides a crash fire vehicle for on-scene standby.

2.3.2. Crewmember responsibilities:

2.3.2.1. Pilot, copilot, and flight engineer will remain on the flight deck during all phases of the refueling operation.

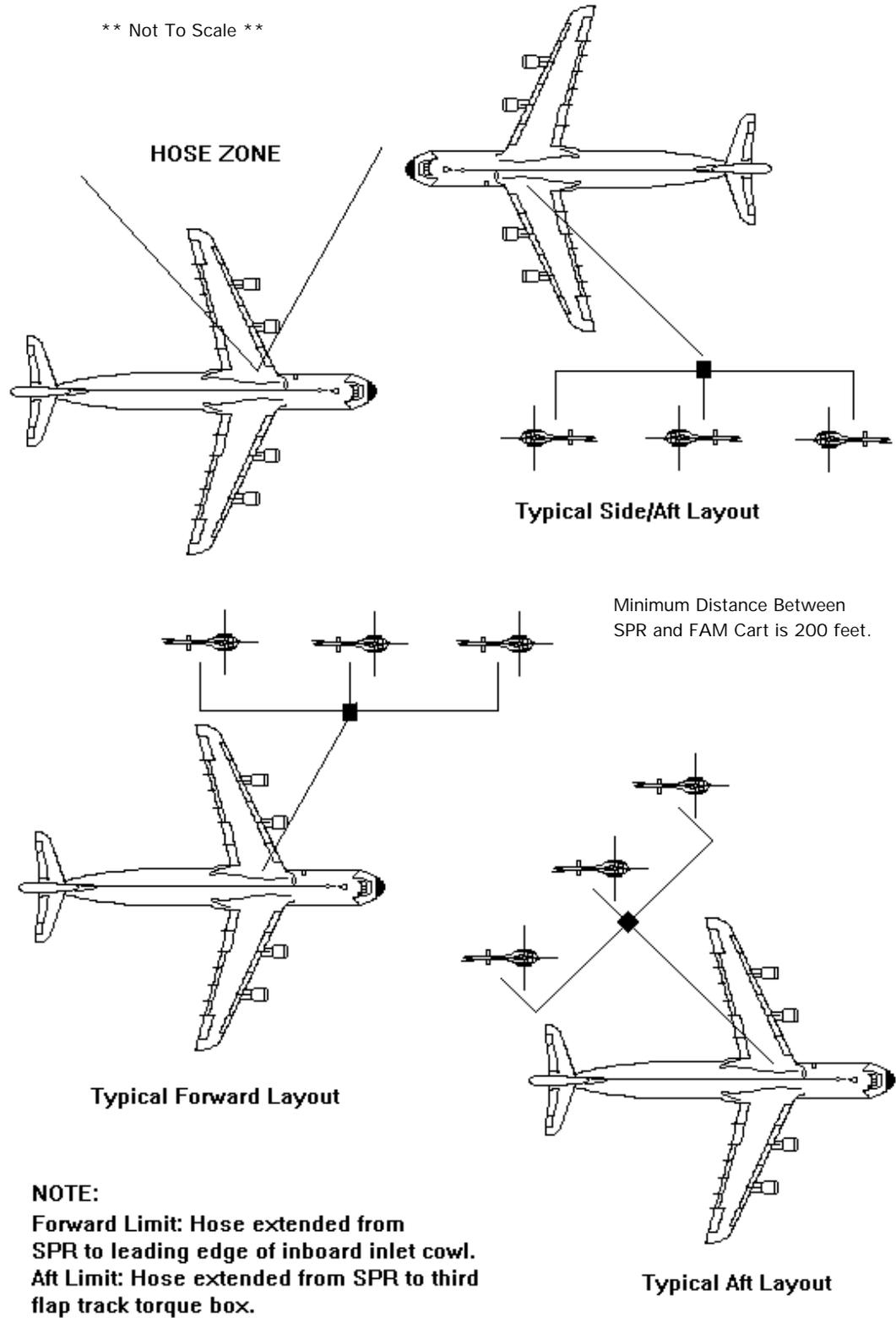
2.3.2.2. HRS is normally the scanner and is responsible for fuel servicing operation, operating the forward area manifold (FAM) cart if used, and ensuring all personnel are properly equipped and briefed on refueling procedures. When performing dual refueling operations, two HRSs are required. Normally, the scanner will be the left HRS and a loadmaster (LM) will be the right HRS and shall be referred to as "left scanner" and "right scanner." Each HRS is responsible for the refueling operation conducted from their respective SPR.

2.3.2.3. SPR monitors (SPM) are responsible for connecting refuel nozzles to the SPR and scanning their respective wing, SPR, and refuel hose for leaks. SPM will assist in the retrieval of FARP equipment.

2.3.2.4. Hose deployment personnel (HDP) are responsible for deploying and retrieving refueling equipment. The HDP connects the refuel nozzle to receiver aircraft and refuels aircraft if the receiver does not deplane a crewmember to refuel their aircraft, and acts as the fireguard for the receiver. On receivers that do not deplane a crewmember, an additional person at the point will be required to act as fireguard. HDP shall not marshal aircraft into a FARP location.

2.3.2.5. Additional crewmembers will assist as required with equipment deployment and retrieval and manning fire extinguishers.

Figure 2.1. Typical Engines Running FARP Layouts.



Chapter 3

SOLL II AMPLIFIED CHECKLISTS

3.1. General. The following procedures allow the airplane to be unloaded and offloaded with the minimum amount of lighting and time.

