

**BY ORDER OF THE SECRETARY  
OF THE AIR FORCE**

**AIR FORCE MANUAL 10-3511**

**2 DECEMBER 2020**



**Operations**

**PARARESCUE AND COMBAT  
RESCUE OFFICER OPERATIONS**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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OPR: AF/A3S

Certified by: AF/A3S  
(Brig Gen Thomas P. Palenske)

Supersedes: AFI16-1202, 3 May 01

Pages: 125

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This publication implements Air Force Policy Directive (AFPD) 10-35, *Battlefield Airmen*, AFPD 10-30, *Personnel Recovery*, and references Air Force Tactics, Techniques and Procedures (AFTTP) 3-1.GA, *Tactical Employment – Guardian Angel (S)* and AFTTP 3-3.GA, *Combat Aircraft Fundamentals – Guardian Angel*. It establishes policy for Pararescue and applies to individuals at all levels in the Regular Air Force, the Air Force Reserve and Air National Guard (ANG), except where noted otherwise (for the purpose of this manual, the ANG is considered a Major Command (MAJCOM)). Operators temporarily or permanently assigned to a chartered test organization may deviate from the contents of this manual as outlined in individually approved test plans required for test and evaluation purposes. This publication may be supplemented at any level, but all supplements will be routed to the Office of Primary Responsibility (OPR) listed above for coordination prior to certification and approval. Refer recommended changes and questions about this publication to the OPR listed above using the AF Form 847, *Recommendation for Change of Publication*. Route AF Forms 847 from the field through the appropriate chain of command. The authorities to waive wing/unit level requirements in this publication are identified with a Tier (“T-0, T-1, T-2, T-3”) number following the compliance statement. See Department of the Air Force Instruction (DAFI) 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestor’s commander for non-tiered compliance items. Send approved T-2 and T-3 waivers to AF/A3S (with the Lead MAJCOM OPR as an informational addressee) within three duty days for tracking and process improvement. **(T-1)**. Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction 33-322, *Records Management and Information*

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### ***SUMMARY OF CHANGES***

This manual has been substantially revised, and needs to be completely reviewed. A significant amount of procedural information has been removed and incorporated in other publications. New guidance includes: environmental considerations; roped rescue, extrication, confined space/structural collapse, snow/ice/avalanche operations; updates for new aircraft and equipment; tandem parachuting calculations and procedures; equipment maintenance and inspection and the inclusion of a local procedures chapter.

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## Chapter 1

### GENERAL INFORMATION

**1.1. Purpose.** This manual outlines standard operating procedures for PJ and CRO operations during Personnel Recovery and/or sensitive item recovery operations, and in support of Global Access and Precision Strike operations when applicable.

**1.2. Applicability.** This manual applies to operators (i.e., PJs, CROs and other attached Special Warfare Airmen), support personnel, and their managers across the full range of military operations. This manual prescribes guidance for PJ and CRO operations under most circumstances, but is not a substitute for sound judgment or common sense. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

**1.3. Key Words Explained.**

1.3.1. "Will", "Must" 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. "**Note**" indicates operating procedures, techniques, etc., considered essential to emphasize.

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

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

1.3.7. See [Attachment 1](#), Glossary of References and Supporting Information, for additional terms.

**1.4. Deviations.** Do not deviate from the instruction and procedural guidance in this manual except when the situation demands immediate action to ensure safety (specifically, the protect against death or serious bodily injury) or an urgent requirement exists; any deviation must be approved by the appropriate Tier waiver authority. In this case, the Team Commander, or Team Leader in their absence, will evaluate all options and take the appropriate action to ensure the safety of those under their control.

1.4.1. Units will report all deviations without an approved waiver to the appropriate waiver authority (with the Lead MAJCOM OPR and AF/A3S as informational addressees) within 24 hours or when tactically/operationally feasible. (**T-1**).

1.4.2. When it is necessary to protect those under their control from a situation not covered by this manual and immediate action is required, the Team Commander has ultimate authority and responsibility for the course of action to be taken.



**1.5. Conflicting Supplement Procedures.** This manual is a basic directive and will be the default if there are conflicts between supplements.

1.5.1. Combined command operations. Plan and conduct all operations that include forces from multiple MAJCOMs using provisions in this manual. Do not assume or expect personnel to perform MAJCOM/Theater unique procedures without MAJCOM/A3 approval and advance training.

1.5.2. Though a unit's entries in **Chapter 19** are not a supplement, conflicts between units during combined ops will default to the lowest common derivative of this manual.

**1.6. Development of New Equipment and Procedures.** Units must obtain MAJCOM approval prior to testing new equipment or procedures that would require an update to current guidance. **(T-1).** Units are encouraged to suggest new equipment, methods, tactics and procedures. Test suggestions are made via squadron and wing weapons officers through command channels to the lead MAJCOM Weapons and Tactics Branch in accordance with Air Force Manual (AFMAN) 11-260, *Tactics Development Program* using AF Form 4326, *Tactic Improvement Proposal* for tactics and procedures and in accordance with AFI 63-101/20-101, *Integrated Life Cycle Management* using AF Form 1067, *Modification Proposal* for equipment.

**1.7. Operational Reports.** The reporting requirements in this manual are exempt from licensing in accordance with AFI 33-324, *The Air Force Information Collections and Reports Management Program*.

## Chapter 2

### ROLES AND RESPONSIBILITIES

**2.1. AF/A3S.** Develop and standardize operations guidance and procedures in coordination with all commands with assigned PJs or CROs. AF/A3S will:

- 2.1.1. Advise AF/A3 on all PJ/CRO manpower, operation, and equipment matters.
- 2.1.2. Brief/coordinate with Headquarters Air Force directorates and other officials or organizations on PJ/CRO operation and equipment matters.

**2.2. MAJCOMS.** MAJCOMS with assigned PJs or CROs will:

- 2.2.1. Supplement this publication, if necessary, with MAJCOM specific guidance and ensure supplements are available on AF e-Publishing website after publication.
- 2.2.2. Process all MAJCOM AF Form 847s for this publication and forward through stan/eval channels to the lead MAJCOM OPR.

**2.3. Lead MAJCOM.** AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems* lists the lead MAJCOMs for weapons systems encompassing PJ and CRO operations. The Lead MAJCOM OPR will:

- 2.3.1. Track all AF Form 847s, for inclusion in future interim changes or re-writes.
- 2.3.2. Track all Air Force Safety Automated System reported mishaps that pertain to PJ/CRO operations, identify trends and coordinate mitigation, risk acceptance and recommendation inclusion in published procedures.
- 2.3.3. Serve as OPR for the Guardian Angel Formal Training Unit.
- 2.3.4. Serve as OPR for the 7PR series Unit Type Code (UTCs).
- 2.3.5. Serve as OPR for Combat Air Force (CAF) Deployment schedule.
- 2.3.6. Coordinate with HH-60 and HC-130 publication review teams to ensure PJ and CRO unique requirements are addressed and implemented.

**2.4. Lead Operational Test Agencies.** 88th Test and Evaluation Squadron and 18th Flight Test Squadron will:

- 2.4.1. Provide operational test and evaluation of equipment and tactics, techniques and procedures (TTPs) to validate, enhance and/or expand the capabilities of the PJ/CRO. **(T-1)**.
- 2.4.2. Advise their MAJCOM and AF/A3S of planned deviations to this manual as authorized by validated test plans. **(T-1)**.
- 2.4.3. Notify their MAJCOM and AF/A3S of any deficiencies or improvements to this publication discovered during test operations. **(T-2)**.

## Chapter 3

### COMMAND AND CONTROL

**3.1. General.** Personnel recovery (PR) operations are dynamic, complex and time sensitive with operational and strategic importance. Geographical Combatant Commanders define theater PR Command and Control (C2) for subordinate commanders' implementation. Because of these relationships, PR C2 authorities and responsibilities vary and may not be the same for each theater.

#### **3.2. Command Authorities:**

3.2.1. Operational control (OPCON). Service component commanders normally retain OPCON over their assigned and attached Service forces in accordance with JP 3-30, *Joint Air Operations*. Commanders at all levels assess combatant command OPCON authorities and ensure unit coordination procedures and concepts are established accordingly.

3.2.2. Tactical control (TACON). TACON is command authority over assigned, attached or augmenting forces/military capabilities for a mission tasking. TACON is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control can be transferred to another component or commander and delegated. Commanders will verify TACON authority prior to executing an operation and ensure supported air and ground commanders understand C2 relationships. **(T-2)**.

3.2.3. Execute authority. Commanders with OPCON over CAF PR resources generally hold execution authority for directed missions. Commanders with execution authority formulate plans, allocate assets and approve missions through a command post or a C2 element. Operational group commanders usually serve as execution authority for local training missions.

3.2.4. Mission support. PJ/CROs may be tasked with collateral or secondary missions requiring an understanding of government agency and interagency authorities necessary to provide effective support:

3.2.4.1. Defense Support of Civil Authorities (DSCA) may require warfighting capabilities to aid recovery from disasters, declared emergencies, or to support designated law enforcement and other authorized activities in accordance with AFI 10-801, *Defense Support of Civil Authorities*. Commanders will be familiar with local installation procedures for planning, responding and supporting domestic emergencies, law enforcement support and other national security special activities. **(T-3)**. Unit personnel should be familiar with the appropriate actions to prevent human suffering and the loss of life within the limitations of DoDD 3025.18, *Defense Support of Civil Authorities (DSCA)*, and DoDD 3025.21, *Defense Support of Civilian Law Enforcement Agencies*.

3.2.4.1.1. Within the United States (US): In accordance with DoDD 3025.18, in cases of extreme emergencies (e.g., in order to prevent the loss of life, prevent human suffering or mitigate great property loss) and when a request for assistance is made by civil authority, a commander may provide immediate response by temporarily employing the resources under their control, subject to any supplemental direction provided by higher headquarters. Immediate response authority does not permit actions that would subject civilians to the use of military power that is regulatory, prescriptive, proscriptive, or compulsory.

3.2.4.1.2. Outside the US: a commander may offer assistance to host nation civil authorities in accordance with Status of Forces Agreements (SOFA), Rules of Engagement (ROE) or both. If possible, seek command approval prior to commencing these operations.

3.2.4.2. Foreign Humanitarian Assistance (FHA)/Foreign Disaster Relief (FDR): Department of Defense (DoD) activities conducted outside the US and its territories to directly relieve or reduce human suffering, disease, hunger, or privation requires systematic diplomacy and coordination to achieve a desired US intent. These DoD activities are conducted in support of other governmental departments or agencies or as part of a Geographic Combatant Command security cooperation program to achieve a specific theater campaign objective.

3.2.4.2.1. The Department of State is the lead agency for developing and implementing US foreign policy and has lead responsibility for FHA through the Bureau of Population, Refugees and Migration. US Agency for International Development/Office of Foreign Disaster Assistance is the lead agency for FDR and may deploy a disaster relief team into a crisis area to assist with assessing, coordinating and reporting on a FDR. These specialists work closely with military units and may complement recovery efforts.

3.2.4.2.2. Requests for DoD support may come from a foreign national government, from a country team or both. The DoD should coordinate with the Chief of Mission and country team prior to deploying to assess restrictions and constraints such as SOFA, treaties or other international agreements or arrangements. PR forces may be tasked as part of a Joint Task Force or as an independent entity to support the country team. PR commanders should liaise and maintain a representing presence within JTF headquarter elements and if available, embed personnel in the appropriate operation centers.

**3.3. Command and Control (C2) Responsibilities.** CROs and PJs will be assigned operational roles and responsibilities consistent with their qualifications and experience. (T-2). Depending on the assigned mission, the following responsibilities may be assigned:

3.3.1. Team Leader (TL). A PJ qualified to lead personnel in accordance with AFTTP 3-3.GA.

3.3.2. Team Commander (TC). A CRO qualified to command personnel in accordance with AFTTP 3-3.GA. In cases when the rescue force operates on the ground with no pre-designated ground force commanders (GFC), TCs will act as GFC and have the appropriate authority to accomplish assigned missions. **(T-3)**. The GFC must approve all effects within the operating zone and terminal area to include weapons employment and insertion or extraction activities. **(T-3)**. In cases where supporting forces are assigned to the tactical, maneuver unit (e.g., security teams, interpreters, or medical specialists), TCs are responsible for the welfare and command of the entire force. In the absence of a TC, the senior PJ assigned TL duties will assume GFC duties and responsibilities. **(T-3)**.

3.3.3. Mission Commanders (MC). A CRO who is qualified as a TC and appointed specific command responsibilities based on experience, competence and commander's trust. MCs have the authority to execute missions of increased size, complexity, and force integration.

3.3.3.1. In general, commanders should appoint a MC to lead an operation for complex or high-visibility operations.

3.3.3.2. For integrated Air Force or joint PR operations, the commander should appoint a CRO as MC for missions where the preponderance of operations requires the specific expertise resident in PJ/CROs. Often, that expertise includes command of extended surface operations on land and water, mass casualty operations and complex technical rescue operations.

3.3.3.3. In those cases where multiple units, platforms or capabilities are assembled into a task force for a specific mission with an MC in command, the MC is responsible for the welfare of the task force and will maintain command and control throughout the operation. **(T-3)**. Once the execute authority has been granted, the MC is the delegated TACON command authority during an operation and will direct and monitor subordinate commanders' actions and support their requirements throughout the mission. **(T-3)**.

## Chapter 4

### MISSION PLANNING

**4.1. General.** Planning is the art and science of comprehending a situation, envisioning a desired end-state and laying out effective ways to bring about a conceptualized future. Planning involves skill, knowledge, experience and innovation to ensure success. The planning continuum requires continuous operational assessments to adapt to changing conditions while minimizing risk.

**4.2. Planning Process.** PR requires detailed planning, coordination and a concerted effort from multiple personnel. Plans, or concept of operations, are developed with an operation process where problems are analyzed and solutions are developed. Planners should conduct a comprehensive analysis of potential missions to determine suitable concept of operations. Commanders should drive the operation process and lead others in understanding, visualizing, describing and assessing capabilities. Leaders should synchronize capabilities and maintain information flow during the operation process.

4.2.1. Joint Planning Process (JPP). Planners should use JPP, or a similar process (e.g., the Army's Military Decision Making Process) to build base plans. According to JP 3-0, *Joint Operations*, The JPP underpins planning at all levels and for missions across the range of military operations. Commanders should routinely use JPP to plan, prepare, execute, assess and adapt their concept of operations to increase awareness and to reduce risk.

4.2.2. Troop-Leading Procedures (TLPs). Leaders should use TLPs when tasked with the responsibility of a mission. Leaders should identify the appropriate base plan, developed through JPP, and extract pertinent information. This starting point facilitates a leader's ability to task, prioritize and allocate resources and identify necessary decision points.

4.2.3. Refer to AFTTP 3-3.GA for Personnel Recovery Annex planning tactics, techniques, and procedures (TTPs).

**4.3. Responsibilities.** Planning and preparation is a mission wide responsibility shared by operators, enablers, support and service support personnel alike. The dynamic nature of PR requires an entire unit's participation. Leaders maintain a high-level readiness with active involvement from all unit personnel.

4.3.1. Commander will ensure unit planning is consistent with Designed Operational Capability and Mission Essential Task Listing. **(T-1)**.

4.3.2. Unit members will comprehend mission-planning responsibilities. **(T-3)**.

4.3.3. Survival, Evasion, Resistance and Escape (SERE) Specialist will:

4.3.3.1. Provide team with baseline area of responsibility (AOR) SERE considerations; assist with development of Emergency plan of action (EPA) (as required), and leverage Joint Personnel Recovery Center and Personnel Recovery Coordination Cells for support. **(T-3)**.

4.3.3.2. Provide commanders with isolated personnel (IP) PR data. **(T-3)**.

**4.4. Operational Alert.** Planning and preparation will include operational alert crew rest and duty limitation considerations. **(T-3)**. For personnel not on aircrew status, use the following as a guide for risk management (RM).

4.4.1. Commanders will identify and notify personnel, when the unit has been tasked to maintain an alert posture, for a specific mission or duration. **(T-3)**.

4.4.2. Personnel will adhere to local area procedures when tasked with an alert duty. **(T-3)**.

4.4.2.1. Prior to assuming alert, operators must have the opportunity for at least 8 hours of uninterrupted sleep (operational dependent). **(T-3)**. Commanders should use discretion when assuming a non-airborne alert.

4.4.2.2. Leaders will monitor rest cycles during alert duty periods. **(T-3)**.

4.4.3. The alert period begins upon notification, or upon assumption of alert.

4.4.3.1. Operators will attend daily briefings during alert. **(T-3)**. Briefings should include updates on mission information, safety considerations, rules of engagement, and information on special interest items.

4.4.3.2. Operators may complete initial alert activities (e.g., transportation, briefing, equipment preparation, communications check) without assuming alert.

#### **4.5. Crew Rest and Duty Limitations.**

4.5.1. AFMAN 11-202V3, *Flight Operations*, establishes crew rest as a 12-hour rest period with an opportunity for eight hours of uninterrupted sleep.

4.5.2. TCs and TLs monitor mission parameters and with risk analysis, may request a waiver to the crew rest requirements of AFMAN 11-202V3 in order to facilitate mission accomplishment.

4.5.3. Members will not conduct flight, parachute, or dive operations:

4.5.3.1. Within 12 hours after completing hypobaric (altitude) chamber rides at or above 25,000 feet mean sea level. **(T-1)**.

4.5.3.2. Within 12 hours after consuming alcohol **(T-2)** or if impaired by alcohol or any other intoxicating substance, to include the effects or after-effects. **(T-0)**.

4.5.3.3. Within 72 hours after donating blood, plasma, or bone marrow. **(T-1)**.

4.5.3.4. Refer to the current revision of SS521-AG-PRO-010, *U.S. Navy Diving Manual* (<https://www.navsea.navy.mil/Home/SUPSALV/00C3-Diving/Diving-Publications/>) for criteria for parachute/flight duties after diving or hyperbaric (recompression) chamber rides.

**4.6. Mission Reports.** Complete consolidated mission reports (CMR) following all operational recovery missions or reintegration activities where PJ or CROs are involved. **(T-2)**.

4.6.1. TCs and TLs should be aware that many decisions regarding policies, TTP, and equipment are based in part on the recommendations contained in CMRs. Prepare a CMR as soon as possible following all missions. TCs and TLs will prepare a CMR for any mission in which a team launches (regardless of outcome) or engages in a mission of opportunity. **(T-3)**. Examples include (but are not limited to): searches; equipment and remains recoveries; Tactical Evacuation (TACEVAC); Casualty Evacuation (CASEVAC); reportable training injuries; and combat and civil search and rescue. Solicit inputs from all team members. Utilize the standard CMR format located on the Guardian Angel (GA) SharePoint®'s Weapons and Tactics page (<https://cs2.eis.af.mil/sites/13306/>).

4.6.2. All efforts should be made to sanitize CMRs containing classified and personally identifiable information and submit an unclassified equivalent.

4.6.3. Commanders should consider consolidating and submitting CMRs for exercises, full mission profile, or training evolutions where lessons learned would benefit the community.

4.6.4. Commanders will submit CMRs through the chain of command to the MAJCOM OPR within five duty days. **(T-3)**.

4.6.5. MAJCOM guidance. MAJCOMs will submit reports to Lead MAJCOM OPR within five duty days of receiving them from the field. **(T-1)**.

4.6.6. Lead MAJCOM will maintain the repository for all CMRs. **(T-1)**.

4.6.6.1. Un-classified reports will be posted to the Guardian Angel (GA) SharePoint® Weapons and Tactics page. **(T-1)**.

4.6.6.2. Classified CMRs will be posted to the GA Intelink page. **(T-1)**.

4.6.6.3. Maintain records in accordance with AFI 33-322.



## Chapter 5

### OPERATOR COMBAT SKILLS

**5.1. General.** The PJ/CRO operator is specially trained with specific skills and tools to employ anywhere, anytime. By conducting combat rehearsals involving technical tasks, numerous resources and chaotic conditions, leaders ensure the highest potential for survival and success on the battlefield.

**5.2. Procedures.** Squadron commanders will establish combat skill standard operating procedures (SOPs) and comply with local area or range standards during rehearsals. **(T-3)**. Procedures include:

5.2.1. Individual combat skills.

5.2.1.1. Combatives: Procedures should emphasize offensive, defensive, and controlling techniques. All techniques should be applicable and applied in multiple environments and conditions, with combat load, standing or ground based. These techniques must be easy to teach, remember and employ. Conduct training on mats or soft surfaces to prevent injury during falls or throws. **(T-3)** Personnel will wear appropriate personal protective equipment (PPE). **(T-3)**. Procedures include:

5.2.1.1.1. Weapon transition and retention while manipulating compliant and non-compliant personnel. Training scenarios should be live and consist of lethal and less-than-lethal solutions.

5.2.1.1.2. Control of personnel to conduct search, restraint or a combination of both.

5.2.1.1.3. Use of edged weapons (as required).

5.2.1.1.4. Use of improvised weapons (as required).

5.2.1.1.5. Use of unarmed combative techniques.

5.2.1.2. Combat leadership. Due to the dynamic nature of combat and rescue operations, all CROs and PJs must be trained in leading combat and rescue drills through tactics, techniques and procedures in order to maximize team effectiveness. **(T-2)**. Squadrons should maintain a professional development program providing operators with technical and academic training necessary to grow as an operator.

5.2.1.3. Weapons handling. PJ/CROs must be experts with all assigned weapons. **(T-1)**. In order to disarm patients or enemy combatants, PJ/CROs will also be familiar with the operating procedures for enemy weapons being used in assigned AORs. **(T-2)**. Squadrons should maintain a variety of foreign weapons to ensure each operator's familiarity.

5.2.1.4. ROEs must be explicit for all mission sets. **(T-2)**. All personnel will be familiar with the ROEs and their application to the specific mission. **(T-3)**.

5.2.2. Small unit tactics. PJs and CROs will be trained to work in small teams and augment larger teams. **(T-1)**. Training includes, but is not limited to:

5.2.2.1. Visual Signals.

5.2.2.2. Radio Communications.

5.2.2.3. Movement in Formations (Mounted/Dismounted, Ground/Maritime).

5.2.2.4. Maneuvers/Immediate Actions.

5.2.2.5. Aircraft on/offloading. PJ/CROs often serve as a vital ground-to-air link for aircrew and survivors.

5.2.2.6. Military operations in urban terrain.

5.2.2.7. Assault landing survey and clearance.

5.2.2.7.1. Rotary wing aircraft.

5.2.2.7.2. Tilt rotor aircraft.

5.2.2.7.3. Fixed wing aircraft.

5.2.2.8. Crew served weapons.

5.2.2.9. Fire support. When PJ/CRO are on the ground.

5.2.2.9.1. Call for fire.

5.2.2.9.2. Terminal air control (as required).

5.2.2.9.3. Close air support (as required).

5.2.2.9.4. Artillery (as required).

5.2.3. Hostage rescue and recovery PR support for the joint force. PJ/CRO personnel will be trained for executing dynamic rescue:

5.2.3.1. Engagement of the enemy to rescue a detained IP. **(T-1)**.

5.2.3.2. Execution of interdiction, or rescue during movement of the hostage for all modes of travel (dismounted and mounted). **(T-1)**.

5.2.4. Maritime. PJ/CRO personnel will be experts in water rescue and train for the following missions:

5.2.4.1. Underway recovery. **(T-1)**

5.2.4.2. Open ocean surface search. **(T-1)**

5.2.4.3. Subsurface search. **(T-1)**

5.2.4.4. Sonar systems. **(T-3)**

5.2.4.5. Coastal and inland waterway recovery operations. **(T-1)**

5.2.5. Administrative requirements for live weapons training.

5.2.5.1. Equipment requirements.

5.2.5.1.1. The individual will have:

5.2.5.1.1.1. Slings/holsters for weapons as applicable. **(T-3)**.

5.2.5.1.1.2. Ballistic-rated eye protection. **(T-3)**

5.2.5.1.1.3. Ear protection. **(T-3)**. Either active or two forms of protection are recommended.

5.2.5.1.1.4. Body armor and ballistic helmet will be worn during live fire immediate action drills, demolition operations, or weapons firing at close proximity to steel targets (7m for pistol/50m for rifle, unless manufacturer's minimum safe engagement distance is different). (T-2).

5.2.5.1.1.5. Multi-tool or similar device for sight adjustment and operator level maintenance (recommended).

5.2.5.1.1.6. Dump pouch (optional).

5.2.5.1.1.7. Blowout kit (optional, PJ Medical Operations Advisory Board (MOAB) packing list: <https://cs2.eis.af.mil/sites/13306/medical/SitePages/Home.aspx>).

5.2.5.1.2. The team will have:

5.2.5.1.2.1. Weapons and ammo. (T-3).

5.2.5.1.2.2. Team medical kit in accordance with unit SOPs (**Chapter 19** and PJ MOAB approved packing lists located on the medical site of the GA SharePoint®: <https://cs2.eis.af.mil/sites/13306/medical/SitePages/Home.aspx>). (T-3).

5.2.5.1.2.3. Team litter in accordance with unit SOPs (**Chapter 19**). (T-3).

5.2.5.1.2.4. Voice communication method for emergencies. (T-3).

5.2.5.1.2.5. Range box/general resupply. (T-3).

5.2.5.2. Proficiency requirements.

5.2.5.2.1. Individual. All PJ/CROs will be current through the Air Force Qualification Course prior to engaging in proficiency fire. (T-3).

5.2.5.2.2. Live fire rehearsals. Live fire rehearsals should be preceded with a dry fire walk through within 24 hours of live fire for dynamic ranges or Close Quarters Combat (CQC).

5.2.5.3. Weapons and munitions.

5.2.5.3.1. Security transportation and storage. Weapons and ammunition security will be maintained in accordance with AFMAN 31-101, Volume 2, *Physical Security of Sensitive Conventional Arms, Ammunition, & Explosives (AA&E)*, at all times. (T-1). Weapons will not be left unattended for any reason. (T-1).

5.2.5.3.2. Non-lethal marking round. Operator and supporting personnel are authorized to use non-lethal marking rounds. Using units will maintain operating instructions detailing the use of non-lethal marking rounds. (T-3).

5.2.5.3.3. Lasers operations. General laser training rules are covered in the following regulations: AFI 11-214, *Air Operations Rules and Procedures*, and AFI 48-139, *Laser and Optical Radiation Protection Program*. Individuals will treat lasers as weapons and apply the following:

5.2.5.3.3.1. Do not point in the direction of personnel or reflective surfaces to prevent potential laser exposure hazards. **(T-2)**. **Exception:** Lasers may be used during force on force training, provided all participants are equipped with the appropriate PPE and the laser is set or filtered for force on force training and inspected by the appropriate supervisor.

5.2.5.3.3.2. Never point laser at aircraft. **(T-0)**.

5.2.5.3.4. Pyrotechnics. PJ/CRO will be trained to use all pyrotechnics assigned and authorized for their use. **(T-3)**. Pyrotechnics should be incorporated into training whenever possible.

5.2.5.4. Range operations. Commanders will have policy for range operations and establish range procedures for each range and rehearsal activity. **(T-3)**. The qualified Range Safety Officer (RSO) is responsible for the safe conduct of personnel involved in training operations.

5.2.5.4.1. All events will be briefed prior to execution. **(T-3)**.

5.2.5.4.2. All events that require the shooter to move will follow a progressive training concept, with considerations for experience level, proficiency and individual frequency of training. **(T-3)**. Leaders will use appropriate RM principles to ensure training is conducted safely. **(T-3)**.

5.2.5.4.3. Commanders will appoint RSOs to supervise range activities. **(T-3)**. An RSO will be present during all live fire and non-lethal marking round rehearsals. **(T-3)**. RSO procedures will include:

5.2.5.4.3.1. Review and be familiar with the range procedures. **(T-3)**.

5.2.5.4.3.2. Inspect the range, barriers and impact zones. **(T-3)**.

5.2.5.4.3.3. Establish weapons employment zones/fields of fire. **(T-3)**.

5.2.5.4.3.4. Post range guards or warning barriers (as required). **(T-3)**.

5.2.5.4.3.5. Have two-way communication and contact appropriate officials. **(T-3)**.

5.2.5.4.3.6. Display range flag (as required). **(T-3)**.

5.2.5.4.3.7. Brief personnel and inspect equipment, weapons and ammunition. **(T-3)**.

5.2.5.4.3.8. Clear range after completion. **(T-3)**.

5.2.5.4.4. Range Medic. A qualified medic will be present during all range activities and have the mandatory medical equipment outlined in [Chapter 19](#), Local Operating Procedures. **(T-3)**. The medic will ensure medical equipment is immediately available and medical evacuation plan is established. **(T-3)**. PJs are authorized to perform the training event when assigned as the range medic.

5.2.5.4.5. Range Safety. Safety will be practiced at all times when performing weapons and tactical training. (T-3). It is the responsibility of each individual to stop the event when an unsafe condition exists. Once the unsafe condition and the cause are corrected, the training evolution may continue.

**5.3. Proficiency Fire and Minimum Safe Distances.** In order to perform any weapons proficiency training, PJ/CRO personnel must be current and qualified in accordance with AFI 36-2654, *Combat Arms Program*, for the weapon they will fire. (T-2). While performing proficiency firing, members will adhere to the following minimum safe distances:

5.3.1. Paper targets. There is no minimum safe distance for paper targets. However, if the backstop is within the minimum safe distance and ricochet is possible, adjust the minimum safe distance as required. (T-3).

5.3.2. Steel targets.

5.3.2.1. Examine steel targets for deterioration (e.g., dimpling or cratering; concave or convex warping; cracks, joints or holes in the target surface) and properly tightened/intact fasteners before and after each day's use (and whenever damage is suspected). A chip on the edge of a steel target strike plate should not be considered a crater. A deteriorated target should be removed from use or permanently relegated to long-range use (>100yds).

5.3.2.2. Minimum safe distance in accordance with Department of Energy Publication, *Use of Bullet Traps and Steel Targets* will be followed. **Note:** Manufactures' guidance may differ from these established distances. Reference the manufacturer specifications prior to engaging steel targets to ensure minimum safe distance is enforced.

