United States Marine Corps
Marine Air Traffic Control Mobile Team
Tactical Standard Operating Procedures
(MMT TACSOP)

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The following MMT TACSOP will supersede all previous MACG and MACS MMT administrative and tactical SOPs. Adoption or use of this SOP does not relieve the team leader and members from their responsibility to analyze and adapt to the tactical situation. There should never be any written or implied prohibition against deviating from any SOP item. However, all members should be thoroughly familiar with the standards included herein. Teams of personnel who are thoroughly trained in the contents of this document will find that, when faced with changes in tasking or environment, their capability to execute will be enhanced. Improvement should also occur in the areas of planning, briefing, and debriefing. Knowing what is expected of a professional MMT leader and member is the first step in achieving that level of performance.

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INTRODUCTION

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INTRODUCTION

1000. **GENERAL.** This document sets forth Standard Operating Procedures (SOPs) to be used in tactical Marine Air Traffic Control Mobile Team (MMT) operations. It is an extension of existing instructions concerning conduct of Air Traffic Control (ATC) and ground combat procedures in accordance with EAF NATOPS Manual 00-80T-115, NATOPS Air Traffic Control Facilities Manual 00-80T-114 and the FAA Handbook, Air Traffic Control 7110.65.

1001. **PURPOSE AND SCOPE.** This document provides general guidance and specific operating instructions governing MMT operations. It is not designed to cover every possible contingency and therefore does not relieve personnel from the responsibility to exercise good judgment and common sense regarding those situations not covered.

1002. **DETACHMENTS.** MMT detachments will be led by a designated and certified MMT Leader or Detachment OIC who will be solely responsible for implementation of this SOP.

1003. **OPERATIONAL SAFETY**. A command's operational priority is combat readiness. Combat readiness is achieved through realistic training and conservation of assets. The objective is to accomplish all assigned missions without the loss of life or the serious injury of a Marine. There is abundant opportunity to demonstrate excellence and capability while building a high degree of combat readiness without compromising safety. Deviations from the confines of acceptable operational safety will not be tolerated. MMT Leaders and Detachment Commanders are ultimately responsible for the safety of MMT operations. Everyone has an individual responsibility to ensure safe operations and must carry out his duties in accordance with appropriate guidance and common sense.

1004. **CHANGES.** Changes to this SOP are encouraged. As MMT operations continue and new techniques and equipment are implemented changes should be submitted. All changes shall be submitted through the MMT SOP sponsor, MAWTS-1.

CHAPTER TWO

GENERAL

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GENERAL

2000. **BACKGROUND**.

1. Currently Marine Air Traffic Control is a viable and valuable asset in the Forward Operating Base (FOB) concept for extended aviation operations ashore. However, the Forward Edge of the Battle Area (FEBA) is moving further away from the rear area at an ever increasing rate. In the execution of the six functions of Marine Aviation, it may become necessary to establish ATC services at not only the main air base, air facility, and air site, but also for Forward Arming and Refueling Points (FARPs), Rapid Ground Refueling (RGRs), Noncombatant Evacuation Operations (NEOs), and Lagger Points. The MMT is task organized to provide ATC support to Marine Aviation assets in austere and/or improved landing environments.

2. This concept of support for Marine Aviation was developed by adopting, in part, the mission, training standards and procedures of the Air Force Special Tactics Teams (STT). The MMT can be a dynamic force multiplier ashore that the Marine Air Ground Task Force (MAGTF) commander can depend upon to enhance his offensive combat power.

3. MMT training encompasses all aspects of current Marine ATC training and readiness standards, but focuses primarily on contingency and forward air control operations as well as emphasizing some basic Marine infantry tactics. MMT training responsibility resides with the Detachment Commander. Concentrated training allows for an increase in controller technical proficiency, tactical proficiency, and unit cohesion.

4. The MMT provides a highly responsive unit, well prepared to offer a solution to the command, control, and communications challenge presented by the maneuver element of the Aviation Combat Element (ACE) and the MAGTF commander.

2001. **MARINE ATC MOBILE TEAM MISSION.**

1. The mission of the MMT is to rapidly establish and control Tactical Landing Zones (TLZs) for fixed-wing aircraft and Helicopter Landing Zones (HLZs) in remote and otherwise non-permissive environments in support of the MAGTF. The MMT must be able to flex from these basic missions and provide whatever services are required.

2. The MMT mission includes, but is not limited to, the following inherent tasks

   a. TLZ/HLZ recommendation/assistance in site selection.

   b. TLZ/HLZ limited surveys.

   c. TLZ/HLZ marking.

   d. Providing ATC services at designated TLZ/HLZ.

   e. Provide and operate NAVAIDS.

f. Coordination with civil and military control agencies.

g. Develop terminal instrument procedures.

h. Provide limited weather observations.

i. Establish ground to air and point to point communications.

j. Liaison.

2002. **MARINE ATC MOBILE TEAM ORGANIZATION**. MMTs are administratively and operationally maintained by the Marine ATC Detachment Commander. The Detachment Commander will task the MMT to support unilateral, joint or combined force ACEs for training, exercises, surveys, contingency plans, actual operations, or other requirements.

a. Each team consists of Marine Air Traffic Controllers, Navigational Aids Technicians and Field Radio Operators trained and equipped for MMT operations.

b. A standard team consists of one officer and five enlisted personnel. The team is of adequate size to allow for losses due to TAD, leave, or combat without severely hampering mission accomplishment. The team can be tailored to meet mission requirements by adding controllers to the team or dividing it into smaller elements. A typical MMT is outlined in Table 2-1.