3.1.1. Use the checklists in **Table 3.1.** through **Table 3.13.** in lieu of the aircraft's normal after-landing, OPS stop after landing, OPS stop engine shutdown, OPS stop starting engines, before taxi, before take-off, landing gear kneeling and unkneeling and cargo door and ramp system procedures. The navigator will make the appropriate advisory calls. The flight engineer will read all checklists. The scanner will remain in interphone contact with the flight station during cargo on and offloading operations. The engineer will start depressurizing at the 30-minute advisory and complete the depressurization by the 20-minute advisory.

3.1.1.2. Depressurization at pilot's discretion dependent upon the tactical or training situation.

Table 3.1. One-Hour Advisory Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "1 - HOUR ADVISORY" (N)— "ACKNOWLEDGED" (LM)		1. "1 - HOUR ADVISORY" (N) — "ACKNOWLEDGED" (LM)
			All occupied compartments will respond.
			2. Notify and Brief Troops—AS REQUIRED All occupied compartments will be notified 1 hour before landing.
			3. Load Restraint—CHECKED
			Ensure two forward and two aft tiedown devices are taped as required.
			4. Red Lights—AS REQUIRED

Table 3.2. Thirty-Minute Advisory Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "30 - MINUTE ADVISORY" (N) — "ACKNOWLEDGED" (LM, E)	1. "30 - MINUTE ADVISORY" (N) — "ACKNOWLEDGED" (LM, E)	1. "30 - MINUTE ADVISORY" (N) — "ACKNOWLEDGED" (LM, E)
		2. Depressurization —"STARTED" (E)	All occupied compartments will respond.
			2. Notify Troops—AS REQUIRED All occupied compartments will be notified 30-minutes before landing.
			3. Loose Equipment—STOWED
			4. Chemical Lights—POSITIONED Colors and position will be as mission requirements dictate.

Table 3.3. Twenty - Minute Advisory Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "20 - MINUTE ADVISORY" (N)— "ACKNOWLEDGED" (LM, E)	1. "20 - MINUTE ADVISORY" (N)— "ACKNOWLEDGED" (LM, E)	1. "20 - MINUTE ADVISORY" (N)— "ACKNOWLEDGED"(LM, E) All occupied compartments will respond.
		2. Depressurization — "COMPLETED" (E)	2. Notify Troops—AS REQUIRED All occupied compartments will be notified 20 minutes before landing.
			3. FWD and AFT Ramp Manual Locking Pins and Side Seals Removed or Retracted—AS REQUIRED Accomplish this step on doors to be opened after landing. CAUTION Check outflow valve full open before removing the manual locking pins. NOTE If the side seals cannot be retracted, request the engineer to momentarily turn the air cond master switch to OFF.
			4. Winch—POSITIONED Winch hatch will be removed and cable connected to first item to be winched (as required).
			5. Troop Restraint Devices—SECURED All personnel will be secured by seatbelt or restraint devices
		3. "20 - MINUTE CHECKLIST" (E)— "COMPLETED" (LM, E)	6. "20 - MINUTE CHECKLIST" (E)— "COMPLETED" (LM, E) All occupied compartments will respond

Table 3.4. Six -Minute Advisory Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "6 - MINUTE ADVISORY" (N)— "ACKNOWLEDGED" (LM)		1. "6 - MINUTE ADVISORY" (N)— "ACKNOWLEDGED" (LM) All occupied compartments will respond.
			2. Lights—AS REQUIRED Lights will be turned off on missions requiring blacked out operations.
			3. NVGs—ON

3.2. SOLL II After Landing.

3.2.1. The jumpseat pilot will initiate the SOLL II After-Landing Checklist at 20 knots by stating "20 KNOTS, 20 KNOTS, 20 KNOTS, SOLL II AFTER-LANDING CHECKLIST" over interphone. Initiation of this checklist clears the loadmasters and other personnel to operate in the cargo compartment. The SOLL II After-Landing Checklist is designed to be used in lieu of the normal After-Landing and OPS Stop After-Landing Checklist. Complete only the asterisk items when all engines are to remain running.

Table 3.5. SOLL II After Landing Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
		*1. Hydraulic Pressure— CHECKED	1. Personnel—NOTIFIED
		*2. Cabin Differential Pressure Indicator - ZERO	2. Troop Doors-AS REQUIRED When mission requirements dictate, troop doors will be opened during taxi
*1. Anti-Skid Switch— "OFF" (CP)		*3. Anti-Skid Switch— "OFF" (CP)	3. Retriever Bar and Rope— AS REQUIRED When mission requirements, install retriever bar and rope.
*2. Pitot Heat and Angle-of-Attack De-Ice Switches—OFF" (CP)		*4. Pitot Heat and Angle-of- Attack De-Ice Switches— "OFF" (CP)	
*3. Cargo Doors Arming Switches—"AS REQUIRED" (CP) Arm the fwd and aft doors as required for onload and offload.		*5. Cargo Doors Arming Switches — "AS REQUIRED" (CP)	4. Aft Cargo Doors—AS REQUIRED a. Ground Control Switch— OPERATE b. Aft Door Operate Switch— OPEN/OFF c. Ramp Select Switch— TRUCK d. C&I Valves--DEPRESSED e. Upper Hinge Check— COMPLETED f. Ramp Operate Switch— OPEN/OFF g. Ground Control Switch— COMPLETE
*4. IFF—"STATE SETTING" (CP)		*6. IFF— "STATE SETTING" (CP)	
5. Ram Air Turbine Switch--"RETRACT"(P)		7. Ram Air Turbine Switch—"RETRACT" (P)	
*6. Spoilers— "CLOSED" (CP)		*8. Spoilers— "CLOSED" (CP)	
*7 Flaps and Slats— "STATE SETTING" (CP) Retract flaps if the engines are to be shutdown. Otherwise, set takeoff setting.		*9 Flaps and Slats— "STATE SETTING" (CP) Retract flaps if the engines are to be shutdown. Otherwise, set takeoff setting.	