5.3.2.2.1. Pistol: non-jacketed frangible, jacketed frangible and jacketed ball or duty ammunition is 10 yards with no more than a 20° angle of engagement. (T-3).

5.3.2.2.2. Rifle: Jacketed frangible is 10 yards with no more than a 20° angle of engagement if the particular ammunition item passes the Department of Energy's National Training Center test protocol. (T-3).

5.3.2.2.3. Rifle: 5.56/.223 ball, duty, or untested jacketed frangible is 50 yards. (T-3).

**5.4. Static Range Firing.** A static firing range is defined when the fire line is determined to be stationary and not moving. The target line is parallel to the firing line. Shooters may change stances and move along pre-briefed lines when commanded to do so. Examples include zeroing, qualification firing, shooting while moving in briefed direction and box drills.

**5.5. Dynamic Firing Range.** A dynamic firing range is defined when a range has irregular obstacles, no established shooting lanes, or both. Shooters move through weapon employment zones while engaging targets. While target lines are clearly defined, they may be comprised of multiple lines. Examples include arroyo courses, urban streets with a predetermined path of travel, or scripted small team immediate action drills. Additional individual or team briefing requirements for Dynamic Ranges (local area procedures) include:

5.5.1. Concept of operations for the planned event. (T-3).

5.5.2. Range fan and firing limits. (T-3).

5.5.3. Individual firing limits/ fields of fire. (T-3).

5.5.4. Emergency signals and actions. (T-3).

**5.6. Close Quarters Combat (CQC)/ Open Air Combat (OAC) Ranges.** Close quarters and open air combat is defined when active shooters are separated by physical barriers and line of sight communication is compromised. Firing lines and target lines are temporary and dynamic (e.g., room clearing, urban, jungle or rough terrain). All CQC/OAC training will follow a progressive training concept, with considerations for experience level, proficiency and individual frequency of training. (T-3). Leaders will use appropriate RM principles to ensure all phases of CQC/OAC training are conducted safely. (T-3).

5.6.1. The use of flash bang stun grenades may be used if approved on the range being utilized and operators have applicable training.

5.6.2. Scenario based training may be incorporated into the plan as long as there is ample time between events to stop the progression.

5.6.3. Personnel will not engage targets closer than one meter away from another person. (T-3). **WARNING:** When shooting steel, never engage targets closer than the minimum safe distance for ricochet to another person.

5.6.4. Additional individual or team briefing requirements for CQC/OAC.

5.6.4.1. Concept of operations for the planned event. (T-3).

5.6.4.2. Range Fan and firing limits. (T-3).

5.6.4.3. Individual firing limits/ fields of fire. (T-3).

5.6.4.4. Emergency signals and actions. (T-3).

**5.7. Mounted Firing.** Mounted firing is defined as any shooting while on a moving vehicle or platform (e.g., horseback, all-terrain vehicles, cars, tactical vehicles and helicopters). Mounted firing training events will follow a progressive training concept, with considerations for experience level, proficiency and individual frequency of training. (T-3). Leaders will use appropriate RM principles to ensure training is conducted safely. They will accomplish a thorough RM for all phases of the event. (T-3).

5.7.1. The involved team will adhere to the following mounted firing restrictions:

5.7.1.1. Local RSO requirements will be in accordance with **Chapter 19**, Local Procedures. (T-3).

5.7.1.2. Firing from aircraft must be cleared through aircraft commander and briefed. (T-3).

5.7.1.3. Firing from aircraft must be accomplished on an approved aerial gunnery range. (T-2).

5.7.2. The team will cover the following additional briefing requirements for mounted firing:

5.7.2.1. Concept of operations for the planned event. (T-3).

5.7.2.2. Range Fan and firing limits. (T-3).

5.7.2.3. Individual firing limits/ fields of fire. (T-3).

5.7.2.4. Emergency signals and actions. (T-3).

5.7.2.5. CASEVAC plan to aircrew (if applicable). (T-3).

5.7.2.6. Clear to fire, cease fire, ground party communications and position, range azimuths, and a map study of the range and surrounding area. (T-3).

**5.8. Gunship Call for Fire.** Use AFTTP 3-2.6, *Multi-Service Tactics, Techniques and Procedures for the Joint Application of Firepower (JFIRE)* for guidance on call for fire. Additional briefing requirements:

5.8.1. Coordinate fire coordination line relationships with call for fire and close air support aircraft. (T-3).

5.8.2. Brief fire coordination to team and ground personnel. (T-3).

5.8.3. Brief range features to team and ground personnel. (T-3).

**5.9. Non-lethal Marking Rounds.**

5.9.1. Non-lethal marking restrictions.

5.9.1.1. No head shots against live opponents.

5.9.1.2. No shots at less than the minimum safe distance specified in the technical order for relevant non-lethal marking round.

5.9.2. Required individual equipment when non-lethal marking rounds are in use:

5.9.2.1. Ballistic paintball style face shield (Ballistic eyewear and ear protection that completely covers outer ear are suitable substitutes, though it is strongly recommended that the entire face be protected). (T-3).

5.9.2.2. Ballistic helmet. (T-3).

5.9.2.3. Gloves. (T-3).

5.9.2.4. Long sleeve shirt (recommended taking into account environmental conditions as they influence risk management).

5.9.2.5. Athletic protector (recommended).

**5.10. Pyrotechnics Operations.** PJ/CRO personnel use multiple pyrotechnics to provide realism in training. Additional guidance for handling and employment can be found in AFMAN 91-201, *Explosives Safety Standards*. Personal and team safety equipment required for training:

5.10.1. Ear protection. (T-3).

5.10.2. Eye protection. (T-3).

5.10.3. Whistle. (T-3).

5.10.4. Fire retardant gloves for handling expended pyrotechnics. (T-3).

5.10.5. Appropriate class fire extinguisher for pyrotechnics in use (1 per location). (T-3).

5.10.6. Team medical equipment in accordance with **Chapter 19** and PJ MOAB listed Ground Party Load out located on the Medical site of the GA SharePoint®: <https://cs2.eis.af.mil/sites/13306/medical/SitePages/Home.aspx> (T-3).

**5.11. All-Terrain Vehicles (ATVs).** While operating ATVs or other special purpose tactical vehicles, personnel will wear a MAJCOM approved tactical helmet or DOT approved helmet (M-Series vehicles are excluded) in addition to eye protection and other appropriate protective equipment. **(T-3).** (Refer to AFI 91-207, *The US Air Force Traffic Safety Program*, for motorcycle and ATV qualification courses).

**5.12. Night Vision Device (NVD) Driving.**

5.12.1. Operators must be qualified to drive a vehicle prior to driving it with NVDs. **(T-3).**

5.12.2. For training, driving with NVDs will not be performed in or around civilian traffic. **(T-3).**

5.12.3. Minimum illumination and times will be briefed prior to driving with NVDs. **(T-3).**

**5.13. Tactical Employment.** The following personal equipment is required for all operators during tactical operations unless the TL/TC completes a mission, enemy, terrain, troops - time available and civilian considerations (METT-TC) RM review and determines that the mission dictates otherwise.

5.13.1. Ballistic eye protection.

5.13.2. Ballistic helmet.

5.13.3. Body armor. **WARNING:** When using Enhanced Small Arms Protection Insert plates, a soft armor backer must be worn between the plate and body. **(T-2).** Plate deformation/spalling uninhibited by soft armor may maim or kill the operator.

5.13.4. NVDs.

5.13.5. Hearing protection.

5.13.6. Combat pill pack (analgesics/prophylactics/antibiotics).



## Chapter 6

### ENVIRONMENTAL CONSIDERATIONS

**6.1. General.** Every environment presents threats to the operator. In every operation, the threat must be acknowledged and possibly mitigated for the safe and effective execution of the PR mission set. This chapter sets out minimum requirements for addressing environments. For more information, refer to Air Force Handbook (AFH) 10-644, *Survival Evasion Resistance Escape (SERE) Operations*, AFTTP 3-3.GA, AFI 48-151, *Thermal Injury Prevention Program* and other publications listed in subparagraphs below. **Exception:** When the intent is other than operational (e.g., Monster Mash, physical training, morale or team building events) the below listed equipment may be waived or centrally positioned by the Squadron Commander or delegate, based on appropriate RM assessment.

#### **6.2. Desert.**

##### 6.2.1. Team briefing requirements.

6.2.1.1. High and low temperatures. Temperatures vary greatly in the desert environment. **(T-3).**

6.2.1.2. Hydration requirements for individual and team. **(T-3).**

6.2.1.3. Wildlife and vegetation. **(T-3).**

##### 6.2.2. Mission planning.

6.2.2.1. Dry gun lube may minimize sand and dust accumulation.

6.2.2.2. Weapons cleaning kit is required with weapon. **(T-3).**

6.2.2.3. Plan water requirements, consumption/depletion considerations, and resupply points; address resupply factors (natural or coordinated) during route study. **(T-3).**

6.2.2.4. High and low temperature forecast for duration of mission plus 72 hours.

##### 6.2.3. Personal equipment. Minimum personal protective equipment requirements for this environment.

6.2.3.1. Clothing (adequate to cover majority of exposed skin). **(T-3).**

6.2.3.2. Sunglasses. **(T-3).**

6.2.3.3. Goggles (seal must be adequate to protect eyes from fine sand particles). **(T-3).**

6.2.3.4. Sunscreen. **(T-3).**

#### **6.3. Water / Maritime.**

##### 6.3.1. Team briefing requirements.

6.3.1.1. Air temperature. **(T-3).**

6.3.1.2. Water temperature. **(T-3).**

6.3.1.3. Wave height. **(T-3).**

6.3.1.4. Significant currents. **(T-3).**

6.3.1.5. Wind speed and direction. (T-3).

6.3.1.6. Nearby shipping lanes and maritime traffic. (T-3).

6.3.2. Mission planning.

6.3.2.1. Obtain applicable information (weather, surf, tides, and currents, etc.).

6.3.2.2. Identify satellites coverage and radio procedures requirements.

6.3.2.3. Properly seal and waterproof mission essential equipment.

6.3.2.4. Properly lube and protect weapons, allowing immediate use if required.

6.3.2.5. Consider anti-nausea pre-medication.

6.3.3. Personal equipment. Minimum personal protective equipment requirements:

6.3.3.1. Flotation. (T-3).

6.3.3.2. Signal mirror. (T-3).

6.3.3.3. Sunscreen. (T-3).

6.3.3.4. Thermal/Environmental Protection:

6.3.3.4.1. A wet suit does not protect from cold air temperature or wind after leaving the water. If air temperature is a factor, a dry suit will offer protection both in and out of the water.

6.3.3.4.2. A wet suit, dry suit or maritime thermal protection suit will be worn on all operational missions when fuel spills, jellyfish, coral reefs or manmade hazards may be negotiated. (T-3).

6.3.3.4.3. In water temperatures above 70° Fahrenheit (F), the TL will prescribe the team attire to ensure adequate protection from physical, environmental and tactical dangers. (T-3).

6.3.3.4.4. In water temperatures between 60° and 70° F, as a minimum, a wetsuit top will be worn. (T-3).

6.3.3.4.5. In water temperatures between 50° and 60° F, a 5mm wetsuit or greater will be worn. (T-3).

6.3.3.4.6. In water temperatures below 50° F, a dry suit is suggested.

6.3.3.4.7. Gloves, booties and hood with commensurate thermal protection capabilities are recommended.

6.3.3.4.8. If no subsurface operations are planned, consider surface dry suit or diving dry suit with surface swimmer valves. **WARNING:** If thermal protection gloves are required, non-bulky three or five-finger gloves will be worn to enable dexterity for parachute activation/manipulation during jump operations. (T-3).

6.3.4. Physical training. When physical training is the intent, flotation is not required in open water when any of the following apply.

6.3.4.1. The water is less than 5 feet deep.

6.3.4.2. A swim buddy/observer is within 100 m.

6.3.4.3. Safety boat is present.

**6.4. Jungle.** Jungles may have very dense vegetation, vertically and horizontally, limiting view and movement.

6.4.1. Team briefing requirements.

6.4.1.1. Jungle density. (T-3).

6.4.1.2. Temperatures and humidity. (T-3).

6.4.1.3. Wildlife and vegetation. (T-3).

6.4.1.4. Lost visibility with aircraft procedures. (T-3).

6.4.2. Mission planning.

6.4.2.1. Mission planning will include a lost visibility plan for supporting aircraft. (T-3).

6.4.2.2. Frequency Modulation (FM) whip antenna should be carried.

6.4.2.3. Communications, Digital Situational Awareness and Global Positioning System (GPS) devices may be degraded in the jungle environment.

6.4.2.4. Weapons cleaning kit is required. (T-3).

6.4.2.5. Identify dangerous indigenous plant and animal life. (T-3).

6.4.3. Emergency procedures. Mission planning will include briefing anaphylaxis protocols found in latest edition of *Pararescue Medications and Procedures Handbook* (PJMPH). (T-3).

6.4.4. Personal equipment. Minimum personal protective equipment requirements for this environment:

6.4.4.1. Quick drying boots. (T-3).

6.4.4.2. Multiple pairs of socks. (T-3).

6.4.4.3. Water purification method. (T-3).

6.4.4.4. Signal mirror. (T-3).

6.4.4.5. Environmental protection from insects (as required).

6.4.4.6. Pen gun flares (as required).

6.4.4.7. A hammock with bug netting should be considered.

**6.5. Mountain.** The mountain environment includes a wide variation of terrain and environments. Elevations have a wide range and include lower adverse terrain up to alpine elevation conditions. Weather conditions can change without warning. Higher elevations increase the probability of more extreme changes in weather. Additional information can be found in AFTTP 3-1/3.GA, Army Techniques Publication (ATP) 3-90-97, *Mountain Warfare and Cold Weather Operations*, TC 3-97.61, *Military Mountaineering*, and *Mountaineering: The Freedom of the Hills* (*Freedom of the Hills*).

### 6.5.1. Team briefing requirements.

6.5.1.1. High and low temperatures at objective altitude and along route of travel. **(T-3)**.

6.5.1.2. Weather patterns for duration of mission plus 72 hours. **(T-3)**.

### 6.5.2. Mission planning.

6.5.2.1. Historical, current and forecasted weather.

6.5.2.2. Terrain analysis.

6.5.2.3. Identify danger areas/obstacles.

6.5.2.4. Identify technical requirements.

6.5.2.5. Estimate movement times.

6.5.2.6. Estimate effects of terrain and environment. (See [Table 6.1](#)).

6.5.2.7. Review procedures in applicable chapters of this manual and *Freedom of the Hills* for anchors, ascending, descending, raising, lowering, litter rigging, emergency procedures and avalanche procedures as required.

6.5.2.8. Topographical maps are recommended for all mountainous operations as the mountain environment lends itself to terrain following better than any other environment.

6.5.2.9. Proficiency, experience, strengths and weaknesses of team members. **(T-3)**.

6.5.2.10. When operating above 8,000' Mean Sea Level (MSL), teams should be equipped with drugs to counter and treat Acute Mountain Sickness, High Altitude Pulmonary Edema and High Altitude Cerebral Edema. Reference PJMPH for types/dosages. **Note:** 70-80% of respiratory acclimatization occurs within 7 days at altitudes up to 18,000 feet.

**Table 6.1. RM considerations for operations greater than 72 hours.**

Altitude in Feet (MSL)	Risk	Mitigation
8,000-14,000	Altitude Sickness and decreased performance is common	Medications required. Consider pretreatment when rapid ascent to altitudes above 8,000ft may occur Avoid onset by limiting initial ascent to no higher than 8,000ft then 1,000 ft. per day thereafter
14,000-18,000	Altitude sickness and decreased performance is the rule.	
18,000 +	With acclimatization, operators can function for short periods.	
Terrain	Risk	Mitigation
Exposed climbing	Ropes required for movement	PPE / Safety lines

6.5.3. Personal equipment. Minimum personal protective equipment requirements when planned operations are above 8,000ft.

6.5.3.1. Glasses / goggles (tinted and clear). **(T-3)**.

6.5.3.2. Wind/waterproof, breathable “hard shell” jacket. **(T-3)**.

6.5.3.3. Sunscreen. (T-3).

6.5.3.4. Consider cold weather requirements.

## **6.6. Cold Weather.**

6.6.1. Team briefing requirements.

6.6.1.1. High/Low temperatures for duration of mission plus 72 hours. (T-3).

6.6.1.2. Winds for duration of mission plus 72 hours. (T-3).

6.6.2. Mission planning.

6.6.2.1. Batteries have reduced operating times.

6.6.2.2. All electronics, including cables and cords, are prone to failure.

6.6.2.3. Weapons

6.6.2.3.1. Bring a weapon cleaning kit. (T-3).

6.6.2.3.2. Use Clean, Lubricate, Protect/Lubricant, Arctic Weapon (CLP/LAW) oil or dry lube for lubricating weapons (CLP/LAW freezes at -35° F). (T-3).

6.6.3. Personal equipment. Minimum personal protective equipment requirements when temperatures are forecasted below 32° F.:

6.6.3.1. Wind/waterproof, breathable “hard shell” top and bottom. (T-3).

6.6.3.2. Base layer, top and bottom. (T-3).

6.6.3.3. Insulating layer, top. (T-3).

6.6.3.4. Insulating hat. (T-3).

6.6.3.5. Gloves. (T-3).

6.6.3.6. Signal mirror. (T-3).

6.6.3.7. Additional individual equipment requirements when snow is present or forecasted:

6.6.3.7.1. Glasses/ goggles. (T-3).

6.6.3.7.2. Sunscreen. (T-3).

6.6.3.7.3. Boots compatible with snow travel aids (e.g., crampons, snowshoes, skis, etc.). (T-3).

6.6.3.7.4. If threat of Avalanche exists, each member will have:

6.6.3.7.4.1. Beacon. (T-3).

6.6.3.7.4.2. Probe. (T-3).

6.6.3.7.4.3. Shovel. (T-3).

**6.7. Urban.** The urban environment is characterized by hardened and sharpened artificial surfaces that may increase damage to personnel and equipment. The urban environment can have additional threats from the surrounding environment (e.g., mountainous, desert).

6.7.1. Team briefing requirements

6.7.1.1. Reference points/prominent features able to be seen from ground and air. **(T-3)**.

6.7.1.2. Primary and alternate Landing Zone (LZ). **(T-3)**.

6.7.2. Mission planning. A detailed map study must be conducted to identify the following points of interest:

6.7.2.1. Objective. **(T-3)**.

6.7.2.2. Routes of ingress/egress. **(T-3)**.

6.7.2.3. Prominent features in the area. **(T-3)**.

6.7.2.4. Potential LZs. **(T-3)**.

6.7.3. Team equipment.

6.7.3.1. M-320 (METT-TC dependent).

6.7.3.2. Hand grenades (METT-TC dependent).

6.7.3.3. Gridded Reference Graphics (as available/required).

6.7.4. Personal equipment considerations.

6.7.4.1. Knee pads.

6.7.4.2. Leather gloves.

6.7.4.3. White light (with appropriate filter as required).

6.7.4.4. Helmet.

6.7.4.5. Eye Protection.

6.7.4.6. NVDs.

**6.8. Chemical, Biological, Radiological, Nuclear and High-Yield Explosives (CBRNE).** CBRNE environment refers to the environments with suspected or confirmed contamination with chemicals, biological agents, radiation, nuclear radiation or explosive gases. In addition to the underlying environment, this section deals with the additional precautions required for operating in these environments.

6.8.1. Team briefing requirements.

6.8.1.1. Known CBRNE threat, severity and potential operational effects. **(T-3)**.

6.8.1.2. Known antidote/emergency actions. **(T-3)**.

6.8.1.3. Contaminated area. **(T-3)**.

6.8.1.4. Any equipment not authorized for use in hazardous area. **(T-3)**.

6.8.1.5. Clean area/dirty area(s). **(T-3)**.

6.8.1.6. Safe distance. **(T-3)**.

6.8.1.7. Wind speed and direction. **(T-3)**.

6.8.1.8. Decontamination plan. Both hasty and controlled. **(T-3)**.

6.8.2. Mission planning. When operating in an environment with a known CBRNE threat, planning must include the following considerations:

6.8.2.1. AFTTP 3-4, *Airman's Manual*. (T-3).

6.8.2.2. Safety Data Sheets (SDS). (T-3).

6.8.2.3. Immunizations and immunization shortfalls. (T-3).

6.8.2.4. Prophylaxis. (T-3).

6.8.2.5. Intelligence specifically for the CBRNE threat itself in addition to threats from conventional/ unconventional forces. (T-3).

6.8.2.6. Wind direction for contaminated area and objective area. (T-3).

6.8.2.7. Ensure team equipment does not pose an additional threat in the hazardous area (e.g., quickie saw operation in an explosive environment). (T-3).

6.8.3. Set up. Prior to entering hazardous areas ensure the following is accomplished:

6.8.3.1. All protective gear is donned. (T-3).

6.8.3.2. Equipment is prepared with M8 tape (as required).

6.8.3.3. Clean/Dirty lines are established. (T-3).

6.8.3.4. All air samplers are calibrated. (T-3).

6.8.3.5. Ensure ability to decontaminate / clean up personnel and equipment. (T-3).

6.8.4. Standard procedures. With the addition of protective equipment, procedures may stay the same for PJ/CRO operations. Extra care should be taken not to compromise protective equipment during operations.

6.8.5. Emergency procedures. All operators will be familiar with signs and symptoms and emergency treatment procedures for contamination as outlined in AFTTP 3-4. (T-3).

6.8.6. Clean-up/regeneration.

6.8.6.1. Any equipment or personnel entering a suspected hazardous area will be treated as contaminated until either the equipment/personnel or the area has been found clean and free of hazardous material. (T-3).

6.8.6.2. Any personnel or equipment that makes contact with contaminated personnel or equipment will also be considered contaminated. (T-3).

6.8.6.3. Contaminated personnel and equipment will not enter into clean areas until properly cleared or decontaminated in accordance with AFTTP 3-4. (T-1).

6.8.7. Team equipment.

6.8.7.1. Regardless of the hazardous determination, ensure all M8 tape is placed on equipment prior to entering affected area. (T-3).

6.8.7.2. Ensure all M8 tape is clean prior to equipment leaving the contaminated operations area. If it is contaminated, ensure proper decontamination. (T-3).

6.8.8. Personal equipment. In addition to the underlying environmental protection, additional PPE specific to the CBRNE environment is required:

6.8.8.1. Air monitors for explosive components and oxygen levels. **(T-3)**.

6.8.8.2. Chemical and biological detection materials. **(T-3)**.

6.8.8.3. Gas Mask, ground crew assemble or equivalent. **(T-3)**.

6.8.8.4. Antidotes. **(T-3)**.

## **6.9. Uniform and Grooming Considerations.**

6.9.1. Uniform deviations. Consistent with the law of war (and in cases of doubt, consult the servicing JA), commanders may authorize uniform deviation standards for operational purposes under any of the following circumstances:

6.9.1.1. The deviation is a uniform standard for all personnel with similar mission requirements (e.g., PJ/CRO conducting CAF combat search and rescue).

6.9.1.2. The deviation is an operational necessity per mission planning and analysis.

6.9.1.3. Worn while assuming an official alert or during the conduct of training. **Note:** Personnel may wear authorized non-standard duty uniforms in and around the duty station while in the performance of their assigned duties. Deviation standards will include the following removable patches: US Flag, Rank and Name/Service Tapes. **(T-3)**

6.9.2. Grooming deviations. Commanders should authorize grooming deviations standards for operational purposes under one of the following circumstances:

6.9.2.1. The deviation is identified in the theater operational reporting instructions.

6.9.2.2. The deviation is an operational necessity per mission planning and analysis.

6.9.2.3. The deviation is approved by the first O-6 in the chain of command.

6.9.3. Responsibilities.

6.9.3.1. Commanders are responsible for ensuring a professional image and keeping the appropriate host base/post leadership informed of authorized deviations. **(T-3)**.

6.9.3.2. Leaders are responsible for uniformity, enforcing authorized standards and informing personnel of deviation changes or procedural requirements.

6.9.3.3. Operators authorized grooming deviations will wear an authorized combat uniform, business casual attire, or functional civilian clothing during duty as mission dictates. **(T-3)**. Operators will hand carry a commander signed memorandum of record identifying their specific deviation authorization. **(T-3)**.

6.9.3.3.1. Business Casual consists of slacks, collared shirt, complimentary footwear and belt. Functional civilian clothing consists of hiking style full-length pants, collared shirt, closed-toed footwear and a belt.



6.9.3.3.2. Under the specifics set forth in this section, and other unique ongoing operations, select personnel may be eligible for civilian clothing allowance at the temporary duty rate in accordance with AFI 36-3012, *Military Entitlements*. The unit commander must exercise good discretion, justify the request and accurately track member allowances when authorizing civilian clothing allowances. (T-3).

## Chapter 7

### ROPED RESCUE

**7.1. General.** Roped rescue is dynamic in nature and incorporates technical rescue essentials, adaptive mountain rescue procedures, climbing fundamentals, as well as mountaineering standards in all environments. Roped rescue operations should be conducted in accordance with *Freedom of the Hills*, AFTTP 3-3.GA and this manual.

**7.1.1. Team Leader:**

7.1.1.1. Assigns roles and responsibilities for team members. **(T-3).**

7.1.1.2. Designates safety perimeter and brief requirements for being tied in to anchor. **(T-3).**

7.1.1.3. Designates individual responsible for all safety checks. **(T-3).**

7.1.1.4. Briefs communications and emergency procedures. **(T-3).**

7.1.1.5. Determines equipment to be worn during tactical/technical operations (e.g., Load Bearing Vest, Armor). **(T-3).**

7.1.2. Control. Gives commands to lower/raise load. **(T-3).**

7.1.3. Belay Man. Belay Man is responsible for lowering climber/patient attendant or taking in slack as climber ascends. **(T-3).**

7.1.4. Edge Man. The edge man cleans and protects edge and assists load over edge. **(T-3).**

7.1.5. Attendant. The attendant manages handling the patient and cleans route if necessary. **(T-3).**

7.1.6. Vector. May be used to direct main and safety line over the edge.

**7.2. Required Rope Rescue Briefing.**

7.2.1. Mission objective. **(T-3).**

7.2.2. Technical operation. Type of system, focal point of entry/edge. **(T-3).**

7.2.3. Responsibilities. **(T-3).**

7.2.4. Communication plan. **(T-3).**

7.2.5. Risk management. **(T-3).**

7.2.6. Safety or “hands free” devices that will be used. **(T-3).**

7.2.7. De-rigging plan – start from edge and work back towards anchors. **(T-3).**

**7.3. Roped Rescue RM considerations.**

7.3.1. Operator skill/experience level.

7.3.2. Safety line being used.

7.3.3. Slope angle – high/medium/low angle.

7.3.4. Terrain surface/hazards/obstacles.

7.3.5. Amount of safety margin available with equipment.

#### 7.4. General Team Roped Rescue Requirements.

7.4.1. Minimize potential shock loading.

7.4.2. Assess and brief RM prior to loading a system without a safety line. **(T-3)**. Proprietary single rope rescue systems (eg. TRACE and AR kits) are authorized with appropriate training and risk management.

7.4.3. A safety check or “whistle test” is required for all systems prior to applying a live load to the system. ‘Whistle test’ implies a hands free back up is in place. **(T-3)**.

7.4.4. “Close” systems with a knot to prevent the end of the rope from feeding through the device and causing an accidental run out. **(T-3)**.

7.4.5. Protect rope/webbing with edge protection when and where possible.

7.4.6. Evaluate need for a barrelman to negotiate obstacles.

7.4.7. For training, all operators within 10 feet of an edge where a fall of 10 feet or greater, down a slope of 50° or greater is possible, must be tied in. **(T-3)**.

7.4.8. Determine load size and calculate safety factor required; a less than 10:1 safety factor will not be accepted without a careful RM evaluation. *Freedom of the Hills* contains techniques for these calculations for high, medium and low angle operations.

7.4.9. Select and construct anchors to support the intended dynamic load. **(T-3)**.

7.4.10. Focus equalized anchor systems with an appropriate knot. **(T-3)**. **WARNING:** Free running equalizing anchor systems are not authorized. **WARNING:** The angle between the outside legs of an anchor should be kept below 90°. At angles greater than 120° between legs, the force exerted on each anchor point exceeds the force exerted on the anchor by the load. This is especially important in anchors with only two legs. **WARNING:** When using gear anchors points such as “friends” or ice screws, two anchor points with a minimum of 12 Kilonewton (kN) rating each will be placed for personal loads, four anchor points with a minimum of 12 kN rating each will be placed for rescue loads. **(T-3)**.

7.4.11. Main line and safety line should be interconnected at the litter yoke with a tandem knot.

7.4.12. Patients will be secured to either the main or safety line through their harness. **(T-2)**. **NOTE:** Harness may be actual climbing harness or made with available webbing or suitable substitute that meets the intent of securing the patient.

7.4.13. For training, patients will have head and eye protection to avoid injury. **(T-3)**.

7.4.14. Any time a progress capture device is employed a tension release mechanism will be used to connect the device to the anchor (Load Releasing Hitch (LRH), tied off belay device, etc.). **WARNING:** Dynamic ropes will not be used as the main or belay line in rescue systems. **(T-3)**.

#### 7.5. Required Individual Equipment for Roped Rescue:

7.5.1. Helmet. **(T-3)**.

7.5.2. Sit harness. **(T-3)**.

- 7.5.3. Whistle (recommended).
- 7.5.4. Gloves. Appropriate construction to protect from anticipated friction. **(T-3)**.
- 7.5.5. Locking carabineer and belay device. **(T-3)**.
- 7.5.6. Personal retention device (Pick-off, Nylon daisy chain, Purcell's, etc.). **(T-3)**.
- 7.5.7. Rope tool (Knife, Hook knife, Trauma shears, etc.). **(T-3)**.
- 7.5.8. Eye protection (Highly recommended, not required).
- 7.5.9. Radio for communication (recommended).

## **7.6. Lowering Systems Team Requirements.**

- 7.6.1. General.
  - 7.6.1.1. A twin line system should be used for redundancy in high angle terrain if rope damage is possible.
  - 7.6.1.2. Personnel will be tied into the end of the rope. However, a triple-action locking carabineer may be used if the situation warrants and RM is assessed. **(T-1)**.
- 7.6.2. Procedures.
  - 7.6.2.1. Design/construct system to meet lowering requirements, pay close attention to the fall line, focal point and weight of load. **(T-3)**.
  - 7.6.2.2. Members will use an appropriate friction device for the expected loads **(T-3)**:
    - 7.6.2.2.1. Personal loads may use ATC, Gri-Gri®, Munter hitch or comparable device.
    - 7.6.2.2.2. Rescue loads will use brake rack, Scarab®, Traverse 540°, tandem ATCs, Super Munter or comparable device. **(T-3)**.
  - 7.6.2.3. Use tandem Prusiks appropriately sized for the rope diameter in use as back up for rescue loads. **(T-3)**. **WARNING:** Only use rescue load rated mechanical rope grabs for back up to rescue load systems.

## **7.7. Haul System and Mechanical Advantage Team Requirements.**

- 7.7.1. General.
  - 7.7.1.1. Always consider a separate anchor with safety line for redundancy. If system strength is questionable, then a separate safety system must be utilized. **(T-3)**.
  - 7.7.1.2. Every attempt must be made to make sure that the haul line and safety line are protected from sharp edges or any other obstacles that may cause rope abrasion.
- 7.7.2. Procedures.
  - 7.7.2.1. Anchors will be built with a 10:1 safety factor for anticipated working load (load plus haul force, e.g., if load is determined to be 2kN, then all equipment must be rated to 20kN or greater). **(T-3)**.

7.7.2.2. A progress capture should be included between the load and the first pulley with a suitable anchor to handle the load (Prusik with LRH, etc.). **WARNING:** If at any time the haul team meets unexpected resistance, (e.g., litter trapped on an overhang or a rope pinched in a crack) cease hauling until the situation is identified and corrected. Be prepared to initiate a lower if hung up.

## 7.8. Suspension Traverse/High Line Team Requirements.

7.8.1. Only rescue load rated static kernmantle rope will be used for conducting a suspension traverse or high line. **(T-3)**. (A 30kN rating should be considered the minimum standard. See *Freedom of the Hills* for an in-depth discussion on vector angles and resultant forces on ropes and anchors.).

7.8.2. Sloping suspension traverses/high lines require a belay/tagline or mechanical advantage and require tandem prusiks with an LRH attached in front of the brake rack or mechanical advantage to protect against a dynamic event. **(T-3)**. **WARNING:** Traverse lines have extremely high forces as rope sag is eliminated. Forces on the anchors reach catastrophic levels as the rope angle approaches zero degrees. Each anchor must always be stronger than the traverse line.

## 7.9. Roped Climbing Team Requirements.

7.9.1. Aid climbing techniques are recommended for roped rescue/recovery.

7.9.2. Roped climbing will be used whenever there is an immediate or obvious danger of a catastrophic fall. **(T-3)**.

7.9.3. Individuals will establish protection so that a fall will not exceed 10 feet, to include rope ascensions. **(T-3)**.

7.9.4. Climber must be belayed. **(T-3)**.

7.9.5. Base anchors and system selection on potential fall forces.

7.9.6. A dynamic style rope should be used when a fall from above the highest anchor is possible. Dynamic ropes bear the *Union Internationale des Associations d'Alpinisme (UIAA)* symbol for single or double rope use. Ropes must be rated for single use to be utilized in a single rope system. **(T-3)**.

## 7.10. Rappelling Requirements. (See [Chapter 14](#) for Rappelling from Helicopter requirements).

7.10.1. General. Helmets and gloves will be worn on all rappels. **(T-3)**.

7.10.2. Procedures.

7.10.2.1. Construct anchor oriented to load and attach rope.

7.10.2.2. Ensure rope has sufficient length to access the objective and tie a knot in the end to prevent accidental run out.

7.10.2.3. Use edge pro anywhere the rope may abrade.

7.10.2.4. Rappeller will connect harness to rope with weight appropriate friction device. **(T-3)**. **WARNING:** Rappeller should use hands-free back up. If the hands-free back up will hinder operations, the TL will apply RM to determine use.

## Chapter 8

### EXTRICATION

**8.1. General.** Extrication is the removal of trapped personnel using a wide variety of handheld, static, kinetic, hydraulic/pneumatic, battery- and gas-powered tools to cut, bend, break or manipulate vehicle/structure material to facilitate or expedite their recovery. Extrication operations are conducted in accordance with AFTTP 3-3.GA and this manual.

**8.2. Downed Aircraft Recovery Operations.** Downed aircraft recovery operations are conducted in accordance with AFTTP 3-3.GA, this manual and applicable checklists.

8.2.1. Team commander/team leader responsibilities. TC/TL should establish a Casualty Collection Point (CCP) up wind and at safe distance recommended by Technical Order (TO) 00-105E-9, *Aerospace Emergency Rescue and MISHAP Response Information*.

8.2.2. Minimum briefing requirements:

8.2.2.1. Shut down procedures. **(T-3)**.

8.2.2.2. Hazardous material. **(T-3)**.

8.2.2.3. Emergency entrances. **(T-3)**.

8.2.2.4. Crew/passenger counts. **(T-3)**.

8.2.2.5. Critical sensitive equipment and required recovery, destruction or zeroizing tasks. **(T-3)**.

8.2.2.6. CCP location – may be briefed on scene. **(T-3)**.

8.2.3. Downed aircraft risk management considerations:

8.2.3.1. Operator skill/experience level.

8.2.3.2. Terrain/location of crash.

8.2.3.3. Hazardous material aboard aircraft.

8.2.3.4. Fire/Smoke/fumes present.

8.2.3.5. Aircraft munitions present.

8.2.3.6. Wind/hazard drift direction and avoidance.

8.2.4. Downed aircraft recovery operations.

8.2.4.1. Safeguarding aircraft wreckage. When PJ and CRO personnel are the first to arrive at an incident, they will establish security and control until properly relieved. **(T-3)**.

8.2.4.2. When reporting status of survivors or remains, do not use names or privacy act info via unsecure communication methods.

8.2.4.3. Secure classified material until competent authority assumes control. **(T-3)**.

8.2.5. DSCA missions do not normally include the removal of deceased from incident sites. However, in remote or inaccessible areas, the PJ TL, with medical direction coordination and Coroner/Deputy Coroner approval, may be directed to effect the removal of human remains. PJ/CROs will not accept appointment as deputy coroners. **(T-2)**.

8.2.5.1. Removal of military remains. The remains of military personnel are removed only upon the approval of a medical officer. In the absence of a medical officer, approval will be obtained from the proper authorities and relayed to the team. **(T-3)**.

8.2.5.2. Removal of civilian remains. Remains of civilian personnel, who were employed by the military, will be recovered in accordance with the same standards set for military personnel. **(T-1)**.

8.2.5.3. International removal of human remains. A mission necessitating the removal of military or civilian remains across international borders will involve local and national laws of the countries involved. Prior to commencement of this type operation, team leadership will both consult the US diplomatic representatives to the countries concerned and obtain necessary mission clearance. **(T-0)**.

8.2.6. Downed aircraft team equipment minimums:

8.2.6.1. Digital camera (GPS enabled preferred). **(T-3)**.

8.2.6.2. GPS. **(T-3)**.

8.2.6.3. Marking flags. **(T-3)**.

8.2.6.4. Recovery flags (Military and associated Civilians). **(T-3)**.

8.2.6.5. Recovery bags. (May be used for either Human Remains or equipment.) **(T-3)**.

8.2.6.6. PPE – to include hazardous material (HAZMAT) protection for any know threats. **(T-3)**.

8.2.6.7. Extrication equipment (as required).

8.2.7. TC/TL should access current crash rescue schematics provided by the US Army Combat Readiness Center for airframes being supported in the AOR (Information available at <https://safety.army.mil/ON-DUTY/Aviation.aspx>).

## Chapter 9

### CONFINED SPACE/STRUCTURAL COLLAPSE OPERATIONS

**9.1. General.** Consider all confined space/structural collapse (CS/SC) operations as hazardous and use appropriate caution when planning and approaching. CS/SC operations are conducted in accordance with *Freedom of the Hills*, AFTTP 3-3.GA and this manual. AFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards* may be used for reference.

**9.2. CS/SC Defined.**

9.2.1. Confined space is defined by three criteria:

9.2.1.1. Space is big enough to bodily enter.

9.2.1.2. Space is not meant for continuous human occupancy.

9.2.1.3. Space has limited means of entry and escape.

9.2.2. Structural collapse is defined as any structure that has received damage to its infrastructure making it unsuitable for occupancy.

**9.3. CS/SC Responsibilities.**

9.3.1. TC/TL:

9.3.1.1. Responsible for operation.

9.3.1.2. Brief all equipment and PPE requirements.

9.3.1.3. Ensure safety of all personnel in operation.

9.3.1.4. When dealing with a structural collapse, safe zones and CCPs should be established away from the collapsed structure a distance of 1.5 times the height of the structure.

9.3.1.5. Consider assigning a knowledgeable/capable entrant as entry element lead. The TC/TL then delegates the following to the entry element lead:

9.3.1.5.1. Oversee operations in space.

9.3.1.5.2. Ensure safety of all entrants.

9.3.1.5.3. Communicate all actions to attendant.

9.3.2. Entrant:

9.3.2.1. Prepare all equipment needed in the space.

9.3.2.2. Understand actions required in the space.

9.3.2.3. Communicate actions to attendant.

9.3.3. Attendant:

9.3.3.1. Inspect all entrants for proper PPE and equipment prior to entering the space.

9.3.3.2. Remain alert to all entrants and actions in space.

9.3.3.3. Communicate entrant and space status to TL.



**9.4. Minimum Team CS/SC Briefing Requirements.**

- 9.4.1. Determine if a permit is required. **(T-3)**.
- 9.4.2. Atmospheric hazards. **(T-3)**.
- 9.4.3. Safe areas and emergency egress plan. **(T-3)**.
- 9.4.4. Specialized equipment to be used.
  - 9.4.4.1. Team equipment. **(T-3)**.
  - 9.4.4.2. PPE requirements at different stages (include known or suspected HAZMAT). **(T-3)**.
- 9.4.5. Entrants. Determine team size and organization as required.
  - 9.4.5.1. Element Leader (EL).
  - 9.4.5.2. Security.
  - 9.4.5.3. Medic.
- 9.4.6. Attendants.
  - 9.4.6.1. Communications (will have at least two types). **(T-3)**.
  - 9.4.6.2. Entrant rescue plan.

**9.5. CS/SC RM Considerations.**

- 9.5.1. Operator skill/experience level.
- 9.5.2. Accessibility of objective.
- 9.5.3. Presence of fire/smoke/fumes.
- 9.5.4. Technical equipment requirements.
- 9.5.5. PPE requirements.
- 9.5.6. Identify structural materials.
- 9.5.7. Assume all structures will potentially collapse.
- 9.5.8. Medical support availability (CASEVAC/hospitals).
- 9.5.9. Environmental considerations (weather/earthquakes/etc.).
- 9.5.10. Status of utilities (gas/electricity/water).

**9.6. CS/SC Operations.**

- 9.6.1. Assess tactical threat. Team sizes and timelines may be directly affected by the tactical threat level.
- 9.6.2. Assess atmospheric hazards. Atmospheric monitors will be turned on/calibrated in fresh air. **(T-3)**. Intelligence driven atmospheric hazards should be confirmed and verify the following:
  - 9.6.2.1. Normal oxygen concentration limits are between 19.5% and 23.5% (If below, supplemental oxygen is required. If above, there is an increase in explosive potential).

9.6.2.2. Lower explosive limit (LEL) is <10%.

9.6.2.3. Airborne combustible dust: There should be five feet of visibility at all times, use appropriate RM measures in less than five feet of dust visibility.

9.6.2.4. Carbon Monoxide (CO) <35ppm (self-contained breathing apparatus (SCBA) required for >35ppm.).

9.6.2.5. Hydrogen Sulfide (H<sub>2</sub>S) <10ppm.

9.6.2.6. Other contaminants. Use SDS or other intelligence sources for proper mitigation (e.g., cyanide, ammonia, aromatic hydrocarbons).

9.6.2.7. Respiratory protection. Unless all the above conditions are met, respiratory protection is required. **(T-3)**. Based on the threat, determine if passive or active protection is warranted.

9.6.2.7.1. Passive: Air purifying respirator/CBRNE Mask.

9.6.2.7.2. Active: Supplied air SCBA. **Note:** If the atmosphere contains any hazard that requires the use of the SCBA mode of a powered air-purifying respirator (PAPR) equipped system, turning the PAPR system on will introduce the hazard into the mask. Even with the PAPR OFF and on SCBA mode, the standard Osen-Hunter SHIELD configuration is not a completely self-contained apparatus since all modes are routed through the same system. If a known “non-scrubable” atmospheric hazard exists, one of two actions is recommended: If possible, convert the SHIELD systems to SCBA-only mode by removing the PAPR system according to the user manual; or alternatively, install the blanking caps that are used during vacuum testing. As long as the system passes the vacuum test, this will prevent any ambient air from entering the system during use. The battery pack should also be disconnected to prevent damage to the PAPR motor in the event the switch is inadvertently turned on.

9.6.3. Determine isolation/ventilation. Prior to entering the space, determine whether to isolate or ventilate the space. Ventilation of the space can sometimes cause problems of its own to include creating an explosive environment.

9.6.4. Identify other hazards. Hazards to the team could include but not limited to:

9.6.4.1. Mechanical. Find source to cut power as required.

9.6.4.2. Engulfment. Consider reduced PPE in order to negotiate hazard.

9.6.4.3. Thermal. Ensure adequate PPE.

9.6.4.4. Chemical contact. Get SDS.

9.6.4.5. Electrical. Identify source and cut off station.

9.6.4.6. Booby traps.

9.6.5. Determine additional protective gear requirements.

9.6.5.1. Tyvex®/Tychem® garments will be worn in any environment where there is a threat of hazardous contaminant transfer to skin. **(T-3)**.

9.6.5.2. Thermal protection. This could be anything from additional clothing to prevent hypothermia to gloves for handling burning material.

9.6.5.3. Voltmeter (to verify power is disconnected).

9.6.6. Identify two types of communications. Examples include voice, radio, whistle blows, hand signals and rope tugs. Two separate radio frequencies do not fulfill this requirement.

9.6.7. Identify entrant rescue procedures. Any time personnel enter a confined space; there will be a plan to retrieve the personnel. **(T-3)**.

9.6.7.1. Self-rescue via self-haul, immediate means of retrieval, ascend or walk out on horizontal entry.

9.6.7.2. External retrieval via entrant's tether.

9.6.7.3. Entry rescue. If the space prevents the ability to use a line for retrieval, there will be back up entrants prepared to enter the space for rescue. **(T-3)**. Initial entrants will be prepared for quick hook up and retrieval by entry rescue team. **(T-3)**. The entry rescue team will be tethered much like a safety diver. **(T-3)**.

9.6.8. Minimum team equipment requirements:

9.6.8.1. Pre-entry team atmospheric monitor:

9.6.8.1.1. Calibrate and record significant levels in both "safe" area and the space. **WARNING:** Monitors will be calibrated in fresh air; if calibrated in anything other than fresh air, false readings can occur. **(T-3)**.

9.6.8.1.2. Ensure monitors cover all expected atmospheric threats. **(T-3)**.

9.6.8.2. Rope kit. **(T-3)**.

9.6.8.3. RIES™ /MRIEST™ kits or pulleys and rope grabs (as required).

9.6.8.4. Additional rigging (slings, pulleys, carabineers, cams, edge protection, friction control).

9.6.8.5. Immediate means of retrieval per team SOPs. **(T-3)**.

9.6.8.6. Litter with harness. **(T-3)**.

9.6.8.7. Tripod (not required but highly recommended for vertical raises).

9.6.9. CS/SC entrant equipment minimums:

9.6.9.1. Personal monitor(s). **(T-3)**.

9.6.9.2. Headlamp(s). **(T-3)**.

9.6.9.3. Helmet. **(T-3)**.

9.6.9.4. Eye pro. **(T-3)**.

9.6.9.5. Gloves. **(T-3)**.

9.6.9.6. Communications. **(T-3)**.

9.6.9.7. Sit harness or other means to connect to retrieval system. **(T-3)**.

9.6.9.8. Specialized equipment as required (cargo net, webbing, extrication tools, tripod, pulleys, slings, carabineers).

9.6.9.9. PPE as dictated by environment.

9.6.9.10. Med kit as dictated by mission.

9.6.10. CS/SC Casualty packing equipment. Determine how patient will be packaged:

9.6.10.1. Harness (wrist, manufactured, or expedient).

9.6.10.2. Litter SKEDCO®/Stokes).

9.6.10.3. Short spine board/Kendrick Extrication Device (K.E.D.®)

## Chapter 10

### SNOW, ICE, AND AVALANCHE OPERATIONS

**10.1. General.** Rescue operations in this environment induce many unique challenges, such as the cold and travel in snow, ice, glacier and avalanche conditions. This is compounded by the distinctive personal protective equipment that is required to operate safe and effectively.

#### **10.2. Glacier.**

##### 10.2.1. Glacier responsibilities.

10.2.1.1. The TL will obtain forecasted conditions at the objective area and know the proficiency, experience, strengths, and weaknesses of all team members involved in the operation. **(T-3)**.

10.2.1.2. TL will ensure all team members are briefed and proficient with ice axe arrest procedures, including four major sliding positions (head up/down and belly/ back) and emergency procedures for falling ropes team member. **(T-3)**. **WARNING:** To minimize the potential for training injuries, crampons should not be worn during practice ice axe arrests.

##### 10.2.2. Glacier risk management.

10.2.2.1. Operator skill/experience level.

10.2.2.2. Accessibility of objective, by land and air.

10.2.2.3. Weather conditions.

##### 10.2.3. Glacier procedures. During glacier operations each PJ and CRO will:

10.2.3.1. Only perform un-roped travel after careful assessment of conditions and RM review. **(T-3)**.

10.2.3.2. Wear crampons or have them readily available. **(T-3)**.

10.2.3.3. Carry an ice axe with appropriate tether. **(T-3)**.

##### 10.2.4. Glacier personal equipment.

10.2.4.1. Environmental protection in accordance with [Chapter 6](#).

10.2.4.2. Helmet (capable of proper fit over thermal protection).

10.2.4.3. Ice axe.

10.2.4.4. Crampons.

10.2.4.5. Snowshoes/ Skis (appropriate for terrain).

10.2.4.6. Sit harness.

10.2.4.7. Personal friction device.

10.2.4.8. Carabineers, locking – 4 each.

10.2.4.9. Carabineer, non-locking – 4 each.

- 10.2.4.10. Pulleys, prussic minding – 2 each.
- 10.2.4.11. Tandem prusiks: Long/Short, sewn or tied.
- 10.2.4.12. Rope ascension capability (Purcell's, Ascenders, etc.).
- 10.2.4.13. Material to build personal anchor (e.g., ice screws/pickets, webbing, etc.).
- 10.2.4.14. Headlamp.
- 10.2.4.15. GPS/compass.
- 10.2.4.16. Low stretch, life-rate rope, preferably dry treated.

### **10.3. Alpine (Snow and Avalanche).**

#### **10.3.1. Avalanche general considerations.**

- 10.3.1.1. Current and historical conditions are assessed for avalanche forecasting purposes.
- 10.3.1.2. Assess mission requirements and team capability in determining method and distance of movement.

#### **10.3.2. Alpine/avalanche procedures.**

- 10.3.2.1. All members will perform an avalanche beacon check prior to traveling into any area with an avalanche potential. **(T-3)**.
- 10.3.2.2. Prior to crossing an avalanche danger zone, the team will conduct an assessment of the threat and consider emergency egress routes, detours, or other mitigation strategies. **(T-3)**. Avoid roping up in non-glacial avalanche terrain unless fall risks cannot otherwise be mitigated.
- 10.3.2.3. If caught in an avalanche, initiate use of any avalanche emergency equipment, keep ruck on, attempt to ditch skis/snowshoes and “swim” to stay on surface (see *Freedom of the Hills* and AFTTP 3-3.GA for further guidance).
- 10.3.2.4. When responding to an avalanche:
  - 10.3.2.4.1. TL will identify egress route(s) and assign a team member to monitor upslope conditions for further avalanche activity. **(T-3)**.
  - 10.3.2.4.2. Ensure each rescuer and each recovered victim's beacon are set to receive until the last victim is located then immediately return all beacons to transmit.
  - 10.3.2.4.3. Once a victim who requires digging out is located, to the max extent possible, begin digging towards victim from one and a half times the burial depth on the downhill side, on plane with the victim's location.

#### **10.3.3. Additional required alpine/avalanche personal equipment.**

- 10.3.3.1. Avalanche probe. **(T-3)**.
- 10.3.3.2. Avalanche shovel (metal blade strongly recommended). **(T-3)**.
- 10.3.3.3. Avalanche transceiver (worn close to skin, under outer garment layers, turned on and in transmit mode). **(T-3)**.

10.3.3.4. Inclinometer. (T-3).

10.3.3.5. Avalanche protective devices as required (Avalung, avalanche airbags, etc.).

## Chapter 11

### SURFACE WATER OPERATIONS

**11.1. General.** This chapter establishes guidance for surface water operations. All maritime operations are accomplished in accordance with AFTTP3-1/3.GA and this manual. When conducting maritime training operations, appropriate authorities such as the Coast Guard, Base Security, Embassy or Harbor Master should be notified if operations are to be done within their jurisdiction.

**11.2. Swiftwater.** Swiftwater is defined as any body of water that is moving, to include Class I through Class IV rapids, floods and mudslides. This type of recovery is very dangerous, requiring a well-organized team and specialized equipment. The area of operation where this type of recovery is conducted should be secured and under friendly control. The safe recovery of victims in an area of swift moving water requires proper planning and execution.

11.2.1. Responsibilities. Roles may be combined so that all responsibilities are covered in order to complete mission.

11.2.1.1. Team Lead.

11.2.1.1.1. Brief and direct plan.

11.2.1.1.2. Ensure safety and accountability of all operators and survivors. Establish hot, warm and cold zones. Position spotters, rope men and downstream safety as required.

11.2.1.1.3. Assess hydrodynamics at and below incident site.

11.2.1.2. Spotter. Posted up current, watching for debris that could endanger rescue team.

11.2.1.3. Rope Man.

11.2.1.3.1. Ensure required rope bags are ready for deployment.

11.2.1.3.2. Stay attentive to swimmers when tethered.

11.2.1.4. Swimmer.

11.2.1.4.1. Prepare personal equipment for water entry.

11.2.1.4.2. Once victim contact is made, every effort is made to maintain contact.

11.2.2. Risk management considerations.

11.2.2.1. Operator skill/experience level.

11.2.2.2. Water conditions (e.g., depth, current, visibility, debris, etc.).

11.2.2.3. Above/below the surface.

11.2.2.4. Special equipment requirements. Rope systems, boat, extrication, etc.

11.2.2.5. Distance from shore.

11.2.3. Restrictions.



11.2.3.1. All personnel in the warm and hot zones will wear flotation and helmet. **(T-3)**.

11.2.3.2. Any rescuer entering the water while connected to a rope will be tied in via a personal quick-release. **(T-3)**. **WARNING:** Never tie a rope around a rescuer without a method of rescuer activated quick release should the water pressure become too great.

#### 11.2.4. Team Equipment.

11.2.4.1. Throw bag with buoyant rope.

11.2.4.2. Ropes and basic rigging hardware.

11.2.4.3. Thermal treatment for exposed individuals.

11.2.4.4. Defibrillation capability to address potential dysrhythmias.

11.2.5. Personal equipment. Minimum gear that will be worn whenever team members are within 10 feet of the water's edge:

11.2.5.1. Flotation vest specifically designed for swiftwater (non-bulky, swimmer cut). **(T-3)**.

11.2.5.2. Personal attachment quick release (stand-alone or flotation-integrated). **(T-3)**.

11.2.5.3. Helmet. **(T-3)**.

11.2.5.4. Thermal protection in accordance with [Chapter 6](#).

11.2.5.5. Knife (readily accessible - attachment point should be above the waist). **(T-3)**.

11.2.5.6. Footwear that provides basic protection and traction in the water environment. **(T-3)**.

11.2.5.7. Whistle. **(T-3)**.

11.2.5.8. Swimmer's mask or goggles (recommended but not required).

11.2.5.9. Individual throw bag with buoyant rope (highly recommended).

### 11.3. Surf Zone Operations.

#### 11.3.1. Team Lead will:

11.3.1.1. Brief and direct plan. **(T-3)**.

11.3.1.2. Ensure safety and accountability of all operators and survivors. **(T-3)**.

11.3.1.3. Assess hydrodynamics and obstacles at and below incident site. **(T-3)**.

11.3.1.4. Specify the uniform and equipment carried by each Team Member. **(T-3)**. **WARNING:** Team members must check their buoyancy with all mission equipment prior to the mission to ensure positive buoyancy. **(T-3)**.

#### 11.3.2. Required surf zone briefings. Brief the following items for surf zone operations:

11.3.2.1. Objective. **(T-3)**.

11.3.2.2. Command and signal (include International Maritime Distress Channel in the communication plan). **(T-3)**.

11.3.2.3. Risk management. **(T-3)**.

- 11.3.2.4. Emergency retrieval plan of swimmers. (T-3).
- 11.3.2.5. Hazards. Environmental and marine life. (T-3).
- 11.3.2.6. Environmental considerations in accordance with [Chapter 6](#).

11.3.3. Surf zone risk management.

- 11.3.3.1. Operator skill and experience levels.
- 11.3.3.2. Water conditions (e.g., depth, current, visibility, debris, etc.).
- 11.3.3.3. Above and below surface conditions.
- 11.3.3.4. Special equipment requirements. Rope systems, boat, extrication, etc.
- 11.3.3.5. Distance from shore.

11.3.4. Surf zone procedures. **Note:** Advanced Rescue Craft (ARC) are the preferred vehicle for negotiating surf zones. **WARNING:** Never tie a rope around a rescuer without a method of rescuer activated quick release should the water pressure become too great.

11.3.5. Minimum individual equipment for surf zone operations includes:

- 11.3.5.1. Pro-Tec helmet or equivalent should be worn except at the discretion of the TC/TL.
- 11.3.5.2. Floatation: inflatable or non-inflatable (inflatable devices will have enough air placed in it to provide floatation). (T-3).
- 11.3.5.3. Fins (secured to body). (T-3).
- 11.3.5.4. Emergency signaling device. (T-3).
- 11.3.5.5. Individual lighting available for night operations. (T-3).

11.3.6. Tactical swimmers' minimum equipment requirements include:

- 11.3.6.1. Floatation. (T-3).
- 11.3.6.2. Fins. (T-3).
- 11.3.6.3. Appropriate environmental protection. (T-3).
- 11.3.6.4. Knife. (T-3).
- 11.3.6.5. Emergency signaling device. (T-3).

**11.4. Watercraft Operations.**

- 11.4.1. All personnel will meet state/federal training/licensing requirements prior to operating watercraft on public bodies of water. (T-0).
- 11.4.2. Each unit will develop local procedures on the use of assigned watercraft and include it in [Chapter 19](#), Local Procedures. (T-3).

**11.5. Combat Rubber Raiding Craft (CRRC) Operations.** The TL will ensure that the boat operator has a basic understanding of boat handling in both open water and surf zone operations. **(T-3).**

11.5.1. Care and maintenance. CRRC and components will be maintained in accordance with manufacturer specifications, data and **Chapter 19.** **(T-3).**

11.5.2. Minimum team CRRC rigging/equipment:

11.5.2.1. Righting lines. **(T-3).**

11.5.2.2. Paddles. **(T-3).**

11.5.2.3. Mechanical inflation pump with hoses. **(T-3).**

11.5.2.4. Tool and repair kit. **(T-3).**

11.5.2.5. Bow line (short enough that it cannot reach the prop). **(T-3).**

11.5.2.6. GPS (open water). **(T-3).**

11.5.2.7. Compass (open water). **(T-3).**

11.5.2.8. Communications for self-rescue (open water). **(T-3).**

11.5.2.9. Manufacturer specific lifting harness, bowline harness with throw bag for painter line and 2 x 30' frapping lines (for operational missions and CRRC hoisting operations). **(T-3).**

11.5.2.10. Lighting will be available during night training operations and displayed as necessary. **(T-3).**

11.5.2.11. Secured equipment to avoid loss and possible injury in rough seas.

11.5.2.12. CRRC bow bag (recommended):

11.5.2.12.1. Survival kit.

11.5.2.12.2. Horn.

11.5.2.12.3. Batteries.

11.5.2.12.4. Flashlight.

11.5.2.12.5. Water.

11.5.2.12.6. Water procurement tools.

11.5.2.12.7. Flare.

11.5.2.12.8. Sea dye.

11.5.2.12.9. Meals Ready to Eat.

11.5.3. Minimum CRRC personal equipment:

11.5.3.1. Helmet, recommended (Required for CRRC hoisting ops). **(T-3).**

11.5.3.2. Environmental protection in accordance with **Chapter 6.**

11.5.3.3. Floatation. Must provide positive buoyancy to operator dressed for intended mission (hard floatation recommended.). **(T-3).**

- 11.5.3.4. Whistle and signal mirror. (T-3).
- 11.5.3.5. Eye protection recommended (e.g., facemask, swimmers goggles, etc.).
- 11.5.3.6. Maritime knife. (T-3).
- 11.5.3.7. Emergency signaling device. (T-3).
- 11.5.3.8. Fins. (T-3).
- 11.5.3.9. Individual lighting available for night operations. (T-3).

**11.6. CRRC Hoisting.** See AFTTP 3-3.GA. **Note:** If the CRRC is not required to continue the mission, weigh the risk associated with hoisting the craft versus destroying it in place after all members and essential gear have boarded the larger vessel.

11.6.1. CRRC hoisting restrictions.

- 11.6.1.1. Do not attempt to approach a vessel that is changing course.
- 11.6.1.2. Never cross the bow of a larger vessel. If a transition to the far side of the ship is required, cross behind the stern of the vessel, staying clear of the prop wash.