Table 3.5. SOLL II After Landing Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			5. Cargo Restraint—AS REQUIRED All tiedowns not taped will be removed at this time
*8. Radar - "AS REQUIRED" (P, N) Radar will be set to STANDBY or OFF, as required.	*1. Radar - "AS REQUIRED" (P, N) Radar will be set to STANDBY or OFF, as required.	*10. Radar - "AS REQUIRED" (P, N)	
		11. APUs - START	
		12. APU Generator Selector Switch—AS REQUIRED Select either L or R APU.	
		13. APU/EXT PWR Selector Switch—APU	
		14. APU Bleed Valves— OPEN	
		15. APU ISO Valves— OPEN	
		*16 SOLL II After- Landing Check — "COMPLETED" (E)	

3.3. SOLL II Block-In.

3.3.1. The SOLL II Block-In Checklist is designed to be used in lieu of the OPS Stop After-Landing, OPS Stop Engine Shutdown, and normal Kneeling Operations Checklists. Complete only the asterisk items when all engines are to remain running.

Table 3.6 SOLL II Block-In Checklist.

PILOT	SCANNER	ENGINEER	LOADMASTER
*1. Brake Switch - "EMERGENCY" (CP)	1. Crew Door Mechanical Lock— REMOVE (Remove during taxi-in)	*1. Brake Switch— "EMERGENCY" (CP)	1. Security Forces— OFFLOADED WARNING Parking brake must be set.
*2. Parking Brake— "SET" (P)		*2. Parking Brake— "SET" (P)	2. Flight Station Ladder— RETRACTED Ladder should be retracted during taxi-in.

Table 3.6 SOLL II Block-In Checklist (continued).

PILOT	SCANNER	ENGINEER	LOADMASTER
	*2. "SCANNER CLEARED TO DEPART AIRPLANE, VISOR CLEAR" (E) -- "DEPARTING AIRPLANE" (S)	*3. "SCANNER CLEARED TO DEPART AIRPLANE, VISOR CLEAR" (E) -- "DEPARTING AIRPLANE" (S)	*3. "SCANNER CLEARED TO DEPART AIRPLANE, VISOR CLEAR" (E) -- "DEPARTING AIRPLANE" (S) Right scanner departs airplane with kneeling collars and installs left and right MLG kneeling collars
*3. Landing Gear System Indicators—"CHECKED" (CP) Check for green wheels, MLG and NLG position indicators—centered.	<p style="text-align: center;">NOTE</p> Right scanner departs with kneeling collars and installs left and right MLG kneeling collars. Left scanner departs with and installs strut limiter and kneel pad extend pin	*4. Landing Gear System Indicators—"CHECKED" (CP)	4. Visor—OPEN a. Forward Ramp and Visor Area — CHECKED b. Ground Control Switch—OPERATE c. Visor Operate Switch – OPEN/OFF
*4. MLG Caster Switch—"CASTER" (P)	3. Crew Entrance Door Ladder Position Lever—POSITIONED	*5. MLG Caster Switch—"CASTER" (P)	5. Crew Entrance Door Ladder—POSITIONED <p style="text-align: center;">WARNING</p> Ensure all personnel are clear before retracting the crew entrance ladder.
	4. NLG Configuration - COMPLETED a. NLG Strut Limiter —AS REQUIRED b. Folding Bulkhead – UNLOCKED c. Kneel Pad Actuator Switch – EXTEND/OFF d. Kneel Pad Extend Pin -- INSTALLED e. Level Kneel Pad – POSITIONED		
	5. MLG Kneeling Collars— As Required		
	6. Crew Entrance Door and Kneeling Configuration—"COMPLETED, CLEAR TO KNEEL" (S). <p style="text-align: center;">CAUTION</p> Scanners will monitor gear movement		
*6. Crew Entrance Door and Kneeling Configuration—"COMPLETED, CLEAR TO KNEEL" (S)	*7. Kneel Select Switch—"AS REQUIRED" (E) Select the desired kneeling mode and check that the armed light comes on.		

Table 3.6 SOLL II Block-In Checklist (continued).

PILOT	SCANNER	ENGINEER	LOADMASTER
		*8. Kneel Command Switch - "KNEEL" (E)	
	7. NLG--"KNEELED" (E)	*9. NLG--"KNEELED"(E)	6. NLG—"KNEELED" (E)
	Right scanner will move to a position to clear FWD ramp for offload. Left scanner will position to observe FWD ramp opening.	Check NLG kneel light on	7. FWD Ramp— POSITIONED a. Ramp Select Switch— DRIVE IN b. Ramp Operate Switch— OPEN/OFF c. Ground Control Switch—COMPLETE
	8. Airplane - CLEARED TO ONLOAD/ OFFLOAD Left scanner will signal LM when clear to On/Offload		8. Personnel/Equipment - ON/OFFLOADED
	9. Kneeling Operation—"COMPLETED" (E)	*10. Kneeling Operation—"COMPLETED" (E) Check MLG kneel lights ON	9. Kneeling Operation—"COMPLETED" (E)
5. Continuous Ignition—"OFF" (P)		11. PTUs—Off	
6. Fuel and Start Ignition—"STOP" (P)		12. ATMs-AS REQUIRED For [B] model winching operation, no. 1 or 4 system must be pressurized.	
		13. Bus Tie Switches—GRD TRANS	
		14. Continuous Ignition—"OFF" (P)	
		15. Fuel and Start Ignition—"STOP"(P)	
		16. Fuel Boost Pumps—OFF	
		*17. SOLL II Block-In Check—"COMPLETED" (E)	