11.6.2. CRRC hoisting set up (accomplished after inflation of the CRRC).

- 11.6.2.1. Install a bowline harness in accordance with manufacturer instructions. Stow running end of bow harness to topside D-ring while not in use.
- 11.6.2.2. Install the manufacturer specific lifting harness assembly in accordance with instructions.

11.6.3. Minimum CRRC hoisting items briefed by TC/TL.

- 11.6.3.1. Vessel must maintain a steady course.
- 11.6.3.2. Point of boarding along the ship.
- 11.6.3.3. Painter line. The crew supplies a trailing line to maneuver the CRRC to; alternatively, the team can use a throw bag to establish a line between vessels.
- 11.6.3.4. Frapping lines. One line on the aft is required but two lines are optimum (one aft and one forward).
- 11.6.3.5. Initial boarding plan and boarding order.
- 11.6.3.6. Hand and arm emergency signal to stop the operation.
- 11.6.3.7. Any special instructions required to complete the operation pertaining to boarding or attaching to lines or hoist.
- 11.6.3.8. Actions to retrieve personnel, equipment and CRRC.

11.6.4. CRRC raise operations.

- 11.6.4.1. Maintain lateral separation until the brief is accomplished and the captain clears the team to proceed. If radio communication is not effective, approach 45° from the vessels course, hold station at the ships ladder and send the required personnel aboard to brief with crew. Ensure personnel briefing ship's crew have a radio to communicate the brief back to the team.

11.6.4.2. Approach at a 45° angle to vessels course. The leeward side of the vessel is highly recommended. However, conduct appropriate RM before selecting a side. **Note:** The optimum course for the vessel is 20°-30° off the bow, and into the wind and seas making 2-5 knots forward speed. This will help deflect wind and seas for better communication and smoother boarding.

11.6.4.3. Hold position forward of boarding station and ask for the sea painter line. Deploy the bow harness from its stowed position and connect the line then drift back allowing line to pull CRRC.

11.6.4.4. Attach frapping line(s).

11.6.4.5. Embark via rope/caving/ships ladder leaving Coxswain and one member.

11.6.4.6. The coxswain controls the CRRC while remaining operator receives hoist hook and attach lifting harness. Turn off engine, lift and lock in stowed position to avoid damage to engine and ship's deck during lifting process. **WARNING:** Hoist hooks can weigh several hundred pounds and crush the operator into the side of the ship or the CRRC floor. Extreme caution must be exercised when the hook is near the CRRC (remember that waves affect a CRRC much more than a ship).

11.6.4.7. Final operators embark ship via ladder once lifting harness is secured to hoist. **WARNING:** Never raise or lower CRRC with personnel on board. The CRRC floor and lifting harness are not rated for personnel.

11.6.5. CRRC Lower Procedures: Reverse raise procedures. **WARNING:** Never back down parallel to clear a vessel under way. Depart at 45° angle.

**11.7. ARC Operations.** ARCs may be deployed as stand-alone watercraft, or to augment other watercraft. They are usually deployed with a rescue sled attached to the back to facilitate water recoveries.

11.7.1. General responsibilities.

11.7.1.1. ARC operator.

11.7.1.1.1. Perform pre and post operation checks.

11.7.1.1.2. Ensure adequate fuel for mission.

11.7.1.1.3. Navigate ARC in a safe and effective manner.

11.7.1.1.4. Never lose sight of sled attendant; mounted or dismounted.

11.7.1.2. Sled attendant.

11.7.1.2.1. Assist ARC operator as required.

11.7.1.2.2. Ensure sled is prepared for survivor recovery.

11.7.1.2.3. Maintain control of survivor once contact is made.

11.7.2. Minimum personal equipment:

11.7.2.1. Helmet or wetsuit hood (as required).

11.7.2.2. Flotation (hard flotation is required). **(T-3).**

11.7.2.3. Fins (as required, recommended secured to body).

11.7.2.4. Knife. **(T-3)**.

11.7.2.5. Whistle and signal mirror. **(T-3)**.

11.7.2.6. Appropriate environmental protection in accordance with [Chapter 6](#).

11.7.2.7. Lighting (Required for night). **(T-3)**.

11.7.2.8. NVDs (Recommended for night). **Note:** It is illegal to operate a personal watercraft style ARC at night in some states. Consult local authorities for area rules/exception.

## Chapter 12

### SUB-SURFACE WATER OPERATIONS

**12.1. General.** All PJ and CRO dive operations are conducted in accordance with U.S. Navy Diving Manual, AFI 10-3501, *Air Force Diving Program*, AFTTP 3-3.GA, this manual, and MAJCOM approved guidance. **(T-1)**. (Local diving SOPs are documented in **Chapter 19**). **EXCEPTION:** Emergency air sources used for parachuting or aircraft egress are not within the purview of this section.

#### 12.1.1. Diving roles and responsibilities.

##### 12.1.1.1. Diving Supervisor.

12.1.1.1.1. Conducts all subsurface diving operations in accordance with documents listed in **Paragraph 12.1** to include: planning, briefing, inspection of divers, execution, equipment storage, clean up, and safety of the dive.

12.1.1.1.2. Ensure equipment is operational and able to perform the intended function to complete the mission. **(T-3)**.

12.1.1.1.3. Obtain appropriate weather information for the area of operation. **(T-3)**.

12.1.1.1.4. Verify currency/qualification status of all divers and assess the medical status of all divers prior to their entering the water. **(T-3)**.

12.1.1.1.5. Remain topside and on-scene while divers are in the water. In the event of a diving accident, they will remain on-scene until all divers have exited the water and ensure qualified personnel remain on scene until all divers are cleared. **(T-3)**.

12.1.1.1.6. Ensure dive table limits are not exceeded. **(T-3)**.

12.1.1.1.7. Ensure medical evacuation plans include the location and operational status of the nearest recompression chamber and brief to the team. **(T-3)**.

12.1.1.1.8. Ensure lost diver procedures are reviewed and understood by all divers. **(T-3)**.

12.1.1.1.9. Document all training, currencies and mishaps. **(T-3)**.

##### 12.1.1.2. Dive Medic.

12.1.1.2.1. A non-diving level of care no lower than national paramedic certification (NRP), or DoD equivalent, under the medical control of a physician will be present for all open-circuit dive operations. **(T-2)**. Dive Medic will meet qualifications standards in AFI 10-3501.

12.1.1.2.2. A Dive Medical Technician, Special Operations Technician or Dive Medical Officer will be present for all closed-circuit training dive operations in accordance with the Navy Diving Manual. **(T-2)**.

12.1.1.2.3. Ensure necessary medical equipment is available at the dive sight. **(T-3)**.

12.1.1.2.4. Coordinate with the dive supervisor on the medical evacuation plan.

12.1.1.2.5. Provide routine or emergency medical treatment to diving personnel.

12.1.1.2.6. Accompany the dive casualty to the treatment facility in case of medical evacuation (some civilian helicopters will not accommodate additional personnel, in this case the Dive Medic will provide detailed patient handoff to flight crew and obtain contact information for the flight service and receiving facility). **(T-3)**.

12.1.1.3. The standby/safety diver will:

12.1.1.3.1. Be current and qualified on all equipment in use. **(T-3)**.

12.1.1.3.2. Attend the entire dive or operation briefing. **(T-3)**.

12.1.1.3.3. Be briefed and knowledgeable of the rescue procedures for the diving equipment being used by the divers. **(T-3)**.

12.1.1.3.4. Whenever divers are in the water, the standby diver will be appropriately dressed and positioned as near as possible to the dive station. **(T-3)**. **Exception:** The safety diver can remove mask, fins, air cylinder with regulator and buoyance compensator after Dive Supervisor equipment pre-dive inspection check, but must be near this equipment and ready for immediate entry into the water after being briefed by the Dive Supervisor.

12.1.1.3.5. Use air cylinders that are at a minimum, charged to the calculated air requirement for the dive (use fully charged tanks whenever operationally feasible). **(T-3)**.

12.1.1.3.6. Be equipped with an octopus rig (secondary regulator) and a tending line. **(T-3)**.

12.1.1.3.7. Be equipped with at least 100 CF of air for dives planned deeper than 60 feet saltwater. **(T-3)**.

12.1.1.4. All divers will:

12.1.1.4.1. Attend all briefs. **(T-3)**.

12.1.1.4.2. Assist Dive Supervisor as required. **(T-3)**.

12.1.1.4.3. Prepare personal equipment. **(T-3)**.

12.1.1.4.4. Know the briefed signals. **(T-3)**.

12.1.2. Diving personnel requirements. Minimum personnel required for diving operations are:

12.1.2.1. Two divers or tethered diver and tender. **(T-3)**.

12.1.2.2. One dive supervisor. **(T-1)**.

12.1.2.3. One standby diver. **(T-2)**.

12.1.2.4. One dive medic. **(T-2)**. The dive medic can be the same individual as the standby diver.

12.1.3. Diving safety and support boats. See AFI 10-3501 for requirements.



12.1.4. Minimum dive briefing requirements. Every dive will be preceded by a briefing, attended by all personnel involved in the dive, in accordance with the U.S. Navy Diving Manual. The dive brief includes, at a minimum, risk assessment and the ability of all divers to clear their ears. **(T-3)**. If key support personnel are unavailable to attend the dive brief, the diving supervisor will ensure personnel are briefed separately. **(T-3)**.

## **12.2. Underwater Dive Conditions.**

12.2.1. Surf. Dive Supervisor maintains execute authority for water entry operations conducted through plunging surf of any size. Careful consideration is required from the Dive Supervisor.

12.2.2. Cold water.

12.2.2.1. When water temperature is at or below 37° F, a redundant self-contained underwater breathing apparatus (SCUBA) of twin bottles, each having a K-valve and an approved cold weather regulator or twin bottles with one common manifold and an approved cold weather regulator (with octopus rig) shall be used. **(T-3)**.

12.2.2.2. The use of life preservers/buoyancy compensators equipped with pressurized gas activation cylinders are prohibited when diving under ice. **(T-3)**.

12.2.2.3. Diver tending lines are mandatory when diving under ice in order to help the divers relocate the entrance hole. In addition, the divers must wear a distress light that should be turned on upon entering the water. **(T-3)**.

12.2.2.4. A full facemask with a demand mode regulator and ambient breathing valve is highly recommended to increase diver comfort and safety.

12.2.3. Contaminated water. Prior to conducting dive operations in suspected contaminated water, the dive supervisor will conduct an RM to balance the requirements of the operation against the potential risk to personnel. **(T-3)**. Basic guidance and procedures for diving in contaminated water can be found in Navy publication SS521-AJ-PRO-010, *Guidance for Diving in Contaminated Waters*. **Note:** When conducting underwater human remains recovery, dive supervisors will make every effort to protect personnel from injury and unnecessary exposure to body fluids and tissue. Level-B protective gear is recommended to avoid skin and mucous membrane contact with human remains and the water near the remains. Level-B protective gear consists of:

12.2.3.1. Full-face mask with positive pressure.

12.2.3.2. Vulcanized rubber dry suit with attached hood and dry gloves.

12.2.4. Sonar. When active sonar is being used in the dive area, consult the US Navy Diving Manual, Vol. 1 for minimum safe distance.

**12.3. Underwater Emergency Procedures.** In addition to the Emergency Procedures listed in the Navy Diving Manual, the following emergency procedures apply to PJ/CRO diving operations.

12.3.1. Diver Recall. Dive Supervisor briefs all Underwater Emergency Procedures prior to conducting dive operations. A method of diver recall is required for all dives. (T-3).

12.3.2. Entangled Diver. Diver entanglements are relatively common and should be considered only an inconvenience to a well-trained team. Divers usually find themselves or their buddies entangled by their tank valves, fin buckles, or dangling hoses and gauges. **WARNING:** Dive entanglements, if not addressed quickly and efficiently, can have a dramatic effect on usable bottom time, potentially endangering both the mission and the diver.

12.3.2.1. Self-Rescue in Entanglements. Conduct a head-to-fin check to determine point of entanglement, utilize personal cutting tools to get free entanglement. If unable to locate point of entanglement or unable to free entanglement, signal buddy or the standby diver for assistance.

12.3.2.2. Buddy/Standby Diver Assistance to Entangled Diver. The buddy/standby diver determines the point of entanglement and frees the primary diver.

12.3.2.3. Entangled Tending Line. If the primary diver's line is entangled, the standby diver descends and clears both the lines, then ensures the diver is free. In the event the tending line is too entangled to clear, the standby diver clips into the diver's harness with a contingency strap, cut the tender line and take the diver to the surface.

12.3.3. Underwater Emergency Signals. After signaling for the standby diver, the primary diver places a hand on the harness/tether attachment point. Having followed the tether to the diver the standby will encounter the diver's hand. In low/no visibility, the divers then use one or more of the following hand signals to communicate.

12.3.3.1. Tapping the standby diver's hand to the primary diver's second stage indicates, "NEED MORE AIR." Once the standby diver receives the signal, the standby diver places the primary diver's hand on the octopus or the first stage of the new pony bottle. The primary diver removes the octopus or emergency gas supply bottle from the standby diver and inserts the mouthpiece.

12.3.3.2. The standby diver placing the primary diver's hand on the harness/tether attachment point and giving three squeezes means, "I AM LEAVING, BUT I AM COMING RIGHT BACK."

12.3.3.3. The primary diver makes a large circular motion with the standby diver's hand and then placing his hand on point of entanglement indicating "THIS IS WHERE MY ENTANGLEMENT IS." This also helps the standby avoid becoming entangled in the hazard.

12.3.3.4. Tapping the standby diver's hand on the primary diver's chest indicates "I AM HURT." After tapping the chest, the primary diver guides the standby diver's hand to the injured area. The standby diver moves slowly and gently to prevent further injury.

**12.4. Dive Equipment Inspection Criteria.** All SCUBA and associated equipment will be inspected in accordance with AFI 10-3501 and the U.S. Navy Diving Manual, as well as both the Navy's 3-M and its Planned Maintenance System (PMS) requirements. (T-2).

## **12.5. Dive Equipment.**

12.5.1. A marking buoy should be used whenever possible to mark the location of divers in the water. At the discretion of the diving supervisor, a light source may be attached for easier location during night dives.

12.5.1.1. For diving operations conducted between sunset and sunrise, flashlights or diving lights are mandatory for the diving supervisor and medic and chemlights or dive lights are mandatory for each diver. **(T-3)**.

## **12.6. Minimum Personal Dive Equipment.**

12.6.1. Open-circuit SCUBA. **(T-3)**.

12.6.2. Face mask. **(T-3)**.

12.6.3. Life preserver/buoyancy compensator. **(T-3)**.

12.6.4. Weight belt and weights as required.

12.6.5. Dive tool (readily accessible). **(T-3)**.

12.6.6. Fins. **(T-3)**.

12.6.7. Submersible pressure gauge or Reserve J-valve. **(T-3)**.

12.6.8. Dive watch (Only one is required when diving in pairs with a buddy line.). **(T-3)**.

12.6.9. Depth gauge. **(T-3)**.

12.6.10. Octopus regulator (unit Commander may waive requirement after thorough RM analysis).

12.6.11. Environmental protection in accordance with **Chapter 6**, Environmental Operations and this chapter.

12.6.12. Night lighting considerations.

12.6.12.1. Each diver should have a primary and back-up light with sufficient intensity and battery life for the duration of the underwater search.

12.6.12.2. Adequate lights to mark divers, underwater equipment, search area, surface buoys and underwater objects.

12.6.12.3. If the tactical situation permits, topside illumination for dive support team members and diver entry and exit points.

## Chapter 13

### AIRMANSHIP

**13.1. General Flight Rules.** PJ/CRO personnel are considered non-rated universal aircrew members qualified in accordance with AFI 11-202V2, *Aircrew Standardization/Evaluation Program*. Conduct all aircraft operations in accordance with AFMAN 11-202V3, applicable MDS TOs and AFIs, AFTTP 3-1/3.GA and this manual. **Note:** Flying after diving will be accomplished in accordance with the Navy Diving Manual.

**13.2. Responsibilities.** All PJ/CRO are responsible to know the following:

13.2.1. Flight rules. General and MDS specific. **(T-3)**.

13.2.2. Briefed events, procedures and risk management. **(T-3)**.

13.2.3. Equipment.

13.2.3.1. Individual equipment required to complete mission. **(T-3)**.

13.2.3.2. TL/EL/Jumpmaster (JM)/Alternate Insertion and Extraction (AIE) master – is responsible for selection, inspection and installation of mission equipment. **(T-3)**.

13.2.4. Emergency procedures. **(T-3)**.

13.2.5. Flight duties.

13.2.5.1. Crew coordination. **(T-3)**.

13.2.5.2. Flight following. **(T-3)**.

13.2.5.3. Scanning. **(T-3)**.

13.2.5.4. Parachutist/Jumpmaster requirements. **(T-3)**.

13.2.5.5. Situational awareness. **(T-3)**.

13.2.5.6. Aircraft systems.

13.2.5.6.1. Intercom system (ICS). **(T-3)**.

13.2.5.6.2. Weapons. **(T-3)**.

13.2.5.6.3. Oxygen systems. **(T-3)**.

13.2.5.6.4. Chaff/flare dispensers. **(T-3)**.

13.2.6. Post flight.

13.2.6.1. Debriefings. **(T-3)**.

13.2.6.2. Regeneration/reconstitution. **(T-3)**.

**13.3. Team Mission Planning Briefing Requirements:**

13.3.1. Load time. **(T-3)**.

13.3.2. Take off time. **(T-3)**.

13.3.3. Personnel required and estimated weight. **(T-3)**.

- 13.3.4. Equipment required and estimated weight. (T-3).
- 13.3.5. Route to objective. (T-3).
- 13.3.6. Infiltration (infil) procedures. (T-3).
- 13.3.7. Objective. (T-3).
- 13.3.8. Aircraft loiter time. (T-3).
- 13.3.9. Exfiltration (exfil) procedures. (T-3).
- 13.3.10. Egress route. (T-3).
- 13.3.11. EPA. (T-3).
- 13.3.12. Expected mission duration. (T-3).
- 13.3.13. Aircraft status, limitations and restrictions. (T-3).
- 13.3.14. Bump plans. (T-3).

#### **13.4. Mission Preparation and Execution.**

- 13.4.1. The team will inspect all mission and life support items prior to loading on aircraft. (T-2).
- 13.4.2. All equipment loaded on aircraft should be labeled with contents and weight.
- 13.4.3. When moving around aircraft with overhead rotors turning, ensure radio antennas are collapsed prior to entering the rotor plane. Only enter from the proper side and slope (downhill side of the aircraft) once cleared by a crewmember.
- 13.4.4. Never drive underneath the rotor blades, stay 10 feet outside for static rotors (without spotter) and 30 feet outside for turning rotors regardless of vehicle height. (T-3). **Exception:** Planned rapid vehicle on/off loads or “Rapids.”

**13.5. Oxygen Requirements.** While flying as specialized aircrew aboard fixed-wing aircraft, PJ/CROs will ensure they have sufficient oxygen capable of executing the assigned mission in accordance with AFI 11-409, *High Altitude Airdrop Mission Support Program* and AFMAN 11-202V3. (T-2). PJ/CROs are authorized the use of available aircraft oxygen, parachutists oxygen equipment or both to comply with oxygen requirements.

**13.6. Emergency Procedures.** All personnel will be current on aircraft specific Emergency Egress prior to performing non-rated aircrew duties in flight on that aircraft. (T-1).

**13.7. Team Equipment.** Minimum team equipment will be at the discretion of the TL/EL and in accordance with unit SOPs ([Chapter 19](#) and PJ MOAB approved packing lists located on the Medical site of the GA SharePoint®: <https://cs2.eis.af.mil/sites/13306/medical/SitePages/Home.aspx>).

**13.8. Personal Equipment.** Minimum Equipment required for flight will be in accordance with AFMAN 11-301V2, *Management and Configuration Requirements for Aircrew Flight Equipment (AFE)*.

- 13.8.1. Eye protection. (T-3).
- 13.8.2. Hearing protection. (T-3).

13.8.3. Gloves – fire resistant (Nomex®) gloves should be worn for taxi, take-off and landing. **(T-3)**.

13.8.4. NVDs – required for night. **(T-3)**.

13.8.5. Helmet – required for all rotary wing flights and operations involving NVD use. **(T-3)**.

13.8.6. Aircraft compatible headset – (as required) – should have at least one per aircraft.

13.8.7. Aircraft restraint – (as required). **Note:** PJ/CRO personnel and their equipment (rucksacks/helmet bags/team gear/etc.) will be restrained during taxi, take off, and landing while aboard fixed-wing aircraft and during entire flight for rotary-wing aircraft with a device appropriate to the type of aircraft used.

**13.9. Use of Life Support Equipment.** PJs and CROs are not required to use standard issued aircrew life support equipment in accordance with AFMAN 11-301V2 (e.g., survival vest and aircrew helmet) when comparable equipment is worn as approved by functional manager. PJ and CRO personnel are authorized to wear mission equipment/clothing during all phases of flight. This includes, but is not limited to mission equipment/clothing required for combat and non-combat operations in mountainous, water (surface and subsurface), jungle, arctic, desert and urban environments. Minimum Life Support equipment required on flying status:

13.9.1. Radio. **(T-3)**.

13.9.2. Signal kit (contents are METT-TC dependent).

13.9.3. Compass. **(T-3)**.

13.9.4. Medical kit - may be substituted with Blowout Kit prepared in accordance with PJ MOAB approved packing lists located on the Medical site of the GA SharePoint®: <https://cs2.eis.af.mil/sites/13306/medical/SitePages/Home.aspx>. **(T-3)**.

13.9.5. Personal flotation – required over water. **(T-3)**.

13.9.6. Emergency air source – required for rotary wing training over water **(T-3)**, highly recommended for operational missions (METT-TC dependent).

13.9.7. Anti-exposure suit – PJ/CROs meet requirements for anti-exposure suits in accordance with the environmental chapter in this manual. PJ/CROs on aircrew status will follow the guidance for donning equipment. **(T-3)**.

**13.10. Local Training Area.** Life support equipment is required for all flights outside of the local training area in accordance with AFMAN 11-301V2. **Chapter 19** should identify local training areas.

## Chapter 14

### VERTICAL LIFT

**14.1. General.** When METT-TC precludes air-land insertion/extraction, other methods of insertion and extraction need to be employed. These alternative methods are collectively referred to as AIE methods. All the techniques described in this chapter can be accomplished during the day, night or inclement weather, in all geographic environments and throughout all levels of Rescue/Recovery operations.

14.1.1. This chapter establishes guidance for insertion/extraction operations. Specific procedures such as anchor points and altitude restrictions are contained within MDS specific publications. Insertion/extraction operations will be conducted in accordance with AFTTP 3-1/3.GA, this manual, and applicable checklists, along with AFI 11-2-MDS Vol. 3 and AFTTP (or service equivalents) for the MDS. **(T-1)**. For contradictions between regulatory guidance, the Standards and Evaluations section of the participating units will recommend appropriate procedures and annotate in **Chapter 19. (T-3)**.

14.1.2. When utilizing a joint MDS, U. S. Special Operations Command (USSOCOM) is the overall proponent for AIE operations and USSOCOM 350-6, *Special Operations Forces Baseline Interoperable Rotary Wing and Tiltrotor Infiltration/Exfiltration Training Standards* should be referenced and utilized as required. If deploying from coalition MDSs, the TC/TL/EL and coalition aircraft commander determine the safest and most effective insertion and extraction plan.

14.1.3. General individual responsibilities.

14.1.3.1. TC/TL/EL. The TC/TL/EL is responsible for the overall prosecution of the mission.

14.1.3.2. AIE Master. All AIE operations will have an individual who is qualified and current on all planned AIEs designated as the AIE Master. The AIE Master will:

14.1.3.2.1. Ensure required briefings are accomplished prior to mission execution to the aircrews involved, the employing team and any supporting elements that require the information. **(T-3)**.

14.1.3.2.2. Ensure the AIE equipment is inspected. **(T-3)**.

14.1.3.2.3. Review aircraft forms and inspect aircraft for AIE operations. **(T-3)**.

14.1.3.2.4. Ensure the AIE equipment is installed properly. **(T-3)**.

14.1.3.2.5. Give the proper commands and signals. **(T-3)**.

14.1.3.2.6. Stay in contact with the aircrew for as long as possible in order to gather mission updates and pass this information to the team. **(T-3)**.

14.1.3.2.7. Make the final determination on the safety of the deployment. **(T-3)**.

14.1.3.3. Safetyman. The AIE Master may also serve as the safetyman during AIE operations. However, when an additional safetyman is required due to size or complexity of the operation, the TL/EL/AIE Master will appoint a qualified team member to perform safetyman duties. **(T-3)**. The safetyman will:

14.1.3.3.1. Remain secured to the aircraft until ready to deploy. (T-3).

14.1.3.3.2. Monitor the intercom system until ready to deploy. (T-3).

14.1.3.3.3. Maintain a position to observe the entire operation and will relay commands to the deploying team as required. (T-3).

14.1.3.3.4. Continuously evaluate the safety of the operation and immediately inform the crew/team to take necessary action to avert a hazardous situation. (T-3).

14.1.3.4. Team members will:

14.1.3.4.1. Ensure that non-essential equipment and personnel do not interfere with the deployment operations. (T-3).

14.1.3.4.2. Ensure intercom cords and restraint devices are clear of deployment and recovery pathways and AIE devices. (T-3).

14.1.3.4.3. Stay abreast of time calls and be prepared to deploy when directed. (T-3).

14.1.4. Minimum personnel for operations.

14.1.4.1. Land AIEs. Any qualified PJ/CRO personnel that are current in the applicable tasks, including AIE Master duties, are authorized to perform land AIEs on their own.

14.1.4.2. Water AIEs. The team will ensure a support boat (Rubber Raiding Craft or larger) is present for vertical lift water operations performed when there is not another hoist equipped helicopter, helicopter capable of deploying rescue swimmers and/or a life raft, or H/K/MC-130 rigged for deployment of MA-1 survival kit(s) or Rigging Alternate Method Boat (RAMB). (Boat support procedures are covered in [Chapter 16](#)). (T-3).

14.1.5. General briefing requirements: (T-3).

14.1.6. General Procedures. **WARNING:** Only operational equipment will be used for live operations. (T-2).

14.1.6.1. Time calls. The AIE Master will ask for and inform the team of the standard 20-, 10-, 5- and 1-minute warnings. (T-3).

14.1.6.1.1. “20 minute call.” Prepare equipment for deployment.

14.1.6.1.2. “10 minute call.” Inspect equipment, complete preparation.

14.1.6.1.3. “5 minute call.” All AIE equipment should be ready to deploy. Verify AIE device is connected properly. Ensure safety gear is in place and positioned for exit.

14.1.6.1.4. “1 Minute Call.” All safety checks complete.

14.1.6.1.5. “Rope/Swimmers/Boats x3.” Pilot flying call indicating clearance to deploy. Crew member gives AIE Master “Ropes, Ropes, Ropes, etc.” and points out, or use other pre-briefed signal indicating that it is clear to deploy ropes/equipment/team at the AIE Master’s discretion.

14.1.6.2. Weapons.

14.1.6.2.1. Personnel should charge and safe weapons prior to insertion.



14.1.6.2.2. Personnel will keep weapons pointed downward and in a safe direction. (T-3).

14.1.6.3. Night lighting requirements in accordance with [Table 14.1](#)

**Table 14.1. Lighting Configuration for Training.**

Operation	Minimum Lighting Configuration
Operator	1 chemlight or suitable sub available for signaling and 1 overt/covert strobe visible to aircraft (Operator will have additional light visible by air for water operations)
Fast Rope	2 lights at the bottom of the rope 1 light, at least 10 feet from bottom 1 light at the top of rope (facing inboard towards the deploying team)
Hoist hook	1 light on the hook (For water operations a positively buoyant light may be affixed to the hoist cable in such a manner that it will remain on the surface to mark the cable's location in the event the hook is sub-surface.)
Penetrator	1 light on bottom of each paddle
Rappel	1 light on top of drop sack
Rope Ladder	1 light on each side of the ladder at the first and fifth rung from the bottom
SPIES	2 lights at the bottom of the rope and 3 feet above the first set of D-ring attachment points
Stokes	2 lights on the head 1 light on the foot
SKEDCO®	Rolled – 1 light on hoist attachment Extended – 2 lights on head one light on the foot
FRD	Luminescent tape along rope path or 1 light tied to passenger tie in point
Equipment	1 light on top
T-Duck	1 light on inflation handle 1 light on H-harness quick releases 1 light on fuel bag
Soft Duck	1 light on doughnut cut location 1 light on fuel bag
<p><b>Note:</b> Available illumination and user preference should be considered when choosing light color. On low-illumination nights, consider blue or green lights. On medium to high illumination nights, consider red. Infrared (IR) may be considered for tactical training reasons.</p> <p>Lights are required for training. (T-3). Use of lights for tactical operational missions will be determined with METT-TC input using this table as a guide.</p>	

#### 14.1.7. Emergency procedures.

14.1.7.1. If an aircraft emergency occurs while still in the aircraft; the AIE Master will stop the stick by extending a clenched fist in front of the next deploying member. **(T-3)**. **WARNING:** When unsafe conditions are encountered, stop any additional team members from deploying using appropriate hand signals. Make no attempt to physically stop a person that is in the act of deploying as this may cause the person to lose grip of the rope and increase the probability of injury to the team member.

14.1.7.2. If an aircraft emergency occurs while on the AIE device, deploying personnel should descend as rapidly as possible and move from under the aircraft. Move away from deploying side of aircraft (terrain dependent).

14.1.7.3. If aircraft gains altitude, personnel should stop descent and lock in. In event terrain does not permit fly out, be prepared for ropes to be cut free.

14.1.7.4. All AIE operations will have a briefed team recall to include a no radio (NORDO) signal. **(T-3)**.

14.1.7.5. All participants will be briefed the emergency signaling procedures. During AIE operations, emergency signals will be given whenever an aircraft malfunction, device malfunction or injury occurs which will impede the completion of the event. **(T-3)**.

#### 14.1.8. Required personal AIE equipment.

14.1.8.1. Helmet. Required for shipboard operations and land AIEs when multiple iterations are planned. **(T-3)**. With an appropriate RM review, a helmet is optional during water AIEs or when the intent of the land AIE is to infil the team for a follow-on mission.

14.1.8.2. Eye protection. A diver's mask is required for water AIEs (consider an additional normal set for movement in and around the aircraft). **(T-3)**.

14.1.8.3. NVDs. Recommended but not required for night AIE deployments.

14.1.8.4. Hearing protection (two forms recommended). **(T-3)**.

14.1.8.5. Gloves. Appropriate construction to protect from anticipated friction. **(T-3)**.

14.1.8.6. First line belt/sit harness. **(T-3)**.

14.1.8.7. Emergency signal device. **(T-3)**.

14.1.8.8. Environmental protection. in accordance with **Chapter 6**.

14.1.8.9. Flotation. Flotation will be worn for all flights over water. **(T-3)**. Consider using either hard flotation or the UDT vest for intentional water deployments. Use LPU-10Ps or TFSS-5326 PECEI when water entry is not expected due to their non-cumbersome nature for operations. **WARNING:** Hard flotation can make underwater egress difficult.

14.1.8.10. Snorkel (recommended for water).

14.1.8.11. Fins (required for water). **(T-3)**.

14.1.8.12. Dive tool (required for water). **(T-3)**.

14.1.8.13. Lighting. in accordance with **Table 14.1** (required for night). **(T-3)**.

14.1.8.14. Spare headset (recommended for water in case primary set fails).

14.1.8.15. Aircraft restraint device. Commercially produced life rated devices specifically designed for either aircraft or mountaineering use. Individual units will determine procedures to prevent the use of devices beyond their manufacturer recommended service life. (T-3). Units will list alternate aircraft restraint devices authorized for AIE operations in **Chapter 19 (T-3)**. Units will ensure these unit authorized devices meet the following:

14.1.8.15.1. Material used must be rated to a minimum of 2,000 lbs. per strand, using approved mountaineering knots at each end. (T-3).

14.1.8.15.2. Locking/auto-locking carabineers or similar two-stage locking device will be used to attach the alternate restraint device to the aircraft. (T-3).

14.1.8.15.3. A snap shackle device is recommended to attach the alternate restraint device to the operator or aircraft. **WARNING:** The snap shackle pin must have either a spot-welded “key-ring” or a hammered end on the ring side to prevent inadvertent failure. (T-3).

14.1.8.15.4. Non-locking carabineers are not authorized. (T-3).

14.1.8.15.5. Prior to each use, the operator will inspect the aircraft Tie-in for knot/stitching security, frays, soft spots and excessive contamination of petroleum products. (T-3). **WARNING:** Alternate restraint devices will be positioned and adjusted to prevent operators from involuntarily exiting the aircraft. (T-3).

**14.2. Rope/Caving Ladder. WARNING:** Ladders are not designed for aircraft use outside of a hover, use as a dynamic exfil method may result in catastrophic failure and must be limited real world contingencies and to the minimum time, distance and speed required to egress the immediate danger only. (T-3).

14.2.1. Inspection and prep. The team will ensure that the rope ladder is inspected and properly rigged in accordance with TO 00-25-245, *Testing and Inspection Procedures for Personnel Safety and Rescue Equipment* (T-3) and this manual:

14.2.1.1. Cabin is clear of equipment, oil or other fluid and there are no sharp edges. (T-3).

14.2.1.2. Ladder is secured to aircraft. (T-3).

14.2.1.3. Quick release mechanism is functional. (T-3).

14.2.1.4. Spacing device available to elevate ladder away from aircraft for team entry. (T-3).

14.2.1.5. Check length for frays or tears and ladder rungs are securely attached. (T-3).

14.2.1.6. Lighting in accordance with **Table 14.1** or MDS standards.

14.2.1.7. If using a caving ladder, preferably attach the ladder to the Fast Rope Insertion/Extraction System (FRIES) bar in the retracted or intermediate position using two carabineers. Attach a separate safety strap, made of 1-inch tubular nylon with carabineers to a deck ring.

14.2.1.8. Caving ladders can be joined together to increase length.

14.2.2. Contingencies.

14.2.2.1. Climber will have an accessible method for emergency tie in to rope ladder in event the aircraft must fly away while climbing. **(T-3)**.

14.2.2.2. If aircraft descends, wait until contact with ground then step off and away as briefed.

14.2.3. Procedures.

14.2.3.1. When the ladder is deployed and contacts the surface, the team is cleared to ascend.

14.2.3.2. Once inside the aircraft, members secure themselves to an approved attachment point as soon as practical.

14.2.4. Equipment.

14.2.4.1. Personal AIE equipment.

14.2.4.2. Method for emergency tie-in (aircraft restraint fulfills requirement).

14.2.4.3. Ladder and connecting hardware.

**14.3. Rappel.**

14.3.1. Installation.

14.3.1.1. Ropes will be inspected and back coiled in deployment bag prior to use. **(T-3)**.

14.3.1.2. Ropes will be attached to anchor points using locking Carabineers. **(T-3)**. Auto locking are recommended to facilitate faster disconnect once team has deployed. The deploying team is responsible for aircraft rigging and proper hookup of deploying personnel. **Exception:** If the FRIES bar or similar aircraft quick release is used as an anchor point, an appropriate climbing knot may be used to attach to the release mechanism.

14.3.2. Procedures.

14.3.2.1. Rappellers receive a safety check prior to deployment.

14.3.2.2. After the “5-Minute” call, a safety check, and with brake hand established, the rappeller may release aircraft restraint in preparation to exit.

14.3.2.3. Once the aircraft comes to a hover over intended deployment area, and pilot gives “Ropes, Ropes, Ropes” call, the AIE master directs deployment of rope.

14.3.2.4. AIE Master ensures the rope is on the ground and then deploys the team. **WARNING:** Rappeller must remove all slack from the system before exiting the aircraft and descend in a controlled fashion in order to minimize descent rate, reduce the possibility of shock loading, and to maintain brake-hand control. **(T-3)**.

14.3.3. Procedures with bag attached to rappeller.

14.3.3.1. Tie rope into the inside of bag with a knot to prevent run out. Bag will be attached to lower leg on same side as brake hand. **(T-3)**.

14.3.3.2. Rope will be 50 feet longer than rappeller's intended deployment altitude. **(T-3)**. **WARNING:** When rappelling with a leg-bag, descent rate should be slower to negotiate obstacles and care taken to manage tension loops in rope.

14.3.4. Equipment.

14.3.4.1. Personal AIE equipment.

14.3.4.2. Rope. Minimum 9mm, life rated static, back coiled in rope bag. **(T-3)**.

14.3.4.3. Carabineers for attaching rope to aircraft.

14.3.4.4. Descending device/carabineer (match device to rope diameter and rappeller weight). **WARNING: Figure-8**, Munter hitch and Italian hitch rappel configurations may cause twists in the rappel rope. These twists may be severe enough to form excessive twists/knots resulting in the loss of control by rappeller's brake hand. Stitch plate style descender (ATC/Reverso) should be used to minimize rope twists with no degradation in control. **WARNING:** Use caution when employing a soft link extension as moving rope may burn through them.

**14.4. FRIES.**

14.4.1. Set up (Inspected in accordance with TO 00-25-245).

14.4.1.1. Deploying team is responsible for providing and inspecting the fast rope.

14.4.1.2. Attach to aircraft using MDS guidance. (Establish secondary anchor when used for exfil.). **(T-3)**.

14.4.1.3. Rope should be configured for rapid deployment near exit.

14.4.2. Restrictions: Do not connect FRIES to hoist for FRIES exfil. **(T-3)**.

14.4.3. Infil procedures.

14.4.3.1. Do not disconnect from aircraft until established on short final. **(T-3)**.

14.4.3.2. If Fast Rope Descender (FRD) is being used, it will deploy first. **(T-3)**.

14.4.3.3. When requested, aircraft may maintain a maximum of 5 knots forward speed to reduce the risk of fast ropers descending on top of another.

14.4.4. Exfil Procedures.

14.4.4.1. Deployment of FRIES is clearance to attach to rope.

14.4.4.2. Do not attach more than two personnel per attaching loop on the FRIES.

14.4.4.3. For odd number of personnel attach odd person on higher attachment loop.

14.4.4.4. Attach the equipment on the bottom loop. **(T-3)**.

14.4.5. Equipment.

14.4.5.1. Fast rope.

14.4.5.2. Fast rope quick release sling.

14.4.5.3. Secondary anchor (required for exfil).

14.4.5.4. Personal AIE equipment. (If exfilling, two locking carbineers are required.).

## 14.5. FRD.

### 14.5.1. Inspection.

14.5.1.1. Leash inspection. Inspect leashes for torn stitching, damaged or soiled material, frays, cuts or excessive wear that could compromise the leash's purpose. Questionable items will be replaced immediately. **(T-3)**.

14.5.1.2. Hardware inspection. Inspect hardware for corrosion, damage and proper function. Questionable items will be replaced immediately. **(T-3)**.

14.5.1.3. Metal components of the FRD will be inspected annually using nondestructive inspection procedures. Unit support personnel will maintain inspection documentation. **(T-3)**. **CAUTION:** Keep the FRD and components away from chemicals that may compromise the mechanism's integrity (gasoline, corrosives, etc.). Store the device in a cool, dry location away from direct sunlight.

### 14.5.2. Installation and setup.

14.5.2.1. Installation on FRIES Bar. Using a girth hitch, attach the 4-foot retainer leash to the FRIES bar or to the anchor loop of the fast rope. Preposition the leash as required based on the situation. **CAUTION:** The FRD can fall out of the aircraft if the 4-foot retainer leash is not attached to the FRD prior to attempting installation of the device onto the fast rope.

14.5.2.2. Installation on fast rope. Pivot the plates of the FRD open and lay the fast rope between the FRD rollers being sure to align the rope as shown on the FRD side plate, then pivot the plates closed. **WARNING:** Incorrect routing of the fast rope in the FRD could result in an uncontrolled descent and cause serious injury or death.

14.5.2.3. Friction hole selection. Place a locking carabineer through the appropriate friction hole on the FRD for the additional weight being deployed (not including the operators weight). The low friction hole may be used when an operator is deploying with less than 165 pounds of additional weight. The high friction hole is recommended when an operator is deploying with greater than 165 pounds of additional weight.

### 14.5.3. Procedures.

14.5.3.1. FRD will be set up prior to the 5 min call. **(T-3)**.

14.5.3.2. Connect all passengers and equipment to the FRD between the 5- and 1-min call (all connections will be made to the carabineer connected to the appropriate friction hole). **(T-3)**.

14.5.3.3. Do not disconnect aircraft restraint until secured to the FRD with an established brake hand. **(T-3)**.

14.5.3.4. Do not grab fast rope above the FRD; always handle the fast rope under the FRD similar to a rappel.

14.5.3.5. Once on the ground disconnect yourself from the FRD and then disconnect any equipment or passengers that need assistance. **WARNING:** DO NOT allow passenger to grab the fast rope while descending. This will cause the FRD to disengage, creating a rapid, uncontrolled descent.

14.5.4. Minimum team equipment requirements:

14.5.4.1. Personal AIE equipment. (T-3).

14.5.4.2. Fast rope. (T-3).

14.5.4.3. FRD. (T-3).

14.5.4.4. Lighting (as required) in accordance with [Table 14.1](#)

14.5.4.5. Passenger PPE:

14.5.4.5.1. Helmet. (T-3).

14.5.4.5.2. Eye protection. (T-3).

14.5.4.5.3. Sit harness with carabineer. (T-3).

14.5.4.5.4. Gloves. (T-3).

## 14.6. Hoist.

14.6.1. Inspection. Lead AIE Master will inspect or verify an aircrew inspection of hoist prior to use. (T-3). Deploying personnel are responsible to inspect any team equipment or personal equipment required to complete the hoist prior to hoisting, and familiarizing themselves with the style of rescue hook on aircraft. (T-3). When able, all operators should be familiar with operating the hoist.

14.6.2. Set up.

14.6.2.1. All operators should be familiar with the operation of the following rescue devices:

14.6.2.1.1. Double rescue hook assembly. The large gated hook is used for personnel and rescue devices. The smaller clip may be used for equipment or light cargo, the eyelet is for cargo only. Pin-In-Place or "Pip" pin is present.

14.6.2.1.2. Sit harness. The sit harness can be manufactured or tied as a Swiss seat and will be safety checked prior to attaching to the hoist.

14.6.2.1.3. Forest penetrator (ref. TO 14S6-3-1, *Operation and Maintenance Instructions -- Forest Penetrator, Rescue Seat Assembly* and TO 00-25-245).

14.6.2.1.4. Rescue strop (ref. NAVAIR 13-1-6.5, *Rescue and Survival Equipment*, and TO 00-25-245).

14.6.2.1.5. Stokes litter (ref. TO 00-75-5, *Use, Inspection and Maintenance -- Stokes Rescue Litters* and TO 00-25-245).

14.6.2.1.6. SKEDCO® litter.

14.6.2.2. All devices should be equipped with flotation in the event of water operations.

14.6.3. Restrictions.

14.6.3.1. Cable shock loading: Training. If anyone is still on the hoist, stop raising or lowering the cable. Individual may be returned to the surface by lowering the aircraft.

14.6.3.2. Cable shock loading: Operational. Discuss RM with Aircraft Commander and hoist operator taking into account mission requirements, alternate means of insertion/extraction, and consequences of cable failure.

#### 14.6.4. Procedures.

14.6.4.1. Infil procedures. Hoist rider will release aircraft restraint and move to the exit once secured to the hoist, cable slack is removed, and aircraft is established on short final. **(T-3)**.

14.6.4.2. Exfil procedures. **WARNING:** Rotary wing aircraft build up static electricity that will discharge once the cable is grounded. Team should wait for cable to ground out prior to handling it. If fuel is in the terminal area, ensure the aircraft discharges static electricity away from fuel prior to exfil. Move away from fuel if able.

14.6.4.2.1. Rider(s) will give pre-briefed signal to aircraft when connected to hook and ready for exfil. **(T-3)**. **WARNING:** Cable slack must be carefully monitored; excessive slack in the cable can wrap around parts of the operator or gear and cause injury. If the slack cannot be monitored, disconnect from the cable and move away until aircraft has eliminated all slack.

14.6.4.2.2. Aircraft may be prepared with a strap across top side edge of door to aid riders entering.

14.6.4.2.3. Once inside the aircraft, operators will secure themselves and patients as soon as practical. **(T-3)**. **WARNING:** While ascending on the hoist, keep hands and fingers clear of the hoist cable, bumper and hook. Failure to keep hands and fingers clear could cause severe injuries up to and including amputation.

14.6.4.3. Tag Line procedures. A tag line can be used during hoist operations to prevent spins, oscillations and to guide the hoist hook/rider to/from a confined area.

14.6.4.3.1. A tag line or approved anti-rotational device is required for all live and SKEDCO® litter hoists. **(T-3)**. They are highly recommended for all litter hoist operations.

14.6.4.3.2. Additional care must be exercised when there is a threat of entanglement. Tender must take into account the tending line angle, hoist height and tag line length to prevent any unsafe conditions such as "tag line run-out.

14.6.4.3.3. Users coordinate one of two methods of tender offset from hoist point. Optimal tender positioning is within an approximate 120° arc off the hoist side of the aircraft and clear of any aircraft obstructions.

14.6.4.3.3.1. Repositioning of aircraft. Once rescue device is clear of surface/obstructions, pilot repositions aircraft to create offset.



14.6.4.3.3.2. Repositioning the Tender. Tender is positioned offset prior to hoist initiation and control the rescue device throughout the hoist. **WARNING:** Insufficient offset of the tag line tender from the hoist point will negate the utility of the tag line and render it useless to control the rescue devices. This is particularly critical when hoisting SKEDCO® litter as insufficient tag line control will result in violent spins. **WARNING:** All taglines will have a weak link created with a single loop of gutted 550 cord or two wraps of 80lb test tape incorporated between tagline and litter. (T-3).

14.6.5. Litter and barrelman procedures.

14.6.5.1. Patient is secured to the litter prior to attaching hoist cable.

14.6.5.2. The operator connects after litter is secured to the cable. He connects directly to the hoist cable hook and keeps the litter between himself and the aircraft to avoid the litter being drug into him.

14.6.6. Minimum individual equipment requirements:

14.6.6.1. Personal AIE equipment. (T-3).

14.6.6.2. Sit harness (required when hoisting without rescue device). (T-3).

14.6.6.3. Chest harness (as required). Recommended for hoisting with heavy equipment or packs.

14.6.6.4. Barrelman strap. Must meet standards listed in [Paragraph 14.1.8.15](#) (T-3). **WARNING:** All hoist operation conducted on a sit harness will only use locking carabineers or similar two-stage locking device, no quick releases or non-locking carabineers will be incorporated in the connection to the hoist. (T-3).

**14.7. Helocast.**

14.7.1. Procedures.

14.7.1.1. Deployers are clear to come off restraint once short final is established.

14.7.1.2. AIE Master will ensure deployment spacing of team to prevent collision on water entry. (T-3).

14.7.1.3. AIE Master will not deploy team until aircrew passes the clear-to-deploy signal once the standard altitude and airspeed are achieved. (T-3).

14.7.1.4. Max deployment altitude and airspeed not to exceed 10feet/10knots. (T-3). **WARNING:** During high seas, time deployment with the wave crest. This may require more than 1 second between individuals. In very high seas, consider using FRIES.

14.7.2. Minimum individual equipment requirements:

14.7.2.1. Personal AIE equipment. (T-3).

14.7.2.2. Appropriate equipment fitted with floatation. (T-3).

**14.8. Equipment Delivery.**

14.8.1. Additional briefing items.

14.8.1.1. Weight and cube of equipment.

14.8.1.2. 2 minute call requirement.

14.8.2. Set up.

14.8.2.1. Belay point. (Select in accordance with MDS guidance). May be a ceiling tie-down ring, floor ring, or the FRIES bar. Ensure belay system does not interfere with fast rope operations. System can be connected on the same side as the fast rope. Monitor rope for contact with edge of door.

14.8.2.1.1. Route rope through belay device and snap shackle to make a quick release system, then connect snap shackle to belay point using an appropriately rated connection.

14.8.2.1.2. Consider using the FRIES as a high point.

14.8.2.2. Equipment will be secured by a tie-down or the belay until aircraft is in position for deployment. **(T-3)**.

14.8.3. Inspection.

14.8.3.1. Harness.

14.8.3.1.1. No rips or tears in webbing and stitching. **(T-3)**.

14.8.3.1.2. Secured to container – tight fit. **(T-3)**.

14.8.3.2. Rope.

14.8.3.2.1. 10mm static kernmantle life-rated rope/long enough for intended hover height; back coiled in bag. **(T-3)**.

14.8.3.2.2. No rips, frays, soft spots or knots. **(T-3)**.

14.8.3.3. Belay/quick release system.

14.8.3.3.1. All hardware present and functional: Carabineer, snap shackle quick release, friction/belay device and V-blade knife. **(T-3)**.

14.8.3.3.2. No cracks, bends or noticeable fatigue. **(T-3)**.

14.8.4. Deployment procedures.

14.8.4.1. “2 minutes.” Release equipment tie down and move to deployment exit. Belayer must be in position with positive control of the load prior to tie down release. Loads in excess of 100 lbs. will remain secured to the aircraft via a quick release or “Teeter strap.” **(T-3)**.

14.8.4.2. “1 minute.” Position the load halfway out exit (“30 seconds” for CV-22). Maintain ability to retrieve load in case of go-around/abort. Do not release “Teeter strap” until established in a hover. **(T-3)**.

14.8.4.3. “Ropes, Ropes, Ropes.” On AIE Master’s signal, may deploy equipment. Fast rope or other devices may be deployed simultaneously.

14.8.4.4. Belayer must maintain control through entire descent. Equipment should reach the ground prior to personnel. **(T-3)**.

14.8.4.5. Belay man will not disconnect tie-in from the aircraft until belay is complete. **(T-3)**.

14.8.5. Minimum team equipment requirements:

14.8.5.1. Appropriately constructed harness (as requested). **(T-3)**.

14.8.5.2. Belay rope. Minimum 10mm static kernmantle life rated. **(T-3)**.

14.8.5.3. Belay system: Snap shackle, belay device, locking carabineers. **(T-3)**.

14.8.5.4. Leather gloves (as required).

14.8.6. T-duck operations.

14.8.6.1. Set up and inspection.

14.8.6.1.1. CRRC.

14.8.6.1.1.1. Tested in accordance with **Chapter 18**. **(T-3)**.

14.8.6.1.1.2. Valves are on inflate, speed tube isolation clamps open. **(T-3)**.

14.8.6.1.1.3. All caps are in place. **(T-3)**.

14.8.6.1.1.4. Inflation bottle full and connected with inflation system to the CRRC. **(T-3)**.

14.8.6.1.2. Engine tested and prepared in accordance with **Chapter 18**.

14.8.6.1.2.1. Engine attached. Safety lanyard attached to transom. **(T-3)**.

14.8.6.1.2.2. Fuel attached to boat. **(T-3)**. Bladder and lines may be contained in an A-3 bag.

14.8.6.1.3. Harness.

14.8.6.1.3.1. No rips/tears in webbing or stitching. **(T-3)**.

14.8.6.1.3.2. Secured to container with appropriate hardware/quick releases. **(T-3)**.

14.8.6.1.3.3. Check quick releases for proper function. **(T-3)**.

14.8.6.1.4. Rope.

14.8.6.1.4.1. 10mm static kernmantle life-rated rope/long enough for intended hover height; back coiled in bag. **(T-3)**.

14.8.6.1.4.2. No rips, frays, soft spots or knots. **(T-3)**.

14.8.6.1.5. Belay/quick release system.

14.8.6.1.5.1. High point is secure. **(T-3)**.

14.8.6.1.5.2. All hardware present, functional with no cracks bends or noticeable fatigue. **(T-3)**.

14.8.6.1.6. Teeter strap: good condition, carabineer on one end with a snap shackle on the opposite end. **(T-3)**.

14.8.6.1.7. Lighting. in accordance with **Table 14.1**

- 14.8.6.1.8. Load in aircraft, prop aimed out the door/ramp. Route belay line and attach belay device. Attach T-duck with a quick release to the aircraft and secure with an equipment tie down. **(T-3)**.
- 14.8.6.2. Deployment procedures.
- 14.8.6.2.1. “5-minutes.” Ensure FRIES bar is extended, activate chemlights and inflate ends of CRRC tubes. **(T-3)**.
- 14.8.6.2.2. “2 minutes.” Belayer must be in position with positive control of the load with all slack removed prior to tie down release. Release equipment tie down and move to deployment exit. **(T-3)**.
- 14.8.6.2.3. “1 minute.” Position the load halfway out exit (“30 seconds” for CV-22). A “teeter” strap with quick release will be used. This will not be released until aircraft is established in a hover. Maintain constant tension on belay rope to prevent shock loading. **(T-3)**.
- 14.8.6.2.4. “Boats, Boats, Boats.” On AIE Master’s signal, may deploy equipment. Fast rope or other devices may be deployed simultaneously.
- 14.8.6.2.5. Belayer must maintain control through entire descent. T-Duck must reach the water prior to personnel. **(T-3)**.
- 14.8.6.3. Minimum T-Duck equipment requirements:
- 14.8.6.3.1. CRRC with engine and fuel. **(T-3)**.
- 14.8.6.3.2. Harness. **(T-3)**.
- 14.8.6.3.3. Belay rope. Minimum 10mm static kernmantle life rated. **(T-3)**.
- 14.8.6.3.4. Belay system. Friction device, carabineers, quick release. **(T-3)**.

## Chapter 15

### FIXED WING

**15.1. General.** Conduct all fixed wing and parachute operations in accordance with AFI 10-3503, *Personnel Parachute Program*, AFI 11-409, AFI 13-210\_IP, *Joint Airdrop Inspection Records, Malfunction/Incidents Investigations and Activity Reporting*, AFI 13-217, *Drop Zone and Landing Zone Operations*, applicable MDS publications and this manual. Specific parachuting TTPs are contained in AFTTP 3-1/3.GA. For joint operation or for techniques not listed in the above guidance use AFMAN 11-420, *Static Line Parachuting Techniques*, ATP 3-18.11, *Special Forces Military Free-Fall Operations*, and Training Circular (TC) 18-11, *Special Forces Double-Bag Static Line Operations*.

### 15.2. Responsibilities.

15.2.1. TC/TL. The TC/TL has responsibility for the overall mission execution.

15.2.1.1. Perform or designate key duties required for the parachute phase of the operation.

15.2.1.2. Ensure recovery / communications plan for jumpers.

15.2.2. JM. Duties and Responsibilities will be conducted in accordance with AFI 10-3503. **(T-1)**. The JM will ensure that all jumpers perform jump procedures in accordance with AFTTP 3-3.GA (when applicable) and AFMAN 11-420, ATP 3-18.11 and TC 18-11 for joint operations. **(T-2)**.

15.2.2.1. All intentional parachute operations will have a JM assigned. **(T-1)**.

15.2.2.2. Accomplish all briefings required to complete the parachute operations for the mission to include aircrew, jumpers, Drop Zone Controller (DZC) and emergency procedures for all. **(T-3)**.

15.2.2.3. Complete an accurate RM with predicted data for parachute operations. **(T-3)**.

15.2.2.4. Accomplish preparing and rigging all equipment for parachute operation. **(T-3)**.

15.2.2.5. Conduct all inspections to include, jumper, equipment and aircraft. **(T-3)**.

15.2.2.6. When performing Jumpmaster Directed (JMD) operations, the jumpmaster is responsible for the safety of jumpers and the accuracy of drop. **(T-3)**.

15.2.2.7. When performing High Altitude Release Point (HARP)/Computed Air Release Point (CARP) operations, the jumpmaster is responsible for the safety of jumpers. **(T-3)**.

15.2.2.8. For night training jumps, the target indicator (if used) will be determined by the JM/TL and be readily identifiable by all parachutists. **(T-3)**.

15.2.2.9. CARP. To ensure the most accurate computed release point, the JM will coordinate with the aircraft navigator (applicable only to aircraft equipped with multi-system navigational systems) prior to take off to compare the computed release points. **(T-3)**. If there is a discrepancy of greater than 250m, both should check data and calculations. If there is still a disparity, they will come up with a mutually acceptable solution.

15.2.2.10. Regardless of the method utilized to determine the jumper release point the JM will confirm the aircraft is at the correct location prior to jumper deployment, either visually or electronically. The responsibility for the safety of the jumpers cannot be delegated. **(T-1)**.

15.2.2.11. In all cases, the jumpmaster is responsible for considering all factors to include team experience in order to safely and successfully complete the parachute operation.

15.2.2.12. Direct all pre-jump training. Pre-jump training contents are at discretion of the JM. However, a jump briefing, to include a detailed review of emergency procedures will be conducted prior to each individual's first jump of the day. **(T-3)**.

15.2.3. Safety Man. The JM may designate aircrew personnel to act as a safety. Personnel performing safety duties will be thoroughly briefed and trained in the handling and control of static lines. **(T-3)**.

15.2.4. Jumpers. All jumpers are responsible for knowing personal equipment, standard procedures and emergency procedures for parachute operations.

**15.3. Physiology Technician Requirements.** High Altitude Airdrop Mission Support (HAAMS) Requirements. The Air Mobility Command manages HAAMS personnel support for high altitude low opening (HALO) /high altitude high opening (HAHO) operations/airdrops. See AFMAN 11-409 for more details.

**15.4. Briefing Requirements.** For training, the Jumpmaster will ensure the following briefs are accomplished:

15.4.1. Briefing to aircrew. In accordance with the Aircrew Brief in the current Briefing Guide (brief asterisked items at a minimum). **(T-3)**.

15.4.2. Briefing to DZC. In accordance with the DZC Brief in the current Briefing Guide (brief asterisked items at a minimum). **(T-3)**.

15.4.3. Briefing to Jumpers. In accordance with the applicable Jumpmaster Briefs in the current Briefing Guide (brief asterisked items at a minimum). **(T-3)**.

### **15.5. Restrictions.**

15.5.1. Jumper recovery. The DCZ will ensure a parachutist recovery plan is in place prior to any training jump. **(T-3)**. For operational jump missions, communications plan is recommended prior to jumper deployment to affect the recovery of parachutists.

15.5.2. NVD operations. Only personnel who have been trained via an official course or HAF coordinated syllabus are authorized to jump NVDs. **(T-3)**. NVDs may be worn for all military free fall (MFF) operations; however, if they are not worn in the down-and-locked position during HALO operations, they should be in the up-and-locked position until after post opening procedures. The Jumpmaster makes the employment/TTP risk assessment for the team.

15.5.3. Equipment. PJ and CRO personnel are only authorized to jump equipment listed on the current AF Personnel Parachute Program Approved for Use List (PPP AUL). (See AFI 10-3503 for more information). **WARNING:** Any load that is mounted low, front or rear, should have the “leg straps” worn tight enough to keep the load in place throughout the jump. On free fall operations, lightweight loads that are low, front-mounted can be particularly hard to control. Any load under 45 pounds should be evaluated for surface area in the relative wind to determine whether it is safe to jump. **Note:** Jumper should consider lowering all loads greater than 45 pounds if not high- or mid-mounted.

15.5.4. JMD drops.

15.5.4.1. Jumpmaster will have two points of reference or an established release point prior to Drop. (T-3).

15.5.4.2. Once the pilot has established drop clearance visually, verbally or electronically (e.g., green light, thumbs up, verbal clear to drop) indicating that the aircraft is within parameters and the pilot has cleared the team to jump, the decision lays solely with the jumpmaster on when, where and if to deploy the team or equipment.

15.5.5. Wind limitations. Static line and free fall wind limitations are defined in AFI 13-217, For operational deployments, careful consideration will be given to canopy performance, jumper experience, jumper’s equipment, drop zone size/elevation, exit altitude, and tactical situation surrounding the drop zone to ensure mission success.

15.5.6. Exit/deployment altitude restrictions. Exit/deployment altitudes and restrictions for training and operational limits are in accordance with AFI 10-3503 or MAJCOM/A3 approved guidance. Refer to AFTTP 3-3.GA for recommended opening altitudes above and below 20,000 ft. MSL.