3.4. SOLL II Starting Engines.

3.4.1. The SOLL II Starting Engines Checklist at Table 3.7 is designed to be used in lieu of the OPS Stop Starting Engines Checklist. Complete before the SOLL II Block-Out Checklist.

Table 3.7. SOLL II Starting Engines.

PILOT	SCANNER	ENGINEER	LOADMASTER
		1. Air Conditioning Master Switch—OFF 2. System No. 1 and No. 4 Hydraulic Boost Pumps--ON 3. ATMs—OFF 4. Bottom Hydraulic Pumps— DEPRESS 5. Fuel Boost Pumps— ON	
1. Clear to Start Engines— "ENGINES CLEAR TO START" (S) "STARTING NO. __" (P) Before starting each engine the pilot will state the number.	1. Clear to Start Engines- "ENGINES CLEAR TO START" (S) "STARTING NO. __" (P)	6. Clear to Start Engines— "ENGINES CLEAR TO START" (S) "STARTING NO. __" (P)	
2. Continuous Ignition— "ON" (P)		7. Continuous Ignition— "ON" (P) 8. Engine Anti-Ice Switches—AS REQUIRED Turn on engine anti-ice w/ climatic conditions dictate 9. System 2-3 PTU--OFF	
		10. APU/EXT Power Selector Switch - OFF 11. APU Generator Selector Switch - OFF 12. APU Bleed Valve Switches - CLOSE 13. APU Control Switches - STOP 14. APU ISO Valves— CLOSED 15. System 3-4 PTU--ON	
3. Flight Augmentation —"ON" (P)		16. Flight Augmentation - "ON" (P)	
4. ALDCS—"ON" (P)		17. ALDCS—"ON" (P)	
5. Flaps and Slats— "STATE SETTING" (CP) Set flaps and slats to the take-off setting		18. Flaps and Slats— "STATE SETTING" (CP) Set flaps and slats to the take-off setting 19. SOLL II Starting Engines Checklist— "COMPLETED" (E)	

3.5. SOLL II Block-Out.

3.5.1. Use the SOLL II Block-Out Checklist at Table 3.8 in lieu of the normal Unkneeling Operations, Before Taxi, and Before Take-off Checklists. The cargo loadmaster will initiate this checklist by stating "OFF/ONLOAD COMPLETE, RAMP CLOSING, CLEAR TO UNKNEEL." The normal Lineup Checklist shall be accomplished before takeoff.

Table 3.8. SOLL II Block-Out Checklist.

PILOT	SCANNER	ENGINEER	LOADMASTER
	1. "OFF/ONLOAD COMPLETE, RAMP CLOSING, CLEAR TO UNKNEEL" (LM) <i>NOTE</i> Left scanner stays in position to clear visor	1. "OFF/ONLOAD COMPLETE, RAMP CLOSING, CLEAR TO UNKNEEL" (LM)	1. "OFF/ONLOAD COMPLETE, RAMP CLOSING, CLEAR TO UNKNEEL" (LM)
		2. Kneel Select Switch—UNKNEEL	a. Ground Control Switch—OPERATE b. Ramp Operate Switch—CLOSE
		3. Kneel Command Switch--"UNKNEEL"(E)	c. Ramp Select Switch—OFF 2. Visor—CLOSED
			a. Visor Switch - CLOSE/OFF b. Ground Control Switch — COMPLETE c. Manual Locking Pins—INSTALLED
	2. NLG—"UNKNEELED" (E)	4. NLG—"UNKNEELED" (E) a. NLG Kneeled/Not Unkneeled Lights—OFF b. NLG indicator—GREEN WHEELS	3. NLG — "UNKNEELED" (E) Right scanner will remove the left and right MLG kneeling collars. Right scanner will signal the left scanner when completed and board the aircraft.
	3. NLG Configuration—COMPLETED a. Kneel Pad Extend Pin—REMOVED b. Level Kneel Pad—STOWED c. Kneel Pad Actuator Switch—RETRACT and OFF d. NLG Folding Bulkhead—LOCKED e. NLG Strut Limiter - REMOVED		4. Crew Entrance Ladder— POSITIONED 5. AFT Cargo Doors—CLOSED a. Ground Control Switch—OPERATE b. Ramp Operate Switch— OPEN/OFF c. Upper Hinge Check--COMPLETED d. Ramp Operate Switch- CLOSE, HOLD, then OFF

Table 3.8. SOLL II Block-Out (continued).