15.5.7. Spring loaded pilot chute. If used, a spring-loaded pilot chute may cause pilot chute hesitation and possibly an entanglement due to the low-pressure area behind the jumper. This low (negative) pressure area will vary based on the size and rate of decent of the jumper. To mitigate this risk, the jumper must lift a shoulder after pulling the ripcord to disrupt the burble and allow the pilot chute to escape. **WARNING:** Failure to break the burble of low pressure behind the parachutist to allow the spring-loaded pilot chute to escape may cause pilot chute hesitation or entanglements, which could lead to horseshoe malfunctions.

15.5.8. Parachute deployment airspeeds. Specific instructions for all aircraft deployment airspeeds and parachute operating procedures will be in accordance with AFI 11-2-MDS Vol. 3, or service-specific aircraft flight manuals. **WARNING:** Emphasize maximum airspeed restrictions with the aircrew during mission planning and briefing. Use caution when coordinating with the crews of heavy lift aircraft. They frequently have weights that will force them to have airdrop speeds in excess of the safe exit limitations of 135 Knots for the MC1-1C/D/E.

**15.6. Intentional Water/Tree Jumps.** When performing intentional water or tree jumps, PJ and CRO personnel will follow additional equipment rigging guidance contained in AFTTP 3-3.GA. (T-3).

**15.7. Electronic Automatic Activation Device (EAAD).** Use only EAADs listed on the AF PPP AUL. (T-1).

15.7.1. Parachutist must use an EAAD during training MFF operations. (T-2).

15.7.2. Parachutist must use an EAAD during contingency MFF operations unless the ranking jumpmaster determines it would add unnecessary time and complexity to mission execution. **WARNING:** When using “unknown drop zone (DZ) pressure” default setting of 29.92 inches of mercury, the jumpmaster must also add 1,000 feet to the jumpers’ pull altitude as a safety factor in case the EAAD fires on the high side. (T-3). Failure to do so could cause a dual canopy deployment, resulting in injury or death to the parachutist. **WARNING:** If equipped, do NOT turn on EAAD when performing Ram Air Static Line (RASL) at exit altitudes below 3000ft above ground level (AGL). Pressure differentials during a hung jumper scenario may cause the EAAD to inadvertently fire while jumper is still attached to the aircraft. **WARNING:** EAAD calculations will be verified by a second, trained individual. (T-3). Incorrect settings can cause dual parachute activations with the potential of serious injury or death.

**15.8. Risk Management.** In order to help form an accurate prediction of the RM, the following considerations should be made when planning the jump phase of the operation.

15.8.1. Oxygen requirements.

15.8.2. DZ wind speed.

15.8.3. DZ elevation.

15.8.4. DZ condition (land or water).

15.8.5. DZ size.

15.8.6. Jumper equipment.

15.8.7. Jumper experience.

15.8.8. Crew experience.

**15.9. Lighting Requirements.** Jumper and equipment lighting is required during all training airdrop operations that are conducted in or near the hours of darkness. (T-2). Covert lights may be substituted for the below standards only after a careful RM analysis and coordination with owners of the airspace through which transit is planned.

15.9.1. Round canopies. Minimum individual lighting requirements for training jumps with round chutes:

15.9.1.1. Front of the jumper: one red light. (T-3).

15.9.1.2. Front of releasable equipment: one red light. (T-3).

15.9.1.3. Strobe light directed up to the canopy. (T-3).

15.9.1.4. For water, attach green light to helmet for jumper visibility in the water. (T-3).

15.9.2. Ram Air Parachute Systems (RAPS). Minimum individual lighting requirements for training jumps with RAPS:

15.9.2.1. Front of the jumper: one red light. (T-3).

15.9.2.2. Front of releasable equipment: one red light. (T-3).

15.9.2.3. Rear of jumper: one green light. (T-3).



15.9.2.4. Altimeter: one light (if not internally lit). **(T-3)**.

15.9.2.5. Strobe light directed up to the canopy. **(T-3)**.

15.9.2.6. For water - attach green light to helmet for jumper visibility in the water. **(T-3)**.

**15.10. Mandatory Equipment.** Minimum equipment for all training and operational parachute jumps.

15.10.1. Minimum individual land jump equipment requirements:

15.10.1.1. Helmet. **(T-3)**.

15.10.1.2. Goggles. **(T-3)**.

15.10.1.3. Altimeter (required for RAPS). **(T-3)**.

15.10.1.4. Accessible hook knife. **(T-3)**.

15.10.1.5. Gloves. **(T-3)**.

15.10.1.6. Communications device (inter-team radio, cellular phone, etc.). **(T-3)**.

15.10.1.7. Whistle. **(T-3)**.

15.10.1.8. Signal flare (recommended).

15.10.1.9. Signal mirror. **(T-3)**.

15.10.1.10. Flotation in accordance with AFI 13-217 (as required).

15.10.1.11. Light source - required for night. **(T-3)**.

15.10.1.12. Jumper lighting in accordance with [Paragraph 15.9](#)

15.10.1.13. Environmental protection in accordance with [Chapter 6](#).

15.10.2. Minimum individual water jump equipment requirements:

15.10.2.1. Helmet (optional).

15.10.2.2. Diver's face mask or swim goggles. **(T-3)**.

15.10.2.3. Snorkel. **(T-3)**.

15.10.2.4. Single Para-SCUBA Deployment System (SPUDS) or suitable substitute (recommended).

15.10.2.5. ML-4 Kit (recommended).

15.10.2.6. Accessible hook knife. **(T-3)**.

15.10.2.7. Gloves. **(T-3)**.

15.10.2.8. Dive knife/tool. **(T-3)**.

15.10.2.9. Booties. **(T-3)**.

15.10.2.10. Swim fins (If worn on feet, must be secured by heel strap and at least one additional method: e.g., fix-e-palms, ¼" cotton webbing, etc.). **(T-3)**.

15.10.2.11. Alternate load belt with carabineer (as required).

15.10.2.12. Whistle. (T-3).

15.10.2.13. Signal flare. (T-3).

15.10.2.14. Signal mirror. (T-3).

15.10.2.15. Light source (required for night). (T-3).

15.10.2.16. Jumper lighting (in accordance with [Paragraph 15.9](#)).

15.10.2.17. Environmental protection in accordance with [Chapter 6](#).

15.10.2.18. Flotation. When performing deliberate water jumps, floatation is required for jumpers in accordance with AFI 13-217. Options for jumper flotation are contained in AFMAN 11-420, ATP 3-18.11, and TC 18-11 and authorized equipment is listed on the AF PPP AUL. (For training water jumps, a LPU-3P or comparable device will be routed through the waistband of the parachute unless other approved flotation is authorized for the parachute system in order to recover equipment). (T-3). **WARNING:** Non-locking carabineers and other hook type items (e.g., boots with hook grommets versus eyelets) will not be jumped exposed, as the possibilities exist for pilot chute/canopy lines to be entangled within the devices preventing cut-away or causing a malfunction. Stow or tape as necessary and ensure locking carabineers are locked.

**15.11. Equipment Checks.** Jumpers will prepare all equipment for jump operations prior to the jumpmaster parachutist inspection. (T-3). Check all equipment required for the jump operation. (T-3). Additional info can be found in AFMAN 11-420, ATP 3-18.11, and TC 18-11.

15.11.1. SPUDS.

15.11.1.1. Belt will be routed through the friction adapter. (T-3).

15.11.1.2. Bottle inspected and serviceable. (T-3).

15.11.1.3. Gauged full. (T-3).

15.11.1.4. Reserve lever up (if equipped).

15.11.1.5. Regulator attached. (T-3).

15.11.1.6. Hose attached and serviceable. (T-3).

15.11.1.7. Open Air valve and check for leaks. Turn air back off and release pressure. (T-3).

15.11.2. ML-4.

15.11.2.1. Current inspection and repack. (T-3).

15.11.2.2. Quick release is present and functional. (T-3).

15.11.2.3. Tether is present and functional. (T-3).

15.11.2.4. Rigged and worn in accordance with TO 14S1-3-51, *Operation and Maintenance Instruction for Survival Kit Components and Container Assembly* (set ML-4 kit on a chair with the arrow on top, pointing to the front of the chair, jumper then sits on the ML-4 and attaches to lower equipment V-rings, positioning the arrow between the legs, pointed at the knees). **Note:** Special care should be taken when jumping a rear mounted ML-4 kit on a free fall parachute in Bottom of Container pilot chute configuration. Jumpmasters must ensure jumpers have access to the pilot chute handle prior to releasing jumpers. **(T-3).**

**15.12. Jumpmaster Personnel Inspection (JMPI).** PJ and CRO personnel are authorized to perform JMPIs when they have been specifically trained to conduct a JMPI in accordance with AFI 10-3503 and documented in their training records. Parachute specific information can be found in ATP 3-18.11, TC 18-11, AFMAN 11-420 and parachute manufacturer's documentation.

**15.13. Emergency Procedures.** In accordance with ATP 3-18.11, TC 18-11, and AFI 10-3503.

**15.14. Military Tandem Tethered Bundle/Tandem.** Military tandem tethered bundle (MTTB) is designed to allow MFF parachutist to employ expert personnel or heavy or large equipment loads.

15.14.1. Responsibilities.

15.14.1.1. Tandem Master.

15.14.1.1.1. Ensure passenger(s) or MTTB is rigged in accordance with MAJCOM guidance. **(T-3).**

15.14.1.1.2. Brief passenger of required actions: in aircraft, on exit, in free fall, under canopy and on landing. **(T-3).**

15.14.1.1.3. Brief personnel assisting with Tandem operation. **(T-3).**

15.14.1.2. Equipment Bundle Safety. (Equipment Bundle Safety can be a jumper from the same stick.).

15.14.1.2.1. Remove tie down straps from MTTB when instructed by Tandem Master delivering the MTTB.

15.14.1.2.2. Assist Tandem Master with positioning the bundle in proper position for deployment.

15.14.1.3. Drogue Setter (drogue setter can be a jumper from the same stick). **Note:** Drogue Setters must receive ground training from the Tandem Master prior to conducting live jump operations. **(T-3).**

15.14.1.3.1. Prior to movement, the Tandem Master Drogue Setter must be in place and have a firm grasp of Tandem Master's drogue chute. **(T-3).**

15.14.1.3.2. Move with Tandem Master into deployment position without releasing hold of drogue chute.

15.14.1.3.3. Ensure drogue chute has fully deployed from drogue pocket prior to releasing when Tandem Master exits the aircraft.

15.14.2. MTTB rigging procedures. See [Chapter 16](#).

### 15.14.3. MTTB procedures.

#### 15.14.3.1. Actions in the aircraft.

15.14.3.1.1. Equipment will be secured in the aircraft by tandem master or designee in accordance with MDS -9 requirements for taxi, takeoff and landing. **(T-3)**. A minimum of one 5K cargo strap will secure each tandem bundle unit Tandem Master directs preparation for exit. **(T-3)**.

15.14.3.1.2. Time warnings. The following time warnings and actions will be followed:

15.14.3.1.2.1. “10-minute” warning. If not done prior to take-off, the Tandem Master will don the bundle recovery rig or attach tandem passenger and get appropriate JMPI checks. **(T-3)**.

15.14.3.1.2.2. “5-minute” warning. Tandem Master or bundle safety will remove all cargo straps except one. **(T-3)**.

15.14.3.1.2.3. “2-minute” warning.

15.14.3.1.2.3.1. Tandem Master will secure recovery parachute’s tethered carabineer to bundle. **(T-3)**.

15.14.3.1.2.3.2. Tandem Master controls his bundle by grasping the left and right handles on the bundle. **(T-3)**.

15.14.3.1.2.3.3. Tandem master will tell the bundle safety “I have the bundle.” Safety will respond with “You have the bundle” and release remaining cargo strap. **(T-3)**.

15.14.3.1.2.3.4. Drogue setter takes up position to the right of the Tandem Master and maintains a firm grip on the drogue pilot chute handle. Drogue setter will state, “I have your drogue,” to which Tandem Master will reply, “You have my drogue.” The drogue setter will ensure they remain to the right side of the Tandem Master until the drogue is deployed in order to have the drogue feed out of the right side of the drogue pouch. Ensure that the bundle safety remains to the left side of the bundle as not to interfere with the drogue setter’s duties. **(T-3)**.

15.14.3.1.2.3.5. Tandem Master moves the bundle to center portion of the ramp. **(T-3)**.

15.14.3.1.2.4. “1-minute” warning.

15.14.3.1.2.4.1. Tandem Master moves bundle to desired point in preparation for exit. **(T-3)**.

15.14.3.1.2.4.2. Tandem Master maintains visual contact with primary jumpmaster, or safetyman (situation will dictate). **(T-3)**.

15.14.3.1.2.4.3. If a bundle safety is assisting with moving the bundle, he may rotate to the left to assist with the next bundle or return to his position in the stick.

15.14.3.1.2.4.4. When the jumpmaster gives the “Standby” command to the Tandem Master, the drogue setter ensures he is to the Tandem Master’s right side with a firm two-handed grip on the Tandem Master’s drogue pilot chute, assuring that his footing is solid and nothing can interfere with the setting of the drogue pilot chute.

15.14.3.1.2.5. “GO” exit procedure:

15.14.3.1.2.5.1. When the jumpmaster gives the command of “GO,” the Tandem Master establishes eye-to-eye contact with the drogue setter and begins a head and verbal cadence of “Ready - Set – Go.” (T-3).

15.14.3.1.2.5.2. On the count of “GO,” the Tandem Master pushes the bundle straight off the ramp of the aircraft while maintaining a firm grip on the bundle handles. Once clear of the ramp, within 6 seconds the right hand confirms the drogue is set, followed by a systems check. (T-3).

15.14.3.1.2.5.3. As the Tandem Master leaves the aircraft, the drogue setter accompanies him to the edge of the ramp, holding the drogue to the center of the ramp, controlling it until the drogue is pulled from his hands, thus preventing contact with the aircraft. (T-3).

15.14.3.1.2.5.4. As soon as the drogue pilot chute leaves the drogue setter’s hands, he must rotate to the right out of the next Tandem Master’s way or rotate to the next Tandem Master to become his drogue setter. (T-3).

15.14.3.1.2.5.5. If there is a second Tandem Master for the drogue setter, the Tandem Master does not move forward past the hinge of the ramp until the drogue setter moves to his right side and grips his drogue with both hands, at which time the drogue setter will tell the Tandem Master that he has control of his drogue pilot chute. (T-3).

15.14.3.1.2.5.6. The Tandem Master will ensure that his exit does not interfere with other team members (recommend the Tandem Master delays 5 seconds after previous jumper deploys to ensure adequate separation from the team). (T-3).

15.14.3.1.2.5.7. Tandem Master can exit first or last with the accompaniment of JM, drogue setter and optional bundle safety. Alternately, a static line drogue alleviates need of drogue setter. Retrieve static line deployment bag before subsequent jumpers if Tandem Master is first.

15.14.3.1.2.5.8. Crosswind release is preferred to give team stack and tandem bundles separate ‘lanes’ to the Point of Impact (PI).

15.14.3.1.2.5.9. If the jumpmaster gives a “NO DROP,” the Tandem Master will pull the bundle back to the two-minute warning position and wait for further instructions from the jumpmaster. (T-3).

15.14.3.2. Free fall procedures. **WARNING:** Team members will remain clear of tandem master and bundles to ensure they are not entangled in tandem master’s equipment during free fall. (T-3).

15.14.3.3. Canopy procedures. **Note:** Release bundle, if necessary, at 800 feet AGL if landing with the bundle incurs a safety hazard to the jumper (e.g., rocky terrain, tall vegetation, etc.). **WARNING:** No turns will be conducted below 200 feet with the exception of minor corrections necessary to land as close to the DZ as possible. (T-2).

15.14.4. Personnel tandem time warnings:

15.14.4.1. “10-minute” warning:

15.14.4.1.1. Tandem Master secures passenger and equipment to tandem parachute system. (T-3).

15.14.4.1.2. Tandem Master and passenger receive final JMPI. (T-3).

15.14.4.2. “2-minute” warning:

15.14.4.2.1. Tandem pair stand and move to hinge of ramp or designated pre-exit position. (T-3).

15.14.4.2.2. Floor-loaded aircraft: Tandem pair accomplishes all passenger connections steps up to tightening lower connector straps. **Note:** When adjusting the main lift webs and the rear diagonals, it is important to remember that the larger the passenger, the farther to the passenger’s rear the upper connectors must be. This will ensure that the passenger rides in the proper position and provides more comfort and good blood flow for the passenger. Never allow the connectors to go forward of the passenger’s shoulders. **WARNING:** Improperly adjusted leg straps can cause restricted blood flow in the lower extremities resulting in discomfort and/or loss of consciousness.

**15.15. Precision Jumpmaster Procedures.** Precision Jumpmaster (PJM) procedures are a subset of JMD utilized to enable the rapid deployment of personnel through precision release point determination under current conditions. Minimizing the distance to the survivor increases their chance of survival while decreasing the team exposure to the elements and the threat. When PJM procedures cannot be executed because of time or threat, precision jumpmasters will perform CARP or HARP calculation procedures to obtain the release point. If the aircraft is crewed with a navigator/combat systems operator, the JM will compare calculated release points. (T-3). If there is a discrepancy of greater than 250m, both should check data and calculations. If there is still a disparity, they will come up with a mutually acceptable solution. The Jumpmaster has final authority when deploying personnel.

15.15.1. Additional guidance. Aircraft specific parachute deployment procedures are contained in each aircraft’s MDS specific guidance, and amended as necessary by subordinate supplements, flight crew information files and unit flight crew bulletins (FCB). JMs should be familiar with and review the paradrop procedures used by the deployment aircraft. All JMs should review the applicable portions of the FCB of the flying organizations routinely supporting PJ/CRO parachute operations.

15.15.2. Unless threats to the aircraft exist, PJM drops are more appropriate to ensure rescue personnel land on the intended objective. During PJM airdrops, the JM is responsible for the accuracy of the drop. (T-3).

15.15.2.1. JMD airdrops of any type are authorized for training during visual meteorological conditions. (T-3).

15.15.2.2. Procedures, verbal communication, and visual signals are located in AFTTP 3-3.GA, and will be briefed prior to execution. **(T-3)**.

15.15.3. Wind drift indicator (WDI). The primary tool for a JM to determine accurate release point during PJM is the WDI. Wind drift determination is critical to accurate target deployment. The JM should deploy a minimum of one WDI prior to personnel delivery, with consideration to deploying additional WDIs as necessary for verification. Consider additional WDIs if:

15.15.3.1. Delivery site is restrictive.

15.15.3.2. Wind velocity appears marginal or gusty.

15.15.3.3. Lost sight of or unsure of the landing location/accuracy of the previous WDI.

15.15.3.4. Suspect the wind conditions have changed since the last deployment.

15.15.3.5. Any doubt as to delivery conditions.

15.15.3.6. Terrain that would produce inconsistent winds between the downwind and upwind sides of the PI.

15.15.4. JM/pilot communication. The JM and pilot may use two methods to inform the other of the location of an object in the air or on the ground (e.g., wind drift device, equipment or parachutist):

15.15.4.1. For items in the air or on the ground away from the DZ, identify the object's position in respect to the aircraft by giving a clock position, distance and altitude (e.g., "Streamers are at 9 o'clock, just under the wing and above the road").

15.15.4.2. For items on the drop zone, use the PI and heading of "last final flown" as 12 o'clock. (e.g., "Streamers landed at the PI's 5 o'clock for 300 Meters.").

15.15.5. **Attachment 2** provides figures and procedural guidance for specific PJM methods.

**15.16. Aircraft Inspections.** Refer to AFMAN 11-420, ATP 3-18.11, TC 18-11, or MDS specific guidance.

**15.17. Combination Exit Procedures.** See [Chapter 16](#).

**15.18. Rapids.** (This also applies to ramp equipped Vertical Lift aircraft.).

15.18.1. Restrictions.

15.18.1.1. ATV and bike drivers will not be on their vehicles for takeoffs and landings. **(T-3)**.

15.18.1.2. Vehicles will not be on-loaded/off-loaded while the center anchor cable supports are in the installed position. **(T-3)**.

15.18.1.3. Vehicle IR lights will not be used in or around aircraft. **(T-3)**.

15.18.1.4. Vehicles will not be started in flight. **(T-3)**.

15.18.1.5. All restraint devices except one forward and one aft (opposite corners) may be removed during taxi to the offload point. Self-propelled vehicles must have drivers in place with brakes set prior to removing restraints. **(T-3)**.

15.18.1.6. All vehicle drivers will wear NVDs when driving vehicles on or off aircraft under blacked-out or covert lighting conditions. **(T-3)**.

15.18.2. Infil procedures.

15.18.2.1. All personnel prepare for landing at the 6-minute advisory. **(T-3)**.

15.18.2.2. Personnel initiate their “80-Knot” procedures upon hearing the “80-Knot” call or when the aircraft ramp and door start to open. **(T-3)**.

15.18.2.3. When the aircraft has come to a complete stop, the driver may release remaining cargo strap(s) and start the engine.

15.18.2.4. Once a crewmember has signaled that exit is clear (“Touchdown” signal), the driver(s) should immediately drive off the aircraft.

15.18.2.5. The drivers must drive far enough away from the aircraft to allow any remaining vehicles to exit aircraft and for the aircraft to depart.

15.18.3. Exfil procedures. Drivers follow all crewmember directions when approaching and on loading the aircraft. **(T-3)**. **WARNING:** The team must take proper precautions to avoid main and tail rotors or prop blast when on-loading/offloading aircraft.

15.18.4. Equipment.

15.18.4.1. Personal safety and restraint devices as required

15.18.4.2. Vehicle with proper configuration to support mission.



## Chapter 16

### AERIAL DELIVERY OF EQUIPMENT

**16.1. General.** Conduct cargo ramp load (CRL), Container delivery system (CDS), MTTB, door bundle rigging and deployment in accordance with this chapter and specific MDS AFIs if applicable. Rigging procedures will be conducted in accordance with TOs 13C7-1-11, *Airdrop of Supplies and Equipment -- Rigging Containers*, 13C7-55-1, *Airdrop of Supplies and Equipment - Rigging Motorcycle*, 13C7-51-21, *Airdrop of Supplies and Equipment -- Rigging for Special Operations* and AFTTP 3-3.GA. **Note:** Trained PJ/CROs may rig equipment in accordance with the above references for parachute deployments to execute the required mission. When available, AFE specialists and/or Aerial Delivery Specialist/Riggers should be utilized to rig and inspect CRL and CDS equipment for parachute deployments or to assist PJ/CROs in doing so.

#### 16.2. Responsibilities.

16.2.1. TC/TL will identify required equipment needed for mission accomplishment. **(T-3).**

16.2.2. Jumpmaster/Tandem Master will:

16.2.2.1. Ensure proper packing, rigging, loading and inspections of aerial equipment. **(T-3).**

16.2.2.2. Complete RM for predicted operation. **(T-3).**

16.2.2.3. Brief aerial delivery procedures to aircraft and team. **(T-3).**

16.2.2.4. Calculate HARP/CARP for equipment. **(T-3).**

16.2.2.5. Deploy aerial equipment in accordance with established MDS guidance. **(T-3).**

#### 16.3. Restrictions

16.3.1. Deployment altitudes, airspeeds and surface wind limitations for equipment will be in accordance with AFI 11-231, *Computed Air Release Point Procedures* unless specified in this chapter.

16.3.2. Prior to loading, all hazardous material must be packaged in accordance with applicable guidance and for aircraft being used. **(T-3).** Regardless of configuration, provide appropriate Hazardous Declarations (HAZDEC) to aircraft (e.g., include fuel, pyrotechnics, ammo, hydraulic fluid, etc.). **(T-3).**

16.3.3. When packing fuel for drops:

16.3.3.1. Package in accordance with AFMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments*.

16.3.3.2. Do not fill flexible fuel containers more than half-full and purge excess air out. This allows for air expansion in the bladder.

16.3.3.3. Completely fill rigid fuel containers (ensure all air in container is purged).

16.3.4. When rigging door bundles, rig in accordance with TO 13C7-1-11, *Airdrop of Supplies and Equipment - Rigging Containers*.

16.3.4.1. Paratroop door loads. Containers dropped from the paratroop doors require a minimum weight of 11 pounds per square foot. **(T-2)**.

16.3.4.2. Ramp loads. Containers dropped from the ramp require a minimum weight of 28 pounds per square foot. **(T-2)**.

16.3.5. For combinations drops, use most restrictive altitude and wind limitations.

16.3.6. For training combination drops, equipment should precede personnel on the same pass. (TC/TL/JM will determine deployment order for contingency missions.).

16.3.7. Ensure personnel operations are in accordance with **Chapter 19** and AFI 10-3503.

**16.4. General Equipment.** Aerial equipment bundles are usually built with the following components: mission essential equipment, container, padding, harness and cargo chute.

16.4.1. Pack equipment bundles in accordance with available technical orders.

16.4.2. In addition to existing technical orders, the following guidance may be used for door bundles:

16.4.2.1. Container. A container is not required. If used, ensure it is appropriate for, and will withstand the planned airdrop method. **Note:** Fuel containers for aerial delivery are specified, other types and sizes of aerial delivery containers are not specified.

16.4.2.2. When airdropping, or expecting a violent delivery of the extrication/CS/SC litters, remove the wheels and pad the underside of the litter to prevent critical damage.

16.4.2.3. Pad sensitive mission equipment. When using a container, fill all voids with padding. Padding may also be applied to the outside of the container. **Note:** Recommend using soft IV bags versus hard plastic bags during medical resupply airdrops to prevent bursting during landing.

16.4.2.4. Harness. Secure harness in a way that will not allow equipment to fall free of the harness. This may be accomplished by:

16.4.2.4.1. Lacing harness straps through handles/buckles/loops in equipment/case.

16.4.2.4.2. Connecting to points via carabineers to prevent harness from sliding.

16.4.2.4.3. Construct the harness on multiple axis and secure the overlapping straps.

16.4.2.4.4. An aviator's kit bag can be utilized as a simple expedient harness for bundle rigging.

16.4.2.5. Cargo parachutes.

16.4.2.5.1. Refer to AFI 11-231 for cargo chute information: delivery airspeed, delivery altitudes, delivery wind limitations, delivery parachute ballistic. Additional info may be found in AFI 13-217 and TO 13C7-1-11.

16.4.2.5.2. The inspection, repack and maintenance of cargo parachute assemblies will be performed by AFE/Aerial Delivery. **(T-2)**. PJ/CROs must be familiar with inspection time criteria for parachutes being used. **(T-2)**. Refer to applicable Technical Order for complete inspection, repack and storage guidance.

16.4.3. Routine inspections will be conducted in accordance with applicable Technical Order. (T-2).

## **16.5. Combination Drops.**

16.5.1. Static line combination drop procedures.

16.5.1.1. All static lines will be the same length and hooked to the same anchor cable unless D-bags will be retrieved prior to jumpers exiting aircraft. (T-3).

16.5.1.2. Round. Personnel will delay 1-second from equipment deployment using a 1-second interval between jumpers. (T-3).

16.5.1.3. RASL. Personnel will delay 6 to 10-seconds from equipment deploying using a 2-second interval between jumpers. (T-3).

16.5.1.4. For water equipment drops, jumpers should land downwind/downdrift of the package to facilitate reaching the package once in the water.

16.5.2. Military free fall combination drop procedures.

16.5.2.1. Equipment deployment bags will be retrieved prior to personnel deployment. (T-3).

16.5.2.2. Personnel will delay 6 to 10-seconds from equipment deploying using a 2-second interval between jumpers. (T-3).

16.5.2.3. For water equipment, jumpers should land downwind/downdrift of the package to facilitate reaching the package once in the water.

## **16.6. RAMB.** Also applies to legacy Rigging Alternate Method-Zodiac.

16.6.1. Restrictions:

16.6.1.1. RAMB. For training, a minimum of two personnel are required for RAMB deployment. (T-3).

16.6.1.2. RAMB only minimum deployment altitude (NO jumpers):

16.6.1.2.1. G-12= 600' Above Water Level (AWL). (T-3).

16.6.1.2.2. T-10/T-11= 400' AWL. (T-3).

16.6.2. Set up.

16.6.2.1. Rig RAMB bundle in accordance with TO 13C7-51-21, *Airdrop of Supplies and Equipment -- Rigging Loads for Special Operations*.

16.6.2.2. All inspections will be accomplished in accordance with AFI 13-210\_IP.

16.6.2.2.1. Rigger inspection does not require a DD Form 1748-1, *Airdrop Inspection Record, Joint (Containers) (DRAS)*. (T-3).

16.6.2.2.2. Pre- and post-load inspections will be conducted and documented with a certified Joint Airdrop Inspection (JAI). (T-3).

16.6.2.3. Store RAMB packages in a location protected from the environment. **(T-2)**. Recommend storing them in a climate-controlled environment, if possible. RAMB packages should be de-rigged and inspected every 90 days (recommended 60 day repack for 55hp multi-fuel Engine) and documented on a DD Form 1574, *Serviceable Tag - Material*. **Note:** At a minimum, parachutes for RAMB packages should be stored in a climate-controlled environment.

16.6.3. RAMB de-rigging procedures. See AFTTP 3-3.GA.

16.6.4. Minimum equipment requirements:

16.6.4.1. Boat configuration.

16.6.4.1.1. Fuel bladders – (Sufficient for the mission). **(T-3)**.

16.6.4.1.2. Paddles. **(T-3)**.

16.6.4.1.3. Bow line. **(T-3)**.

16.6.4.1.4. Righting lines. **(T-3)**.

16.6.4.1.5. Engine. **(T-3)**.

16.6.4.2. Minimum accessory kit requirements:

16.6.4.2.1. Carabineer, 2 each. **(T-3)**.

16.6.4.2.2. Spark plug, 2 each. **(T-3)**.

16.6.4.2.3. Tool kit, engine. **(T-3)**.

16.6.4.2.4. Foot pump with hose. **(T-3)**.

16.6.4.3. RAMB survival kit (recommended).

16.6.4.3.1. Water container.

16.6.4.3.2. Filter/desalinator.

16.6.4.3.3. 550 cord (50 feet).