PILOT	SCANNER	ENGINEER	LOADMASTER
	4. MLG Kneeling Collars— Removed		e. Ramp Select Switch—OFF f. Aft Door Operate Switch—CLOSE, HOLD, then OFF
	Right scanner will signal the left scanner when the collars are removed		g. Ground Control Switch—COMPLETE h. Manual Locking Pins/Side Seals—INSTALLED/EXTENDED
	5. Ground Clearance—“ALL CLEAR” (S)	5. Ground Clearance —“ALL CLEAR” (S)	
	6. Clear to Board—“NLG PIN REMOVED BOARDING AIRPLANE” (S)	6. Clear to Board—“NLG PIN REMOVED BOARDING AIRPLANE” (S)	6. Personnel – ACCOUNTED FOR Cargo compartment loadmaster will verify with the troop commander that all personnel are accounted for.
1. MLG Caster Switch—“CENTER” (P)		7. MLG Caster Switch—“CENTER” (P)	
		8. Unkneeling Operations —“COMPLETED” (E) a. Kneel Select Switch—OFF	
2. Ram Air Turbine Switch— “AUTO” (P)		9. Ram Air Turbine Switch—“AUTO” (P)	
3. ADS Panel—“SAFE” (CP)		10. ADS Panel—“SAFE” (CP)	
4. Door Open Lights – “OFF” (CP)		11. Door Open Lights – “OFF” (CP)	
5. Brake Switch – “NORMAL” (CP)		12. Brake Switch—“NORMAL” (CP)	
PILOT	**NAVIGATOR**	ENGINEER	LOADMASTER
6. Radar—“AS REQUIRED” (P, N)	1. Radar—“AS REQUIRED” (P, N)	13. Radar—“AS REQUIRED” (P, N)	
7. AFCS—“OFF” (CP)		14. AFCS—“OFF” (CP)	
8. Crew Briefing—“COMPLETED” (P)		15. Crew Briefing—“COMPLETED” (P)	
9. Command Markers—“SET” (CP, P)		16. Command Markers—“SET” (CP, P) Set N1 RPM command markers to the computed take-off N1 RPM.	
10. Waypoint and TACAN Data-“LOADED” (CP, P, N)	2. Waypoint and TACAN Data-“LOADED” (CP, P, N)	17. Waypoint and TACAN Data-“LOADED” (CP, P, N)	
11. Trim—CHECKED AND SET” (CP)		18. Trim—“CHECKED AND SET” (CP)	

Table 3.8. SOLL II Block-Out Checklist (continued).

PILOT	**NAVIGATOR**	ENGINEER	LOADMASTER
	SCANNER	19. Air Cond Master Switch—AS REQUIRED	
	7. Crew Block-Out Report—"SCANNER READY" (S)	20. Crew Block-Out Report—"READY" (LM, S)	7. Crew Block-Out Report—"LM READY" (LM, S)
		21. Pressurization—AS REQUIRED	
		22. "SOLL II BLOCK-OUT CHECKLIST COMPLETED" (E)	

3.6. Pre-Hot Refueling Unkneeling Checklist. The checklist at **Table 3.9.** will configure aircraft for FARP operations in an unknelled configuration, with or without the engines running. After refueling equipment and personnel are offloaded, the aircraft will be unknelled if the engines are to remain running. Steps 1-4 of the Hot Refueling Cockpit Crew checklist and steps 1-2 of the Hot Refueling Ground Crew checklist may be accomplished before initiating this checklist. References to LS and RS in the Hot Refueling amplified checklists, refer to the HRS (LS and RS are required for greater than a 3 point FARP).

WARNING

The Pre-Hot Refueling Unkneeling Checklist does not remove the kneeling pin or lock the folding bulkhead. The aircraft may be taxied in this configuration, but gear retraction in this configuration will cause mechanical damage. Do not taxi with the landing gear knelt unless absolutely required.

Table 3.9. Pre-Hot Refueling Unkneeling Checklist.

COCKPIT CREW	GROUND CREW
1. "OFFLOAD COMPLETE, RAMP CLOSING, CLEAR TO UNKNEEL" (LM)	1. "OFFLOAD COMPLETE, RAMP CLOSING, CLEAR TO UNKNEEL" (LM)
2. "PRE-HOT REFUELING UNKNEELING CHECKLIST" (E)	a. Ground Control Switch—OPERATE b. Ramp Operate Switch—CLOSE c. Ramp Select Switch—OFF
3. Kneel Select Switch—"UNKNEEL" (E)	2. Visor—CLOSED a. Visor Switch—CLOSE/OFF b. Ground Control Switch—COMPLETE
4. Kneel Command Switch - "UNKNEEL" (E)	3. Nose Landing Gear - "UNKNEELED" (E)
5. Nose Landing Gear—"UNKNEELED" (E)	4. Crew Entrance Ladder—POSITIONED
6. MLG Caster Switch—"CENTER" (P)	
7. Unkneeling Operations - "COMPLETED" (E)	
8. Kneel Select Switch—OFF	
9. Continuous Ignition—"OFF" (P)	
10. Fuel and Start Ignition Switches—As Required (P)	
11. Pre-Hot Refueling Unkneeling Check—"COMPLETED" (E)	

Table 3.10. Pre-Hot Refueling Checklist.

COCKPIT CREW	GROUND CREW
1. Crew Briefing—"COMPLETED" (P) <ul style="list-style-type: none"> a. Designate HRS and SPM b. Position of Aircraft: <ul style="list-style-type: none"> (1) Taxi and Parking Plan (2) FARP layouts (3) Emergency Area and Egress Procedures c. Fuel Management <ul style="list-style-type: none"> (1) Estimated offload (2) Minimum fuel necessary to complete mission d. Airplane door configuration e. Brief emergency shut-down of a refueling point 	
2. Radios and Navigation Equipment—"SET" (CP, P, N) <p style="text-align: center;">WARNING</p> Do not operate aircraft HF radio, radar, or radar altimeter within the refueling area while accomplishing FARP operations. <ul style="list-style-type: none"> a. Radios—AS REQUIRED b. Radar Altimeter—OFF c. Radar—Standby or OFF d. IFF—STANDBY 	
3. Hot Brake Check—"COMPLETED" (LS, RS) <p style="text-align: center;">WARNING</p> If brakes are hot, delay the refueling operation until the brakes cooled.	1. Hot Brake Check—"COMPLETED" (LS, RS) <p style="text-align: center;">WARNING</p> If brakes are hot, delay the refueling operation until the brakes cooled.
4. Refueling Equipment—"POSITIONED" (LS, RS)	2. Refueling Equipment - "POSITIONED" (LS, RS) <ul style="list-style-type: none"> a. External power (if available)—CONNECTED (LS, RS) b. FAM Cart (if used)—IN PLACE <p style="margin-left: 20px;"><i>NOTE:</i> FAM cart fuel tank filler valve must be closed before pressurizing hoses to prevent overfilling the fuel tank.</p> c. Hoses and Connectors—IN PLACE d. Fire extinguishers & water containers—IN PLACE e. Fire Vehicle (when available)—IN PLACE
5. Refueling Nozzle—"CONNECTED AND CHECKED" (LT SPM, RT SPM)	3. Refueling Nozzle—"CONNECTED AND CHECKED" (LT SPM, RT SPM) <ul style="list-style-type: none"> a. Half Ball Coupler—One valve OPEN and one valve CLOSED b. Refueling Nozzle—CHECKED for seal and no contamination c. Bonding Wire—ATTACHED d. Refueling Nozzle—CONNECTED e. Nozzle Shut-Off Valve—OPENED

Table 3.10. Pre-Hot Refueling Checklist (continued).

COCKPIT CREW	GROUND CREW
	f. Refueling Nozzle—LOCKED AND CHECKED for security WARNING Ensure the refueling nozzle is locked and checked for security before pressurizing refueling hoses. If a nozzle can be removed, it is defective and must be replaced. g. Half Ball Coupler—Both Valves Open
6. FAM Cart (if used)—"SET" (LS, RS) 7. Fuel Management Panel—SET (E) a. Ground refuel isolation switches— REFUEL b. Boost pumps—ON <i>NOTE:</i> Only one boost pump will be turned on in a tank to be defueled.	4. FAM Cart (if used)—"SET" (LS, RS) a. Main Fuel Control Valve—FUEL POSITION b. Fuel Control Valves—OPEN
8. Leak Check—"COMPLETED (LS, RS)	5. Leak Check—"COMPLETED (LS, RS) WARNING If a leak is detected, discontinue the operation until the leak is repaired. <i>NOTE:</i> Each HDP will inspect refueling hoses from their point to the FAM cart or "X" fitting. SPM will inspect the SPR nozzle and refueling hoses from SPR to FAM cart or "X" fitting. HRS will inspect the FAM cart
9. Fuel management panel—SET (E) a. Boost Pumps—OFF b. Ground refuel isolation valve switches—DRAIN (Off after pressure is relieved from the hose)	6. FAM cart fuel tank (if used)—Filled to one-half full (LS, RS)
	7. FAM cart engine (if used)—STARTED (LS, RS) a. Fuel control valves—CLOSED <i>NOTE:</i> It may be necessary to position the main fuel control valve to an intermediate position to overcome fuel pressure within the FAM cart pump. b. Decompression "T" handle—PULLED OUT c. Throttle—PULLED OUT one-half inch d. Engine Stop/Run "T" handle— PUSHED IN e. Engine Start Rope—PULLED <i>NOTE:</i> As the rope is pulled out, push the decompression "T" handle in. f. Engine Speed—ADJUSTED <i>NOTE:</i> Pull throttle out to increase engine speed. Push in throttle to decrease engine speed. If receivers are not immediately expected the FAM cart may shut down. g. Engine Shutdown—AS REQUIRED CAUTION Accomplish engine shutdown only by pulling out the engine stop/run "T" handle.
10. Pre-Hot Refueling Checks—"COMPLETED" (LS, RS, E)	8. Pre-Hot Refueling Checks—"COMPLETED" (LS, RS, E)