16.6.4.3.4. Duct tape, (1 roll).

16.6.4.3.5. Compass.

16.6.4.3.6. Spare radio/battery, waterproofed.

16.6.4.3.7. CRRC lifting harness.

16.6.4.3.8. Bow harness and throw bag (sea painter kit).

16.6.4.3.9. Chemlights, red, green, 2 boxes each.

16.6.4.3.10. Strobe light.

## 16.7. ARC.

16.7.1. Restrictions. For ARC only drops (NO jumpers), the minimum deployment altitude with the G-12 cargo parachute is 600' AWL. **(T-3)**.

16.7.2. Set up.

16.7.2.1. Rig ARC bundle in accordance with TO 13C7-51-21. **NOTE:** Consider the use of non-ethanol fuel or use of a fuel stabilization additive (follow manufacturer guidance).

16.7.2.1.1. All inspections will be accomplished in accordance with AFI 13-210\_IP.

16.7.2.1.2. Rigger inspection does not require a DD Form 1748-1. **(T-3)**.

16.7.2.1.3. Pre- and post-load inspections will be conducted and documented with a certified JAI. **(T-3)**.

16.7.2.2. Store ARC packages in a location protected from the environment. **(T-2)**. Recommend storing them in a climate-controlled environment, if possible. **Note:** At a minimum, parachutes for ARC packages should be stored in a climate-controlled environment.

16.7.2.3. ARC packages must be de-rigged every 90 days and documented on a DD Form 1574. **(T-3)**.

16.7.2.4. ARC de-rigging procedures. See AFTTP 3-3.GA.

16.7.3. Minimum ARC equipment requirements:

16.7.3.1. ARC configuration (operational mission).

16.7.3.1.1. Adequate fuel for mission. **(T-3)**.

16.7.3.1.2. Rescue sled rigged for attachment. **(T-3)**.

16.7.3.1.3. 2 large locking carabineers. **(T-3)**.

16.7.3.1.4. 20-man life raft. **(T-3)**.

16.7.3.1.5. Compass. **(T-3)**.

16.7.3.1.6. GPS. **(T-3)**.

16.7.3.1.7. Spot light. **(T-3)**.

16.7.3.1.8. Tow line. **(T-3)**.

16.7.3.1.9. Sling harness/painter line. **(T-3)**.

16.7.3.2. Minimum ARC accessory kit requirements:

16.7.3.2.1. Spark plugs – 3 each. **(T-3)**.

16.7.3.2.2. Spark plug wrench with extension. **(T-3)**.

16.7.3.2.3. Spare quick release pin for sled attachment. **(T-3)**.

16.7.3.2.4. Spare emergency stop lanyard. **(T-3)**.

16.7.3.2.5. Pliers. **(T-3)**.

16.7.3.2.6. 10/12mm open-end combo wrench. **(T-3)**.

16.7.3.2.7. Zip ties – 5 each. **(T-3)**.

16.7.3.2.8. 550 cord – 50'. **(T-3)**.

16.7.3.2.9. Fire extinguisher. **(T-3)**.

16.7.3.2.10. Signal kit (emergency flares, orange panel). (T-3).

16.7.3.3. ARC survival kit (recommended).

16.7.3.3.1. Water container.

16.7.3.3.2. Desalinator.

16.7.3.3.3. Spare radio/battery, waterproofed.

16.7.3.3.4. Strobe light.

## **16.8. All-Terrain Vehicle (ATV). (Quad).**

16.8.1. ATV set up.

16.8.1.1. Rig ATV bundle in accordance with TO 13C7-55-1, *Airdrop of Supplies and Equipment -- Rigging Motorcycle*. **NOTE:** Consider the use of non-ethanol fuel or use of a fuel stabilization additive (follow manufacturer guidance).

16.8.1.2. All inspections will be accomplished in accordance with AFI 13-210\_IP.

16.8.1.2.1. Rigger inspection does not require a DD Form 1748-1. (T-3).

16.8.1.2.2. Pre- and post-load inspections will be conducted and documented with a certified JAI. (T-3).

16.8.1.3. Store ATV packages in a location protected from the environment. (T-2). Recommend storing them in a climate-controlled environment, if possible. **NOTE:** At a minimum, parachutes for ATV packages should be stored in a climate-controlled environment.

16.8.1.4. ATV packages must be de-rigged every 90 days and documented on a DD Form 1574. (T-3).

16.8.2. TV de-rigging procedures.

16.8.2.1. Upon landing, right package as required.

16.8.2.2. Locate and cut both “donut” rings. Once cut, separate and allow rigging to fall to the side of the ATV.

16.8.2.3. Push ATV off honeycomb used to support ATV so that all four wheels are on the ground.

16.8.2.4. Collect equipment from rigging. Start ATV.

16.8.3. ATV equipment configuration.

16.8.3.1. Tank will be between ½ and ¾ full of gas. (T-3).

16.8.3.2. 5-gallon fuel can. (T-3).

16.8.3.3. ATV tool kit. (T-3).

## **16.9. Bike / Motorcycle.**

16.9.1. Bike set up.

16.9.1.1. Rig bike in accordance with TO 13C7-55-1.

16.9.1.2. All inspections will be accomplished in accordance with AFI 13-210\_IP.

16.9.1.2.1. Rigger inspection does not require a DD Form 1748-1. **(T-3)**.

16.9.1.2.2. Pre- and post-load inspections will be conducted and documented with a certified JAI. **(T-3)**.

16.9.1.3. Store bike packages in a location protected from the environment. **(T-2)**. Recommend storing them in a climate-controlled environment, if possible. **NOTE:** At a minimum, parachutes for bike packages should be stored in a climate-controlled environment.

16.9.1.4. Bike packages must be de-rigged every 90 days and documented on a DD Form 1574. **(T-3)**.

16.9.2. Bike de-rigging procedures.

16.9.2.1. Upon landing right package as required.

16.9.2.2. Locate and activate A-22 quick release buckles. Once undone, separate and allow rigging to fall to the side of the bike.

16.9.2.3. Push bike off honeycomb used to support bike so that both wheels are free and on the ground.

16.9.2.4. Collect equipment from rigging. Start bike.

## 16.10. MTTB

16.10.1. Rigging tandem equipment bundles. Every attempt should be made to use manufactured plastic barrels, boxes or Sonotubes® as the container for equipment bundles. The use of a container provides protection for the equipment and allows a symmetrical surface for the bundle during free fall. **Note:** Tandem bundles are considered personal equipment and require the same inspection criteria as personal rucksacks. Rigging and packing of the MTTB system parachute assembly shall be in accordance with the manufacturer's specifications. **WARNING:** Only a qualified Tandem Master can supervise the bundle building and rigging process for tandem jumps; never allow non-tandem qualified personnel to rig tandem bundles unsupervised. **(T-1)**.

16.10.2. Tandem bundle rigging procedures.

16.10.2.1. Weigh all items to be dropped to include rigging materials and container. **(T-3)**.

16.10.2.2. Measure container to be dropped. **(T-3)**.

16.10.2.3. Calculate the ideal weight/container size in accordance with **Table 16.1**, Tandem Bundle Calculations (use commercial prefabricated graph if applicable). **(T-3)**.

**Table 16.1. Tandem Bundle Calculations.**

In order to determine the <u>ideal weight</u> for a fixed container:
In order to determine <u>ideal cylinder</u> for predetermined equipment:
In order to determine the <u>velocity</u> of a rigged bundle:
C = drag coefficient When cylinder is 4x8ft tube on end =1.0 to 1.05 When cylinder is 4x8ft presenting a side to the wind = 1.15
D =density of air (given in feet above MSL) 0 = .07 5000 = .06 15,000 = .044 30,000 = .026
V = velocity of bundle in ft./sec (parameters should be between 265 and 440 without RM)
A = Area of surface presented to the wind; where $r$ = radius given in feet (remember radius is half the diameter) given in feet
$g$ = Gravity (32.2 feet/sec)
W = weight of equipment, container and rigging material in pounds

16.10.2.4. Perform RM determination. In order to get a clear idea of the risk include the following items and weigh them against the mission importance and impact of the equipment.

16.10.2.4.1. Bundle fall rate. Canopy and jumper integrity can be negatively affected as fall rate approaches 440 ft./sec. Above 440 ft./sec is considered a high risk for injury, system failure or both.

16.10.2.4.2. Wind speed on DZ.

16.10.2.4.3. Elevation, size and condition of DZ.

16.10.2.4.4. Support for Tandem Master (team members or ground assistance).

16.10.2.5. Loading container.

16.10.2.5.1. Place the items to be airdropped on padding. Place the durable or heavy items on the bottom and the lighter or more fragile items on the middle or top layers. Use the cellulose wadding, felt or honeycomb to cushion the rigged items and to fill the load before closing the container.

16.10.2.5.2. The longer the barrel, the more important the center of gravity. For bundles over 3 feet, attempt to maintain a CG of 2/3 towards presenting area. Use caution on barrels that are in excess of 4 feet with dense weight at the nose end (e.g., CG of 7/8 towards presenting area); they tip as soon as the nose of the barrel crosses the ramp edge and trailing end can impact the tandem master, cause uncomfortable exits or do both. Also, ensure sufficient ceiling height for long barrels with a significantly nose heavy CG.



16.10.2.5.3. Provide padding for sensitive mission equipment. Padding may also be applied to the outside of the container. **WARNING:** Fill all voids with padding so that items will not shift during transport/ deployment. If the equipment shifts, this will cause severe pendulum during free fall.

16.10.2.6. Rig load in accordance with manufacturer's guides. (T-3).

16.10.2.7. Suspend equipment, and check balance. (T-3).

16.10.2.8. Weigh and measure container AGAIN. If necessary, repeat above calculations for adjusted bundle. (T-3).

16.10.2.9. Label container with:

16.10.2.9.1. Surface area. (T-3).

16.10.2.9.2. Weight. (T-3).

16.10.2.9.3. Expected fall rate with air density (e.g., 300ft/sec @ 5000'). (T-3).

**16.11. Joint Precision Aerial Delivery System (JPADS).** JPADS is a family of systems consisting of a specialized JPADS mission planner laptop computer loaded with airdrop calculating software, an ultra-high frequency dropsonde interface, a GPS retransmit subsystem, and dropsondes. The current JPADS steerable parafoil guidance systems are the Microfly® (capable of 200-700 lbs. suspended weight) and Firefly (capable of 700-2K lbs. suspended weight).

16.11.1. Set up.

16.11.1.1. For rigging procedures, reference the manufacturer's technical manuals.

16.11.1.2. The deploying team will meet the following minimum lighting for night training:

16.11.1.2.1. Each side of package: 2 blue lights. (T-3).

16.11.1.2.2. Back of Airborne Guidance Unit (AGU): 2 green lights. (T-3).

16.11.1.2.3. Front of AGU: 2 red lights. (T-3).

16.11.1.2.4. Spider harness: 2 strobes. (T-3).

16.11.1.3. Upload the current National Oceanic and Atmospheric Administration 4-D weather model before proceeding to the aircraft. (T-3).

16.11.1.4. Ensure AGU and mission planning computer connectivity prior to takeoff. (T-3).

16.11.1.5. Verify the AGU is set to the AUTOLAND mode. (T-3).

16.11.1.6. A minimum of 6000' AGL drop altitude should be establish to allow the parafoil system adequate altitude to compensate for winds and set up its landing pattern.

16.11.1.7. For combination drops, use the calculated personnel release point as the JPADS has a more efficient glide ratio. See [Table 16.2](#) to calculate optimal weights for a consistent stack rate of fall. **WARNING:** Care must be taken to ensure that parachutists do not wing load their canopies more than the JPADS, this may place the parachutist in the dangerous position of being lower than the JPADS package.

**Table 16.2. Personnel vs JPADS Rate of Fall by Weight.**

Personnel						Guided Systems				
Total weight	MC-4/5	MP-360	RA-1	MS-360	HG-380	Total weight	ULW w/MC4-5	MP-360	Total weight	2K
lbs.	fps	fps	fps	fps	fps	lbs.	fps	fps	lbs.	fps
150	14.3	9.2	6.6	10.9	4.5	200	11.8	10.5	900	10.6
175	15.2	9.7	7.1	11.2	4.8	250	13.1	11.7	1000	11.2
200	16	10.2	7.6	11.4	5.1	300	14.4	12.9	1100	11.7
225	16.8	10.6	8.1	11.7	5.5	350	15.5	13.9	1200	12.2
250	17.6	11.1	8.5	11.9	5.8	400	16.6	14.8	1300	12.7
275	18.4	11.6	8.9	12.2	6.0	450	17.6	15.8	1400	13.2
300	19.2	12.1	9.3	12.4	6.3	500	18.6	16.6	1500	13.7
325	20	12.5	9.7	12.7	6.6	550	19.5	17.4	1600	14.1
350	20.7	13.0	10.1	13.0	6.8	600	20.4	18.2	1700	14.6
375	21.5	13.5	10.4	13.2	7.0	650	21.2	18.9	1800	15.0
400	22.3	13.9	10.8	13.5	7.3	700	22.0	19.6	1900	15.4
425	23	14.4	11.1	13.7	7.5				2000	15.8
450	23.8	14.8	11.4	14.0	7.7				2100	16.2
*All rate of fall are calculated at sea level									2200	16.6

#### 16.11.2. Procedures.

16.11.2.1. Brief the JPADS annex to the personnel parachute brief. **(T-3)**.

16.11.2.2. It is highly recommended that all jumpers are NVD equipped.

16.11.2.3. Deployment. Normal CRL, CDS or Jumpmaster directed (JMD) procedures are used. **WARNING:** Never deploy the AGU in the OFF mode. The AGU takes approximately one minute to boot up and will not respond to AGU controller inputs while booting. Deploying an AGU in the OFF mode creates an unsafe condition. **(T-3)**.

16.11.2.4. The JPADS system will be deployed prior to jumpers.

16.11.2.4.1. RASL, the jumpers can treat the JPADS as a jumper and follow it at a 2-second interval. However, a 5-second delay is recommended for safety in case the JPADS opens off heading. **(T-3)**.

16.11.2.4.2. MFF, first jumper (Remote Control Operator (RCO)) will delay 4-5 seconds and only exit after ensuring the D-bag is clear (either retrieved or broke away). **(T-3)**.

16.11.2.5. Normally after exiting the aircraft, the RCO overrides the AGU's autonomous mode and flies the AGU, allowing the team to stack on the package. After the stack is formed, the RCO returns the AGU to the autonomous mode and the team follows it to the PI. **WARNING:** In autonomous mode, the AGU will do a series of wide S turns between 1,000 to 2,000 ft. AGL to determine wind direction and then compute its final landing heading. All jumpers will remain aware of these maneuvers and stay clear of the package.

#### 16.11.3. Emergency procedures.

16.11.3.1. Avoiding the AGU cannot be understated. As with any parachute collision, the impact forces will be close to the speeds driven on a highway. If a jumper collides with the AGU, and the AGU has a good canopy, that canopy will be heavily wing-loaded. Because of the wing loading, any turns WILL cause a pendulum effect. In addition, the AGU will not fly at 50% brakes, but will be at “full flight” for landing. This means that it is imperative that the suspended jumper cutaway prior to 1000ft or be prepared for a violent parachute landing fall.

16.11.3.2. If a jumper ends up below a JPADS after opening or cut-away, the jumper slows rate of decent and attempts to rejoin stack.

16.11.3.3. Controller manually controls AGU and attempts to get AGU below low jumper and allow them to rejoin stack.

16.11.3.4. Collision/entanglement with package. **Note:** These procedures are intended to correspond with personnel entanglement emergency procedures so individual jumpers will not have to memorize a different set of emergency procedures if entanglement occurs with an AGU.

16.11.3.4.1. Avoid AGU at all costs/Steer to avoid.

16.11.3.4.2. If collision is imminent, assume the modified spread eagle position while protecting handles.

16.11.3.4.3. If jumper’s canopy is entangled with AGU and AGU has a good canopy: cut away no lower than 1000 ft. AGL.

16.11.3.4.4. Lower/jettison combat equipment.

16.11.3.4.5. Be prepared for a violent parachute landing fall.

16.11.3.4.6. At no time will an RCO attempt to control/land an AGU with a jumper suspended under it.

16.11.3.4.7. If jumper has a good canopy but AGU canopy is entangled with jumper, the jumper should clear the canopy/entanglement from himself and his equipment.

16.11.3.4.8. If jumper and AGU are entangled and neither has a good canopy, clear yourself from entanglement and cut away regardless of position in the entanglement.

16.11.3.4.9. If impact with ground is imminent, deploy reserve in an attempt to slow decent.

16.11.3.5. Lost visual or cannot acquire AGU after exit.

16.11.3.5.1. Keep scanning and attempt to visually acquire AGU.

16.11.3.5.2. Turn to briefed heading and continue scanning.

## Chapter 17

### DROP ZONE / LANDING ZONE

**17.1. General.** Drop zone operations will be in accordance with AFI 10-3503, AFI 13-217, AFMAN 11-420, ATP 3-18.11, or TC 18-11. Additional drop zone guidance is listed below. During training jumps, every attempt should be made to duplicate conditions encountered during operational missions.

#### **17.2. DZ/LZ Responsibilities.**

##### 17.2.1. Team Leader/Jumpmaster.

17.2.1.1. The TL/JM in charge of training is responsible for briefing the Drop Zone personnel of the requirements for training.

17.2.1.2. The TL/JM in charge of training will use the current and approved DZ survey to determine the number of personnel to be dropped per pass based on jumper proficiency, prevailing winds and AFI 13-217. **(T-3).**

##### 17.2.2. Drop Zone Controller (DZC) responsibilities.

17.2.2.1. During unilateral operations, the DZC can perform Drop Zone Safety Officer (DZSO) and malfunction officer duties. Personnel will receive training in accordance with AFI 13-217, AFI 13-210\_IP, and be designated by unit commander prior to conducting DZC/DZSO operations. **(T-3).**

##### 17.2.2.2. DZ Medic responsibilities.

17.2.2.2.1. Medic will ensure all medical equipment is prepositioned and accessible for immediate treatment of injured personnel in accordance with unit SOP and AFI 10-3503. **(T-3).** A dedicated ground medic is not required for unilateral training that includes at least two members medically qualified in accordance with AFI 10-3503 on the first pass. The required medical equipment will be prepositioned with the ground party and accessible for immediate treatment of injured personnel. **(T-3).**

17.2.2.2.2. Vehicle suitable for evacuating injured jumpers and a driver. **(T-3).**

**Exception:** A vehicle is not required when the aircraft can land adjacent to the DZ.

**17.3. Ground Party Briefing Requirements.** The JM will ensure the ground party is briefed in accordance with the current Briefing Guide. **(T-3).**

**17.4. DZ/LZ Set up.** The DZC will inspect all ground party equipment prior to use:

17.4.1. Electronic items will be turned on to confirm operation. **(T-3).**

17.4.2. All communications equipment will be confirmed with a communications check. **(T-3).**

17.4.3. Medical equipment will be inspected and inventoried prior to use. **(T-3).**

**17.5. Drop Zone Procedures.**

17.5.1. Units will have current and approved drop zone surveys for areas utilized in sufficient quantity/location to provide JMs access to selected drop zone information. **(T-3)**. Drop zone surveys may be obtained by calling DSN 576-2899 or use the HQ AMC web site (<https://cs2.eis.af.mil/sites/10358/default.aspx>). DZCs ensure the following:

17.5.2. Communications.

17.5.2.1. Direct radio communication from the DZC to the aircraft will be the primary method of communication for all training parachute operations. **(T-3)**. In case of primary communication failure, back up communications will also be identified. **(T-3)**.

17.5.2.1.1. Communication may be relayed through adjacent air tower as a back up to direct DZ communication in case direct communication fails.

17.5.2.1.2. Air/Ground radio communication is required for all training night deployments. **EXCEPTION:** The ranking TC/TL/JM may waive the direct radio communications requirement after RM analysis if procedures in AFI 13-217 and pre-briefed visual DZ markings are used for the drop.

17.5.2.2. Contact phone numbers. Communication plans should include phone numbers and access numbers. Numbers to consider: Flying squadron operations, Jumpmaster, aircraft commander, range control, Air Traffic Control, MEDEVAC and local hospitals.

17.5.2.3. Visual signals. Standard NORDO signals are in accordance with AFI 13-217 and below:

17.5.2.3.1. CLEAR TO JUMP: Land - Target displayed. Water - boat circling off wind line.

17.5.2.3.2. NO DROP THIS PASS: Land - target scrambled or red smoke/flares/lights on the DZ. Water - boat stationary in water.

17.5.2.3.3. JUMP CANCELED: Land -Target removed. Water - boat rapidly traveling away from the drop zone.

17.5.2.3.4. INJURED JUMPER: Red smoke or flare on the DZ or at place of injury.

17.5.2.4. Strict control of light signals will be maintained at all times as the unnecessary exposure of light may confuse personnel aboard the aircraft. **(T-3)**. Lights, other than those used for the desired point of impact, and those aircraft lighting systems required by regulatory guidance, will remain out for the duration of parachute operations. **(T-3)**.

17.5.2.5. In the event of an injury or any unusual circumstance that requires the excessive use of lights, parachute operations will be suspended until a light condition satisfactory to the TL/JM can be reestablished. **(T-3)**.

17.5.3. Additional water procedures: See AFI 10-3503 for additional requirement for intentional water jump operations and AFTTP 3-3.GA for TTPs.

17.5.3.1. Medical coverage must be in place prior to personnel airdrops. **(T-3)**. If medical personnel are not in the same safety boat as the drop zone controller, the medical personnel must have communications with them. **(T-3)**.

17.5.3.2. All water training jumps require a safety swimmer present in the support boat, prior to jumpers exiting the aircraft. The safety swimmer will be appropriately dressed and ready for immediate water entry should an emergency arise. **(T-3)**.

17.5.3.3. During AF intentional water operations, one power driven recovery boat is required for every three parachutists on a single pass in accordance with AFMAN 11-420(I). **(T-3)**. When all parachutists are military divers, the minimum ratio is reduced to one for every six parachutists on a single pass. Airdropped boats are not considered functional until operational, at which point they may be used for recovery operations.

17.5.4. Injured jumper. Treatment of the injured usually takes priority over other DZ activities. When a jumper's injuries on the DZ require evacuation for life, limb or eyesight, all further jump activities should be cancelled unless DZSO determines to deploy additional jumpers to manage the incident. Following any parachute related injury:

17.5.4.1. Advise aircraft of jumper's status and evacuation requirements.

17.5.4.2. Isolate jumper's equipment.

17.5.4.3. Note surface winds, type landing and any unusual circumstances.

17.5.4.4. DZC/DZSO/Malfunction Officer duties will be in accordance with AFI 13-210\_IP and AFI 10-3503.

17.5.5. Off DZ drop. The decision to suspend or cancel drops will be in accordance with AFI 13-217.

17.5.5.1. Maintain communication with team/jumpers and aircraft.

17.5.5.2. If required, follow vectors from aircraft to team/jumpers position.

17.5.5.3. If injuries reported or suspected, consider the capabilities (medical and otherwise) of any remaining jumpers on board the aircraft if a jump team could reach the patient faster.

17.5.5.4. Units will establish local SOPs for off DZ reporting, in accordance with AFI 13-217, reporting and include in **Chapter 19**. **(T-1)**.

**17.6. Minimum Team Equipment for DZ.** (Additional equipment will be annotated in **Chapter 19**, Local Area Procedures).

17.6.1. DZ Kit.

17.6.1.1. Camera. **(T-3)**.

17.6.1.2. Binoculars. **(T-3)**.

17.6.1.3. Wind meter. **(T-3)**.

17.6.1.4. Panels/lights. **(T-3)**.

17.6.1.5. Pyrotechnics. **(T-3)**.

17.6.1.6. Streamers. **(T-3)**.

17.6.1.7. Radio. **(T-3)**.

17.6.1.8. Spare radio batteries. **(T-3)**.

- 17.6.1.9. Maps. (T-3).
- 17.6.1.10. Compass/GPS. (T-3).
- 17.6.1.11. AFI 13-210\_IP. (T-3).
- 17.6.2. Medical equipment. (T-3).
  - 17.6.2.1. Medical evacuation plan. (T-3).
  - 17.6.2.2. Litter. (T-3).
  - 17.6.2.3. DZ medical kit in accordance with unit SOPs (**Chapter 19** and PJ MOAB approved packing lists located on the medical site of the GA SharePoint®: <https://cs2.eis.af.mil/sites/13306/medical/SitePages/Home.aspx>). (T-3).
  - 17.6.2.4. Rigid spine board. (T-3).
  - 17.6.2.5. Oxygen. (T-3).
- 17.6.3. Tree extraction equipment (when trees pose a reasonable hazard). (T-3).
- 17.6.4. Additional equipment for night drops.
  - 17.6.4.1. NVDs. (T-3).
  - 17.6.4.2. DZ lighting. (T-3).

## Chapter 18

### EQUIPMENT CARE, USE, AND INSPECTIONS

**18.1. General.** This chapter outlines the critical criteria for the inspection, care, and use of the equipment required to perform rescue and recovery operations in accordance with AFTTP 3-1/3.GA, this manual, applicable checklists, and applicable references when specified. **WARNING:** When not in use, all AIE and technical rescue equipment/devices will be stored in a well-ventilated, cool, dry place. **(T-2).** Do not store in areas where they could be subjected to mechanical, chemical or environmental damage. Properly stored devices that meet the inspection requirements can be considered safe and used for daily activities. **WARNING:** PJ and CRO personnel will perform a visual inspection of equipment and devices as outlined in this chapter and prior to use. **(T-3).** Remove any equipment or devices from service when it shows excessive wear, deterioration or no longer works in a like-new fashion.

**18.2. Initial Inspection/Record of Use.** Inspect all new equipment prior to use. **(T-3).** Inspect for possible manufacturer defects and ensure all equipment meets the requirements of this section. Equipment will only be used for the function it was designed. **(T-3).** A locally devised log will be maintained to document all inspections, care and use of AIE and technical rescue and recovery equipment. **(T-3).** The log will be maintained in “hard-copy” format and kept in conjunction with the individual AIE equipment (e.g., fast ropes, stokes litters, rescue straps, etc.). **(T-3).** At a minimum, each log will contain:

- 18.2.1. Date placed into service. **(T-3).**
- 18.2.2. Serial number. **(T-3).**
- 18.2.3. Local control number. **(T-3).**
- 18.2.4. Date of use/inspection date. **(T-3).**
- 18.2.5. Date of next inspection. **(T-3).**
- 18.2.6. Comments. **(T-3).**
- 18.2.7. Initials. **(T-3).**

**18.3. Periodic Inspections.** Units will maintain AIE equipment and devices in accordance with published technical orders, manufacturer instructions and this manual. **(T-3).** **WARNING:** A detailed visual inspection to reveal defects and overall general condition will be conducted by personnel prior to using equipment. **(T-3).**

- 18.3.1. Unless otherwise directed by the manufacturer or a publication referenced in this manual, perform inspections a minimum of every 90-days. **(T-3).**
- 18.3.2. Personnel safety and rescue equipment inspection procedures for the aircraft specific devices (e.g., rescue basket, rope ladder, fast rope) will be inspected in accordance with TO 00-25-245. **(T-3).**
- 18.3.3. If equipment is identified as unserviceable but repairable, removed from service and repair. **(T-3).** Until repair is complete, tag item with DD Form 1577-2, *Unserviceable (Repairable) Tag - Material*, listing:
  - 18.3.3.1. Date found unserviceable. **(T-3).**



18.3.3.2. Why equipment or device is unserviceable. (T-3).

18.3.3.3. Actions required to return equipment or device to serviceability. (T-3).

18.3.3.4. Inspector's initials. (T-3).

18.3.4. If equipment is identified as unserviceable, removed from service. (T-3). Tagged item with DD Form 1577, *Unserviceable (Condemned) Tag - Material*, listing:

18.3.4.1. Date found unserviceable. (T-3).

18.3.4.2. Why equipment or device is unserviceable. (T-3).

18.3.4.3. Inspector's initials. (T-3).

#### 18.4. Alert Equipment Inspection.

18.4.1. General:

18.4.1.1. The designated TL will ensure all alert equipment, devices and medical kits are inspected prior to assuming the designated alert period and before subsequent inspection expirations. (T-3).

18.4.1.2. As detailed above, an inventory log will be accomplished and staged with the alert gear. (T-3). Inspect in accordance with this manual.

18.4.2. Rappel:

18.4.2.1. Ropes are minimum 9mm, life rated static, inspected for rips, frays, burns, melted fibers, soft spots and knots. **Exception:** Commercial individual rope kits (e.g., TRACE and AR kits) are authorized with the proper training and risk management. (T-3).

18.4.2.2. Ropes are tied into rope bag and back coiled (bag weighted for drop or unweighted for leg-bag). (T-3).

18.4.2.3. Bags are lighted appropriately in accordance with [Table 14.1](#)

18.4.2.4. Locking carabineers are inspected for nicks, cracks, oxidation and gate operability. (T-3).

18.4.3. SKEDCO® stretcher. This stretcher, NSN 6530-01-260-1222, is approved for use during helicopter hoist operations. It is authorized for use in the horizontal or vertical lift configuration only. PJ and CRO personnel are responsible for the care, storage, maintenance, inspection and use of the stretcher.

18.4.3.1. Maximum stretcher load for helicopter hoist operations is 600 lbs. (T-2).

18.4.3.2. Patient packaging and stretcher configuration is in accordance with manufacturer's instructions. (T-2).

18.4.3.3. Only the SKEDCO® 9,000 lbs. horizontal lift slings, NSN 6530-01-260-2700, will be used, no substitutions are authorized. (T-2). Replacement slings can be ordered from the manufacturer.

18.4.3.4. A tag line for all SKEDCO® hoist operations is mandatory. (T-3).

18.4.3.5. Inspection criteria. SKEDCO® and components will be inspected for serviceability in accordance with manufacturer's guidance prior to each use.