3.11. Hot Refueling Checklist.

COCKPIT CREW	GROUND CREW
<p><i>NOTE:</i> Receiver crewmember will deplane and with assistance from the HDP stretch out refueling hose, and position fire extinguisher and water container.</p>	<p><i>NOTE:</i> Receiver crewmember will deplane and with assistance from the HDP stretch out refueling hose, and position fire extinguisher and water container.</p>
<p>The HRS is overall observer of the refueling operation and will monitor receiver and its crew. Refueling begins once the nozzle is attached to receiver aircraft. No signal from HDP is required.</p>	
	<p>1. FAM Cart Engine (if used)—STARTED (LS, RS) WARNING FAM cart engine shall not be started when refueling with open port nozzles</p>
<p>1. Receivers—"READY" (LS, RS)</p>	<p>2. Receivers—"READY" (LS, RS)</p>
<p><i>NOTE:</i> When performing dual refueling operations, the RT HRS will state: "Ready, RS" as soon as receivers are ready without waiting for the LT HRS to respond first.</p>	<p><i>NOTE:</i> When performing dual refueling operations, the RT HRS will state: "Ready, RS" as soon as receivers are ready without waiting for the LT HRS to respond first.</p>
<p>2. Fuel Management Panel—SET (E) a. Ground Refuel Isolation Valve Switches—REFUEL b. Boost Pumps—ON</p> <p style="text-align: center;">CAUTION</p> <p>Do not defuel No.2 and No. 3 main tanks below 4,500 pounds. Failure to comply could result in airplane hydraulic system failure.</p>	<p>a. Refueling Nozzle—CONNECTED (1) Half Ball Coupler—One valve OPEN, one valve CLOSED (2) Refueling Nozzle—CHECKED (3) Bonding Wire—ATTACHED (4) Refueling Nozzle—CONNECTED (5) Refueling Nozzle—LOCKED AND CHECKED for security WARNING If a nozzle can be removed, it is defective and must be replaced. Do not pressurize the refueling hose until this check is completed.</p> <p>(6) Half Ball Coupler—Both Valves OPEN b. Fire Guard—IN POSITION</p>
<p>If tanks are being completely defueled, do not leave the pump switches on the ON position for longer than 15 minutes after the corresponding PRESS LOW lights come on. Failure to comply could damage the pumps. <i>NOTE:</i> Only the boost pump will be turned on in the tank to be defueled.</p>	
	<p>3. FAM Cart (if used)—SET (LS, RS) a. Fuel Control Valves—OPEN b. Engine Speed—ADJUSTED WARNING Do not allow manifold pressure to exceed 50 PSI after receiver hookup due to pressure surge on receiver fuel system.</p>

3.11. Hot Refueling Checklist (continued).

COCKPIT CREW	GROUND CREW
	<i>NOTE:</i> When refueling multiple receivers concurrently, stop refueling individual refueling point by closing the FAM cart fuel control valve for the affected point. Do not turn off the fuel boost pumps. Continue to refuel receivers at other refueling points.
3. Fuel Offload—"COMPLETED" (LS, RS) <i>NOTE:</i> If more receivers are to be refueled, reaccomplish items 1 through 3. After the last receiver has been fueled and is clear, each HRS will state "Refueling Complete." <i>NOTE:</i> When refueling multiple receivers concurrently, stop refueling individual refueling point by closing the FAM cart fuel control valve for the affected point. Do not turn off the fuel boost pumps. Continue to refuel receivers at other refueling points.	4. Fuel Offload—"COMPLETED" (LS, RS) <i>NOTE:</i> Optimum fuel flow is achieved when the manifold pressure is equal to or slightly higher than the intake pressure. WARNING Do not stop defueling by closing the SPR nozzle shutoff valve on the tanker aircraft. 5. Receiver Refuel Nozzle—DISCONNECTED a. Half Ball Coupler—One valve OPEN, one valve CLOSED b. Refuel Nozzle Shutoff Valve—CLOSED c. Refueling Nozzle—DISCONNECTED d. Bonding Wire—DISCONNECTED
4. Boost Pumps—"OFF" (E)	<i>NOTE:</i> If more receivers are to be refueled, reaccomplish items 1 through 4. After the last receiver has been fueled and is clear, each HRS will state "Refueling Complete."
5. Hot Refueling Checks—"COMPLETED" (LS, RS, E)	6. Hot Refueling Checks—"COMPLETED" (LS, RS, E)

Table 3.12. Post-Hot Refueling Checklist.

COCKPIT CREW	GROUND CREW
1. Refuel/Fill Valves—AS REQUIRED (E) <i>NOTE:</i> Open appropriate valves to assist in evacuating fuel from the refueling hoses.	1. FAM Cart (if used)—SET (LS, RS) a. Engine—STARTED b. Main Fuel Control Valve—DEFUEL c. Control Valves—OPEN d. Control Valves—CLOSED <i>NOTE:</i> Close appropriate control valve after each refueling point hose is drained. e. Refueling hose between SPR and FAM cart disconnected at FAM cart coupler. f. Engine—SHUT DOWN
	2. External Pump—CONNECTED (SPM) a. Half Ball Coupler—Valves CLOSED (at 10-foot section of the refueling hose) b. Refueling Hoses—CONNECTED to External Pump c. Half Ball Couplers—Valves OPEN
	3. External Pump—ON (SPM)
	4. Pump Leak Check—COMPLETED (SPM)
	5. Refueling Hoses—DRAINED (LS, RS)
	6. External Pump—OFF (SPM)
	7. Refueling Hose—Disconnected from External Pump (SPM)

Table 3.12. Post-Hot Refueling Checklist (continued).

COCKPIT CREW	GROUND CREW
2. Refueling Nozzle—"DISCONNECTED" (LT SPM, RT SPM)	8. Refueling Nozzle—"DISCONNECTED" (LT SPM, RT SPM) <ol style="list-style-type: none"> Half Ball Coupler—One valve OPEN, one valve CLOSED Refueling Nozzle Shutoff Valve—CLOSED Refueling Nozzle—DISCONNECTED Bonding Wire—DISCONNECTED
3. Ground Refuel Isolation Valves—DRAIN (OFF after 8 minutes) (E)	9. SPR Cap—INSTALLED/LOCKED (SPM)
4. Post-Hot Refueling Checks—"COMPLETED" (LS, RS, E)	10. Post-Hot Refueling Checks—"COMPLETED" (LS, RS, E)

3.7. Post-Hot Refueling Kneeling. The checklist at **Table 3.13.** will configure the aircraft for retrieval of FARP equipment and personnel after FARP operations with the aircraft in an unknelt position.

Table 3.13. Post-Hot Refueling Kneeling Checklist.

COCKPIT CREW	GROUND CREW
1. "POST-HOT REFUELING KNEELING CHECKLIST" (E)	
2. ATMs—AS REQUIRED (E)	
3. "VISOR CLEARED TO OPEN" (E)	1. "VISOR CLEARED TO OPEN" (E)
4. MLG Caster Switch—"CASTER" (P)	2. Visor—OPEN <ol style="list-style-type: none"> Ground Control Switch—OPERATE Visor Operate Switch—OPEN/OFF
5. Crew Entrance Door and Kneeling Configuration—"COMPLETED, CLEAR TO KNEEL" (S)	3. Crew Entrance Door Ladder—POSITIONED
6. Kneel Select Switch—"AS REQUIRED" (E)	4. Crew Entrance Door and Kneeling Configuration—"COMPLETED, CLEAR TO KNEEL" (S) <ol style="list-style-type: none"> Crew Entrance Door Ladder Position Lever— POSITIONED NLG Strut Limiter—AS REQUIRED NLG Folding Bulkhead—UNLOCKED Kneel Pad Actuator Switch—EXTEND/OFF Kneel Pad Extend Pin—INSTALLED Level Kneel Pad—POSITIONED
7. Kneel Command Switch—"KNEEL" (E)	
8. Nose Landing Gear—"KNEELED" (E)	5. Nose Landing Gear—"KNEELED" (E)
9. Kneeling Operations—"COMPLETED" (E)	6. Forward Ramp—POSITIONED <ol style="list-style-type: none"> Ramp Select Switch—DRIVE-IN Ramp Operate Switch—OPEN/OFF Ground Control Switch—COMPLETE
	7. Airplane—CLEARED TO ONLOAD
10. Post-Hot Refueling Kneeling Checklist—"COMPLETED" (E)	

3.8. Crew Hot Refueling Emergency Procedures: The HRS will assume immediate control in a refueling emergency, except for control of fire fighting units. If an emergency occurs during dual FARPs, the entire refueling operation (both FARPs) will be shut down until the problem can be corrected. Use the procedures in **Figure 3.1.** through **Figure 3.7.**, as appropriate:

Figure 3.1. Fuel Spill/Leak Checklist.

Fuel Spill/Leak

1. Shut down refueling operation (HRS, SPM, E)
2. Determine cause of leak (HRS)
3. Repair or replace hose or nozzle (HDP, SPM)
4. If unrepairable, terminate refueling operation (HRS, P)
5. Soak up any fuel spill (HRS, HDP, SPM)

NOTE: The HRS determines if other points are capable of continuing FARP operations after emergency procedures are completed.

Figure 3.2. Safety Clearance Compromised Checklist.

Safety Clearance Compromised:

1. Shutdown refueling operation (HRS, E)
2. Correct unsafe condition (HRS)

Figure 3.3. First-Aid for Personnel Sprayed with Fuel Checklist.

First-Aid for Personnel Sprayed with Fuel:

1. Immediately flood the contaminated area with large quantities of water and wash with soap if possible.
2. Notify medical personnel, as soon as possible.
3. Remove all contaminated clothing.
4. Continue irrigation of the contaminated area with water as long as burning persists.

Figure 3.4. FAM Cart Malfunction Checklist.

FAM Cart Malfunction.

1. Close emergency fuel valve by rotating the handle down (HRS)
2. Engine—Shutdown (HRS)
3. Close fuel control valves (HRS)
4. Close dry break coupling valves, disconnect hoses from FAM cart for FAM cart leak (HRS)
5. Soak up any fuel spill (HRS, SPM, HDP)

CAUTION

FAM cart engine shutdown shall only be accomplished by pulling the STOP/RUN "T" handle.

NOTE

If refueling operation must be continued to meet mission requirements, replace the FAM cart with an "X", "T", or "Y" fitting.

Figure 3.5. Fire and Explosion Checklist.**Fire and Explosion.**

1. Shut down refueling operation (HRS, E)
2. Disconnect refuel nozzle from tanker and receiver aircraft (SPM, HDP)
3. Move refuel hose away from the tanker and receiver aircraft (SPM, HDP)
4. Move tanker aircraft from the area (HRS, E, P)

Figure 3.6. Emergency FARP Egress Checklist.

Emergency FARP Egress. This checklist is designed to allow aircraft to depart the immediate FARP location by taxiing forward on two operating engines in the event of a crash, spill, or fire in the FARP area. This checklist will be called for by the pilot and read by the flight engineer. Once the HRS calls "All Clear", the pilot may advance throttles and move the aircraft. If no engines are running, the "SOLL II Starting Engines" checklist can be initiated to start enough engines to allow the aircraft to taxi.

1. Refueling Hoses and Equipment—"DISCONNECTED" (SPM)
2. Ground Clearance—"ALL CLEAR" (HRS)

Figure 3.7. Emergency Quick Start Checklist.

Emergency Quick Start. This checklist is designed to start the remaining engines quickly and allow the aircraft to depart the airfield in event of emergency. Ground personnel will be onloaded; however, all equipment will be left behind to allow for timely departure. this checklist will be called for by the pilot, and read by the flight engineer. The SOLL II Block-Out and normal Line-Up Checklist must be completed before take-off.

1. Refueling hoses and equipment - "DISCONNECTED" (SPM)
2. Fuel Boost Pumps - As Required (E)
3. Clear to Start Engines - "ENGINES CLEAR TO START" (S)
4. Applicable Engines - "STARTING ENGINES ____ AND ____" (P)
5. Quick Start Checklist - "COMPLETED" (P, E, S)