18.4.3.5.1. Inspect litter for cuts, tears or holes. **(T-3)**.

18.4.3.5.2. Inspect lift slings for cuts, tears and abrasions. **(T-3)**.

18.4.3.5.3. Check all hardware and securing straps for security of attachment, condition and proper operations. **(T-3)**.

18.4.3.5.4. Steel carabineer present, no noticeable cracks, free of rust, gate operates and locks. **(T-3)**.

18.4.3.5.5. Inspect all grommets for serviceability. **(T-3)**.

18.4.3.5.6. Inspect litter and all components for evidence of damage from exposure to petroleum-based products (oil, hydraulic fluid, etc.). **(T-3)**.

18.4.3.6. Maintenance and care. Store in the manufacturer's carrying case when not in use. Avoid storing in direct sunlight.

18.4.4. Stokes litter. Inspect Stokes litter in accordance with TO 00-75-5.

18.4.4.1. Current inspection date. **(T-3)**.

18.4.4.2. Cables are serviceable. **(T-3)**.

18.4.4.3. Patient straps are serviceable and function properly. **(T-3)**.

18.4.4.4. Flotation is attached. **(T-3)**.

18.4.4.5. Tagline is complete with weak link and quick release and prepared for deployment. **(T-3)**.

18.4.5. Equipment delivery inspection.

18.4.5.1. Container.

18.4.5.1.1. Check for integrity. **(T-3)**.

18.4.5.1.2. Corners and edges for cracks. **(T-3)**.

18.4.5.1.3. Container attachments are intact and functional. **(T-3)**.

18.4.5.1.4. Container is smooth – will not be hung up on deployment. **(T-3)**.

18.4.5.2. Harness.

18.4.5.2.1. No rips or tears in webbing and stitching. **(T-3)**.

18.4.5.2.2. Secured to container – tight fit. **(T-3)**.

18.4.5.3. Belay rope. Ropes are minimum 10mm, life rated static, inspected for rips, frays, burns, melted fibers, soft spots and knots. **(T-3)**.

18.4.5.4. Belay/quick release system.

18.4.5.4.1. All hardware present and functional. Carabineer, snap shackle quick release, friction/belay device. **(T-3)**.

18.4.5.4.2. No cracks, bends, noticeable fatigue, and free of rust. **(T-3)**.

18.4.6. FRD, check before and after each use for:

18.4.6.1. Cover rotates smoothly. (T-3).

18.4.6.2. No cracks on device. (T-3).

18.4.6.3. No nicks or burs in rope path that may harm the rope or interfere with proper operation. (T-3).

**18.5. Technical Rescue and Recovery Equipment.** This section outlines criteria for inspection, care and use of equipment required for technical rescue and recovery operations in accordance with AFTTP 3-1/3.GA. PJ and CRO personnel will ensure their climbing equipment meets a recognized standard of specification such as DoD, UIAA or European Committee for Standardization (CE) for adverse terrain and recovery operations. (T-2). Other recognized bodies can be found in *Freedom of the Hills*. Equipment not recognized by one of the above organizations will be submitted for approval/disapproval by the MAJCOM Functional Manager. (T-2).

18.5.1. At a minimum, units will maintain technical rescue and recovery equipment in accordance with manufacturer's instructions and this manual. (T-3).

18.5.2. All climbing equipment will be inspected for serviceability prior to use. (T-3).

18.5.3. Perform inspections every 90-days. (T-3).

18.5.4. Record of use. Maintain a locally devised log to document all inspections, care and use of technical rescue and recovery equipment. (T-3). The log will be in "hard-copy" format and kept with the equipment items (e.g., ropes, carabineers, descenders, etc.) or kits (climbing bag, confined space rescue, etc.). (T-3). All kits will have a list of contents and quantity attached in a conspicuous location. (T-3). As a minimum, each log will contain:

18.5.4.1. Date placed into service. (T-3).

18.5.4.2. Serial number. (T-3).

18.5.4.3. Local control number. (T-3).

18.5.4.4. Date of use/inspection date. (T-3).

18.5.4.5. Date of next inspection. (T-3).

18.5.4.6. Comments. (T-3).

18.5.4.7. Initials. (T-3).

18.5.4.8. Include manufacturer specific inspection requirements as applicable.

18.5.5. Ropes. In addition to record of use:

18.5.5.1. Units should establish SOPs for service life of ropes.

18.5.5.2. Record unusual history such as falls or high degrees of tension. (T-3).

18.5.5.3. Remove ropes from service when they become excessively worn, frayed, or exceed their shelf or service life. (T-3).

18.5.6. Soft goods. Inspect webbing, cordellette, slings, daisy chains and harnesses as thoroughly as ropes. Unserviceable equipment will be marked and removed from service. **(T-3)**.

18.5.7. Carabineers and other hardware. Additional technical rescue and recovery hardware consist of, but is not limited to, pulleys, stitch plates, ascenders, descenders, technical rock protection, snow pickets, flukes, etc. Each item will comply with the following:

18.5.7.1. Should be marked for easy identification.

18.5.7.2. Only be used for their intended purpose, at or below its rating. **(T-3)**.

18.5.7.3. Carabineers and other hardware will be removed from service if:

18.5.7.3.1. Dropped from greater than 10 feet onto a hard surface (concrete, asphalt, rocks, etc.). (Items dropped from greater than 10 feet onto a soft surface will be closely inspected for damage and functionality). **(T-3)**.

18.5.7.3.2. Dropped from greater than 50 ft. regardless of surface. **(T-3)**.

18.5.7.3.3. Exposed to forces exceeding its intended use or rating. **(T-3)**.

18.5.7.3.4. Not operating in like new condition. **(T-3)**. **WARNING:** If Carabineer or other hardware serviceability is questionable, remove from service immediately and mark accordingly. **(T-3)**.

18.5.7.4. Locking carabineers will be used when constructing anchors and rescue systems. **(T-3)**. Two non-locking carabineers in the opposite and opposed position can be used in place of one locking carabineer.

**18.6. CRRC.** All CRRC will be inspected at least annually and after each use. **(T-3)**.

18.6.1. Perform inflation test. CRRC must be able to hold pressure for a minimum of 16 hours. **(T-3)**.

18.6.1.1. Turn all valves to “inflate.”

18.6.1.2. Inflate to full pressure (240mbrs), wait 1 hour then record pressure.

18.6.1.3. Turn all valves to “Navigate.”

18.6.1.4. Allow CRRC to set for at least 16 hours. **(T-3)**.

18.6.1.5. Record pressure, a 4mbr/hr. drop is acceptable. **Note:** If unable to record pressure, follow the above steps. Allow to sit a minimum of 24 hours and recheck for an acceptable pressure. **(T-3)**.

18.6.1.6. Turn valves to inflate for storage or bundle prep.

18.6.2. While inflated, check the following for rips, tears, cracks, rot, and rust as appropriate:

18.6.2.1. Bow line. **(T-3)**.

18.6.2.2. Righting lines. **(T-3)**.

18.6.2.3. All D-rings and attachment points. **(T-3)**.

18.6.2.4. Shock absorber inflation tubes and crimps. **(T-3)**.

18.6.2.5. All valves. **(T-3)**.

18.6.2.6. Compressed gas inflation connections. **(T-3)**.

18.6.2.7. Compressed gas bottle holder. **(T-3)**.

18.6.2.8. Floor installs correctly. **(T-3)**.

18.6.2.9. Transom straps operate correctly. **(T-3)**.

18.6.2.10. Engine safety D-ring. **(T-3)**.

18.6.3. After each use, thoroughly rinse the CRRC in order to remove salt, dirt and sand. Fully inflate the CRRC and stand on cones of main inflation tubes. Rinse the entire craft to include the above components and between the main tube and the shock absorbing tubes, then leave standing to dry. **(T-3)**.

**18.7. Submersible Boat Engines.** All submersible boat engines will be inspected at least quarterly and after each use. **(T-3)**. Perform engine run up and all inspections in accordance with manufacturer's guidelines. **(T-3)**.

## Chapter 19

### LOCAL PROCEDURES

**19.1. Requirements.** This chapter is reserved for unit local operating procedures. Procedures herein cannot be less restrictive than those contained elsewhere in this manual. Avoid repetition of guidance provided elsewhere; however, referencing a governing directive is acceptable when it facilitates location of information necessary for local operating procedures.

19.1.1. Before publishing, units will forward copies to appropriate MAJCOM and subordinate agencies who will review the **Chapter 19** and return comments or required changes back to the unit(s), if appropriate. (T-2).

19.1.2. If more than one affected squadron is co-located at the same installation, only one **Chapter 19** is required but all squadron commanders must approve and gain approval through their appropriate chains of command.

**19.2. Organization.** The local chapter is to be organized in the following format and may include, but is not limited to, the following:

19.2.1. Introduction.

19.2.2. General Policy.

19.2.3. Combat Marksmanship and Tactical Operations.

19.2.3.1. Non-lethal marking training operations.

19.2.3.2. Unit Laser Safety Officer.

19.2.3.3. Unit Laser Safety Program.

19.2.4. Environmental Procedures.

19.2.5. Technical Rescue and Recovery Operations.

19.2.6. Maritime Operations.

19.2.6.1. Coxswain and Boat Master duties, responsibilities and training requirements. (Boat Master refers to the responsibility for larger, hard-hull boats generally used in an operational support capacity.).

19.2.6.2. Pre/post-operating inspections.

19.2.6.3. Maintenance of watercraft.

19.2.6.4. Launching/retrieving of watercraft.

19.2.6.5. Use and maintenance of related equipment.

19.2.6.6. Trailer towing procedures.

19.2.7. General Aircraft Operations.

19.2.8. Insertion and Extraction Operations.

19.2.9. Parachute Operations.

19.2.10. Aerial Deployment Equipment.

19.2.11. DZ/LZ Operations.

19.2.11.1. Range specific procedures.

19.2.11.2. Additional equipment required for DZ operations.

19.2.12. Equipment Preparation and Inspection.

JOSEPH T. GUASTELLA Jr.,  
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**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

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### ***Prescribed Forms***

*None*

### ***Adopted Forms***

AF Form 847, *Recommendation for Change of Publication*

AF Form 4326, *Tactic Improvement Proposal*

AF Form 1067, *Modification Proposal*

DD Form 1574, *Serviceable Tag - Material*

DD Form 1577, *Unserviceable (condemned) Tag - Material*

DD Form 1577-2, *Unserviceable (repairable) Tag - Material*

DD Form 1748-1, *Airdrop Inspection Record, Joint (Containers) (DRAS)*

### ***Abbreviations and Acronyms***

**AFE**—Aircrew Flight Equipment

**AFH**—Air Force Handbook

**AFI**—Air Force Instruction

**AFMAN**—Air Force Manual

**AFPD**—Air Force Policy Directive

**AFTTP**—Air Force Tactics, Techniques and Procedures

**AGL**—Above Ground Level

**AGU**—Airborne Guidance Unit

**AIE**—Alternate Insertion and Extraction  
**ANG**—Air National Guard  
**AOR**—Area of Responsibility  
**ARC**—Advanced Rescue Craft  
**ATP**—Army Techniques Publication  
**ATV**—All-Terrain Vehicle  
**AWL**—Above Water Level  
**C2**—Command and Control  
**CAF**—Combat Air Forces  
**CARP**—Computed Air Release Point  
**CASEVAC**—Casualty Evacuation  
**CBRNE**—Chemical, Biological, Radiological, Nuclear and High-yield Explosives  
**CCP**—Casualty Collection Point  
**CDS**—Container Delivery Systems  
**CLP/LAW**—Clean, Lubricate, Protect/Lubricant, Arctic Weapon  
**CMR**—Consolidated Mission Report  
**CO**—Carbon Monoxide  
**CQC**—Close Quarter Combat  
**CRL**—Cargo Ramp Load  
**CRO**—Combat Rescue Officer  
**CRRC**—Combat Rubber Raiding Craft  
**CS/SC**—Confined Space/Structural Collapse  
**DoD**—Department of Defense  
**DSCA**—Defense Support of Civil Authorities  
**DZ**—Drop Zone  
**DZC**—Drop Zone Controller  
**DZSO**—Drop Zone Safety Officer  
**EAAD**—Electronic Automatic Activation Device  
**EL**—Element Leader  
**EPA**—Emergency Plan of Action  
**Exfil**—Exfiltration  
**F**—Fahrenheit

**FCB**—Flight Crew Bulletin  
**FCIF**—Flight Crew Information File  
**FDR**—Foreign Disaster Relief  
**FHA**—Foreign Humanitarian Assistance  
**FRD**—Fast Rope Descender  
**FRIES**—Fast Rope Insertion/Extraction System  
**FM**—Field Manual  
**GA**—Guardian Angel  
**GFC**—Ground Force Commander  
**GPS**—Global Positioning System  
**H<sub>2</sub>S**—Hydrogen Sulfide  
**HAHO**—High Altitude High Opening  
**HALO**—High Altitude Low Opening  
**HARP**—High Altitude Release Point  
**HAZDEC**—Hazardous Declarations  
**HAZMAT**—Hazardous Material  
**ICS**—Intercom System  
**Infil**—Infiltration  
**IP**—Isolated Personnel  
**IR**—Infrared  
**JAI**—Joint Airdrop Inspection  
**JM**—Jumpmaster  
**JMD**—Jumpmaster Directed  
**JMPI**—Jumpmaster Personnel Inspection  
**JPADS**—Joint Precision Aerial Delivery System  
**JPP**—Joint Planning Process  
**kN**—Kilonewton  
**LEL**—Lower Explosive Limit  
**LRH**—Load Releasing Hitch  
**LZ**—Landing Zone  
**MAJCOM**—Major Command  
**MC**—Mission Commander

**MDS**—Mission Design Series

**METT-TC**—Mission, Enemy, Terrain, Troops, - Time Available and Civilian Considerations

**MFF**—Military Free Fall

**MOAB**—Medical Operations Advisory Board

**MSL**—Mean Sea Level

**MTTB**—Military Tandem Tethered Bundle

**NORDO**—No Radio

**NVD**—Night Vision Device

**OAC**—Open Air Combat

**OPCON**—Operational Control

**OPR**—Office of Primary Responsibility

**PAPR**—Powered Air-Purifying Respirator

**PI**—Point of Impact

**PJ**—Pararescue, Pararescueman, Pararescuemen

**PJM**—Precision Jumpmaster

**PPE**—Personal Protective Equipment

**PPP AUL**—Personnel Parachute Program Approved for Use List

**PR**—Personnel Recovery

**RAMB**—Rigging Alternate Method Boat

**RAPS**—Ram Air Parachute System

**RASL**—Ram Air Static Line

**RCO**—Remote Control Operator

**ROE**—Rules of Engagement

**RM**—Risk Management

**SCBA**—Self-Contained Breathing Apparatus

**SCUBA**—Self-Contained Underwater Breathing Apparatus

**SDS**—Safety Data Sheet

**SERE**—Survival, Evasion, Resistance and Escape

**SOFA**—Status of Forces Agreement

**SOP**—Standard Operating Procedures

**SPUDS**—Single Para-SCUBA Deployment System

**TACEVAC**—Tactical Evacuation

**TACON**—Tactical Control

**TC**—Team Commander

**TC**—Training Circular

**TL**—Team Leader

**TLP**—Troop Leading Procedures

**TO**—Technical Order

**TTP**—Tactics, Techniques and Procedures

**UIAA**—Union Internationale des Associations d’Alpinisme

**US**—United States

**USSOCOM**—U. S. Special Operations Command

**UTC**—Unit Type Code

**WDI**—Wind Drift Indicator

## Attachment 2

### RESCUE JUMPMaster PROCEDURAL GUIDANCE

#### A2.1. Fixed Target.

A2.1.1. Procedures. (See [Paragraph 15.15](#) and [Figure A2.1](#) Fixed Target Pattern.).

A2.1.1.1. Head directly toward the target, regardless of the wind direction.

A2.1.1.2. Release the WDI directly over the target.

A2.1.1.3. Immediately upon release, have the aircraft begin a turn, tight enough to observe descent and position of WDI and not lose sight of it.

A2.1.1.4. Establish a rectangular drop pattern oriented so that the final approach is flown oriented from the WDI to the target.

A2.1.1.5. Turn on approach. Make minor changes in heading to pass over the WDI and the target on a direct line. Establish aircraft drift correction prior to passing over the WDI.

A2.1.1.6. Initiate uniform count over the WDI.

A2.1.1.7. Reverse count over the target.

A2.1.1.8. Deploy either a second WDI or jumpers when the reverse count reaches zero. (For multiple jumpers, consider the DZ and that jumpers release before/after reaching zero will land short/long of the target.).

A2.1.1.9. After the jumper clears the aircraft, turn to observe the accuracy of the drop.

A2.1.2. Fixed Target Pattern. The normal flight pattern is a rectangular or racetrack pattern with the final approach from WDI to target. Each leg of the pattern must be long enough to allow the JM and jumpers the preparation needed prior to deployment.

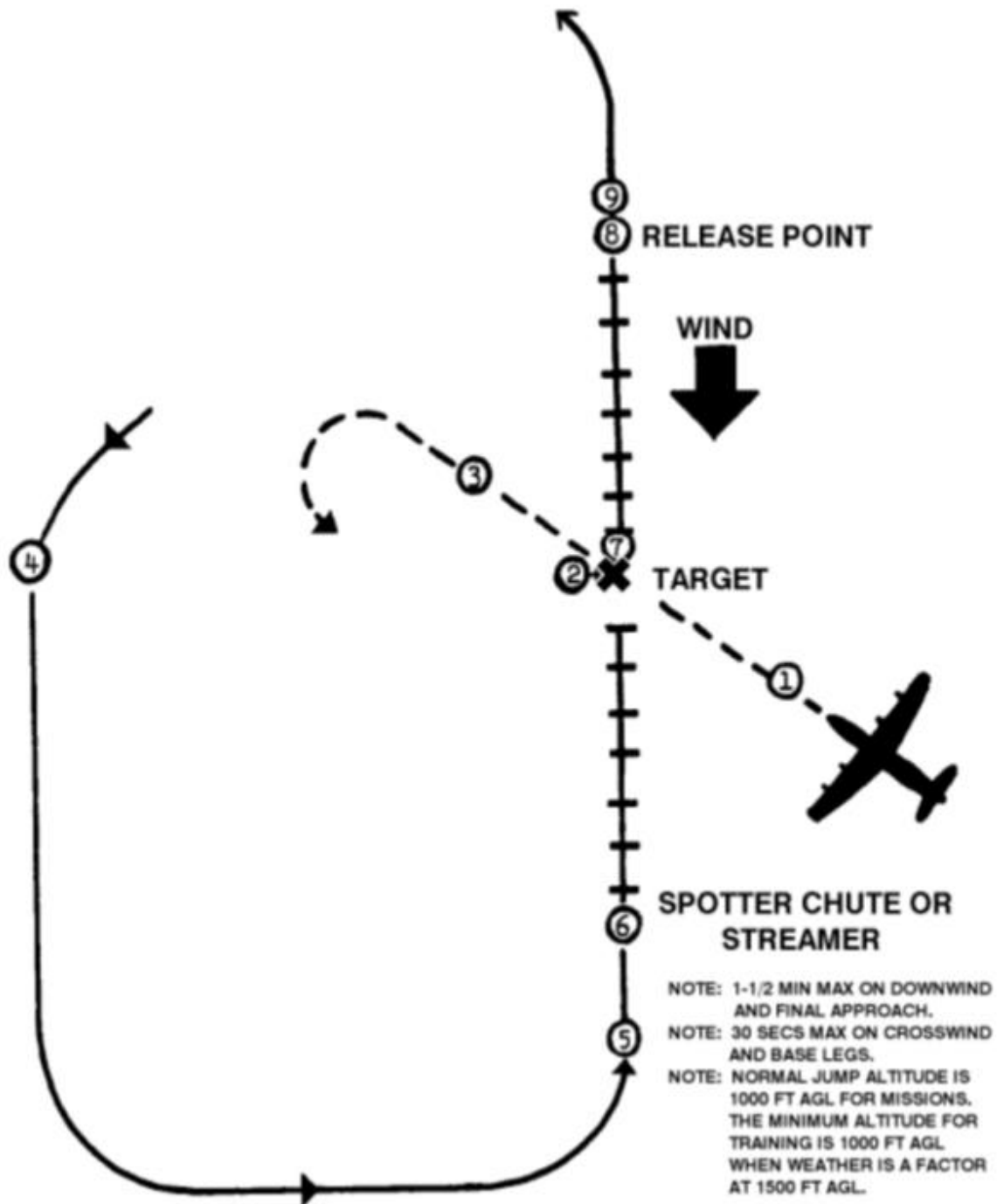
A2.1.2.1. For high performance aircraft, make the turn to the crosswind leg as soon as possible after releasing the WDI. A pattern with crosswind and base legs of not over 30 seconds and with downwind and final legs of 60 to 90 seconds will allow time for heading corrections on final. This allows the JM time to observe the descent of WDI device or jumpers. If a delay is expected, fly another full pattern, as opposed to extending the downwind leg, this maintains the aircraft close to the area for continued evaluation. This pattern will place the aircraft a maximum of 5 minutes from the site at any one time.

A2.1.2.2. Fly the aircraft over the target at a predetermined altitude and airspeed. When directly over the target, drop a minimum of one WDI. The JM and aircrew will make every effort to keep the WDI in sight from release to impact. Over land, the pilot may have to circle over the WDI to ensure the definite location of, or orientation to the impact point to the target. After the first WDI has reached the ground and its position noted, the aircraft will return to the normal pattern. The final approach should pass directly over the WDI and the intended target, in that order. This pattern automatically aligns the final approach into the wind.

A2.1.2.3. Depending on terrain and aircraft configuration, the aircraft may fly either a right or left hand pattern with minor course corrections on final. As the aircraft passes directly over the first WDI, the JM starts a uniform count to measure the time from the WDI to the target. When the aircraft is over the target, stop counting forward and start counting backward from that point, when the JM's count returns to zero, deploy the second WDI or jumper. The reverse count measures an equal distance past the target as was calculated from the WDI to the target. Subsequently, the accuracy of the deployment is dependent upon the JM's alignment and count.



Figure A2.1. Fixed Target Pattern.



## A2.2. Moving Target.

A2.2.1. Procedures. (See [Paragraph 15.15](#) and [Figure A2.2](#) Moving Target Pattern.).

A2.2.1.1. Head directly toward the target, regardless of the wind direction.

A2.2.1.2. Release the spotter chute directly over the target.

A2.2.1.3. Immediately upon release, make a left/right hand turn to observe the descent and position of the WDI.

A2.2.1.4. Establish rectangular drop pattern oriented with the final approach from WDI to target. Adjust the pattern so that the aircraft will be over the target five to nine minutes after the WDI deployment.

A2.2.1.5. Turn on approach. Make minor changes in heading to pass over the WDI and the target on a direct line. Establish aircraft drift correction prior to passing over the WDI. Initiate a uniform count over the WDI.

A2.2.1.6. Reverse count over the target.

A2.2.1.7. Deploy jumpers upon reaching the last digit in the reverse count.

A2.2.1.8. After the jumper clears the aircraft, turn to observe the accuracy of the drop.

A2.2.1.9. Deploy additional jumpers using the drop heading and count established in steps 5, 6 and 7.

A2.2.1.10. Disregard the WDI for subsequent passes.

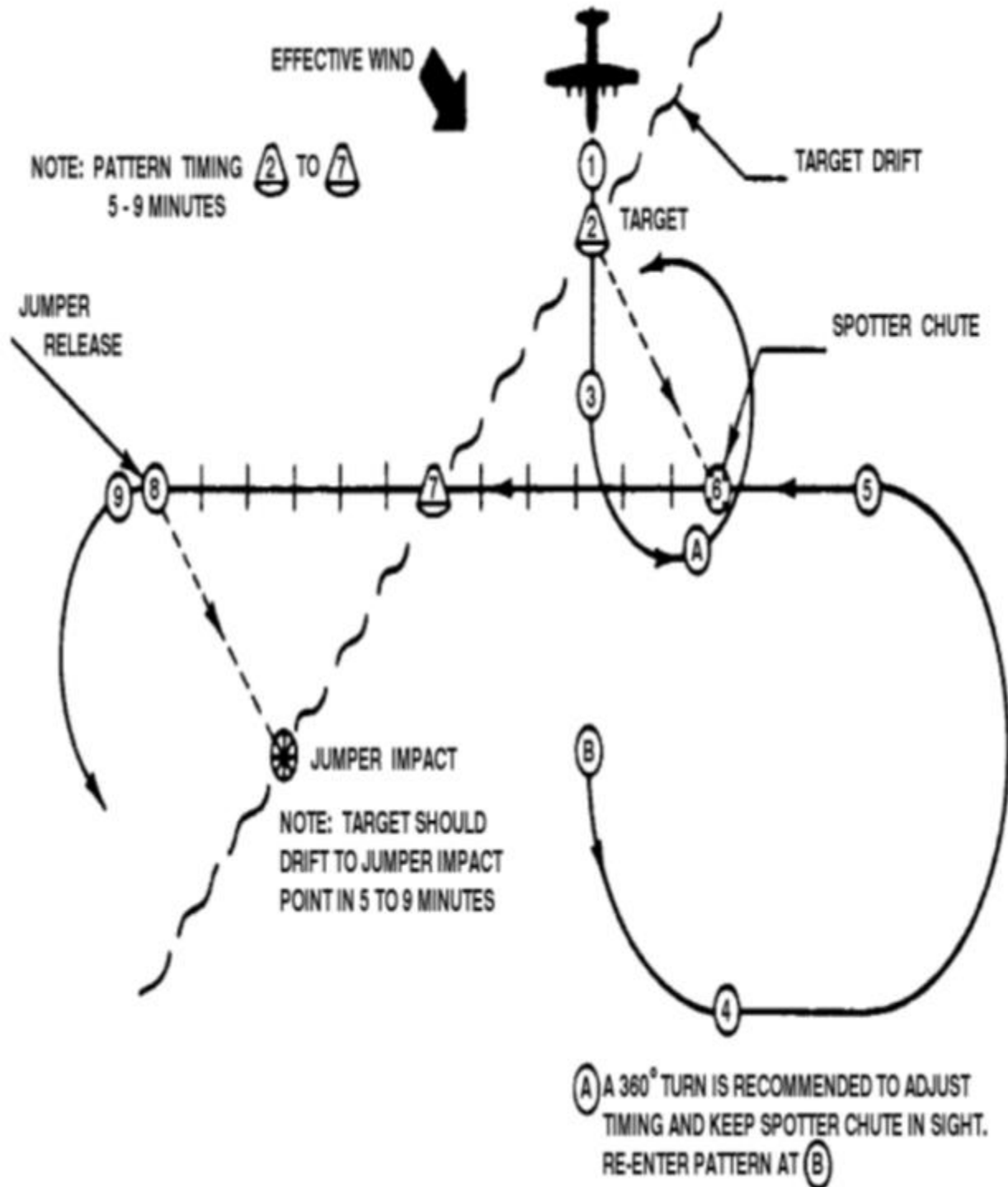
A2.2.1.11. When the target drift rate is changed (drogue chute is installed on target, know wind shift occurs, etc.) the entire WDI procedure must be re-accomplished and a new drop heading and count established.

A2.2.2. Moving Target Pattern. Deployment procedures to a moving target are similar to those employed for a stationary target. Moving target procedures take into consideration target drift and place the team on the downdrift line of the moving target, not necessarily on target. Special attention should be paid to the following items:

A2.2.2.1. Adjust the pattern so that the initial pass over the target after WDI deployment is not less than 5 minutes and not more than 9 minutes, 7 minutes being ideal. If the initial pattern requires more than 9 minutes, the team will be too far downdrift/downwind and with a high target drift rate may not be able to see the target once in the water.

A2.2.2.2. On the initial pass after the WDI deployment, an accurate count can be obtained by the JM and the heading noted by both the JM and pilot. Make all subsequent passes on this initial heading using the count obtained on the first pass. Do not attempt to recheck the count or change the initial heading because the target will have drifted. **Note:** On subsequent passes requiring a change of heading to place the aircraft over the target, ensure the pilot corrects back to original heading before passing over the target. Moving target procedures are normally conducted from fixed-wing aircraft.

Figure A2.2. Moving Target Pattern.



### A2.3. Crosswind Target.

A2.3.1. Procedures. (See [Paragraph 15.15](#) and [Figure A2.3](#) Crosswind Target Pattern.).

A2.3.1.1. Fly over target on heading in a direction to permit a left/right hand pattern.

A2.3.1.2. Release the WDI directly over target.

A2.3.1.3. Accomplish a 180° turn (terrain permitting) in direction of drift and observe distance of WDI from target.

A2.3.1.4. Make another 180° turn to place the aircraft on the approach leg the same distance upwind from the target as the spotter chute is downwind.

A2.3.1.5. Deploy jumpers, equipment or additional spotters chutes/streamers (as required) just prior to when the aircraft is in direct line with the target and WDI.

#### A2.3.2. Crosswind pattern.

A2.3.2.1. A crosswind pattern may be required by terrain conditions or possible sun reflection on the water's surface. The pilot and JM must accurately judge the upwind distance from the target in order for this technique to be effective. The easiest method for obtaining an accurate upwind distance is the utilization of a reference/release point. It is imperative that the jumpers are deployed prior to reaching the reference point due to the forward throw and ballistics of the parachute as opening occurs. The objective is to place the reference point at the center of the stick after forward throw is considered.

A2.3.2.2. Spotting techniques. Reference points may be used on all JMD land deployments. The utilization of reference points will increase the JMs accuracy in determining the proper release point. An established reference/release point will allow the aircraft to fly in any direction as long as it will pass over the reference/release point. These points are a necessity when accomplishing a crosswind or down-wind deployment pattern. The correct method for establishing a reference/release point is:

A2.3.2.2.1. Upon completion of the initial over the target WDI deployment, establish the impact location of the WDI.

A2.3.2.2.2. Pick out a spot that is an equal distance on the opposite side of the target as the WDI. This spot can be any readily identifiable feature, e.g., discolored ground, bushes, trees, etc. **Note:** The JM should pass the reference/release point to the pilot to assure that both are utilizing the same point of reference.

Figure A2.3. Crosswind Target Pattern.