AUTH	MOS	RANK	BILLET
1	7220	2nd/1stLt	Team Leader
1	7257	SSgt/GySgt	Assistant Team Leader
1	7257	Pvt-Sgt	Tower Controller
1	7257	Pvt-Sgt	Tower/Radar Controller
1	5952	Pvt-Sgt	NAVAID Tech
1	5954/0631	Pvt-Sgt	Comm Tech/Fld Radio Opr

Table 2-1 MMT Configuration

2003. **RESPONSIBILITIES.**

1. Upon assignment to an operation/exercise, the MMT Leader is responsible for the following:

a. Coordinating the assignment of MMT members.

b. Publishing Letters of Instruction (LOIs) for operations.

c. Coordinating with S-1 for administrative matters.

d. Coordinating with S-4, and Supply for logistics, embarkation support, vehicles, supplies and equipment.

e. Liaison with aviation unit being supported.

A Pre-deployment Checklist is provided in Appendix B to assist the MMT leader in ensuring that all areas have been fully considered.

2004. **OPERATIONS/EXERCISE.** All MMT operations will be conducted in accordance with applicable ATC Directives, Publications, and Manuals.

1. METHODS OF EMPLOYMENT. MMTs may be called upon to support missions that would include a variety of insertion techniques as an individual unit, or more likely, as part of a larger force in a combined operation.

a. Airlanding (FW) (RW). Airlanding (FW) operations will deliver the MMT by way of a fixed-wing aircraft. During airlanding operations, the MMT is employed with the first element into the objective area. This ensures that all succeeding elements have air traffic control and navigational guidance available for safe and expeditious flow of air traffic.
Airlanding (RW) operations are most common and very effective. MMTs are inserted via assault helo assets well prior to the operations so they can set up for the follow on mission.

(1) Teams being inserted by airlanding operations may be employed from one FOB to another. To support a variety of missions concurrently, they may be transported in "bounding" elements as the Forward Line of Troops (FLOT) continues to move forward. Teams may be transported to an area of operations in strategic airlift then reloaded into tactical aircraft for employment into the objective area.

(2) If air movement is to be fully used, careful plans must be made to accomplish rapid intransit reloading. Under certain conditions, teams configured for combat may be loaded onto the tactical aircraft that will deliver them directly into the objective area.

(3) Some operations may require the MMT to be inserted by an alternate means first and have their vehicles and additional supplies airlanded at first possible chance after establishing the TLZ.

b. Tactical Vehicle. Tactical Vehicle insertions are another viable means of employment. Each team is equipped with a HMMWV and is the primary means of surface insertions. When involved in combined operations, utilization of other surface vehicles should not be overlooked.

c. Overland. Overland insertion is the least preferred method of insertion. It should only be used when the tactical situation absolutely rules out all other possible means of insertion. Although the least preferred, it should not be overlooked as a viable means of insertion and should receive considerable attention in training.

2. SECURITY. Security is a paramount consideration in MMT operations. Equipment must be light and small enough to permit the team to use any of the methods of employment. Ordinarily, this results in a limited communication, visual and electronic capability. The unit should be large enough to transport all equipment effectively and provide a reasonable amount of self security, yet small enough to minimize risk of enemy detection.

3. MMT SCOPE. The MMT provides a highly responsive unit, well prepared to offer a solution

to the Command, Control, and Communications (C3) challenge presented by the maneuver element of the ACE and the MAGTF Commander. The MMT is generally the first control agency into an aviation objective. The MMT is capable of controlling LZs for fixed and rotary wing aircraft under Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). The MMT should be self sufficient for 72 hours without re-supply or augmentation.

4. MMT FUNCTIONS. For each tactical mission involving the use of a TLZ/HLZ, the MMT performs the following functions:

a. Formulates and issues air traffic control clearances, instructions and advisories to effect safe, orderly and expeditious movement of air traffic in their area of responsibility.

b. Conducts a survey of the site to determine its suitability by both the number and type of aircraft. This is usually a hasty survey because most MMTs are not trained in the use of survey equipment. If a deliberate survey is required the MWSS has personnel trained to do this. Depending on the location, STT at Pope Air Force Base has a catalog of airfield surveys and possible TLZ locations from around the globe. The contact information is located in chapter six.

c. Marks the TLZ/HLZ as the mission dictates.

d. Establishes a control point from which to exercise air traffic control.

e. Establishes a control zone around each TLZ and controls all air traffic within this area under VFR and IFR conditions, which may be, extended to non-radar approach control services.

f. Develops terminal instrument procedures for the TLZ/HLZ.

g. Provides and operates navigational aids which support tactical operations that cannot be supported by other agencies.

h. Provides limited weather observations and information.

i. Assists in the selection of sites for TLZ/HLZ operations.

j. Establishes ground-to-air and point-to-point communications.

k. Gathers current ground intelligence data in the objective area and coordinates with intelligence representatives to assure the timely exchange of intelligence data.

l. Can act as the Air Boss if an aviator is not available, otherwise MMT is a direct link to the DASC or DASC(A).

2005. **EMBARKATION/LOGISTICS/SUPPLY.**

1. The S-4 provides embarkation and logistical support for MMT operations. Support includes, but is not limited to, the following:

a. Preparing Equipment Density Listings.

b. Preparing Logistical Support Requirement Analyses.

c. Dash 2 Certification for hazardous cargo (required for all vehicles, ammunition, lithium batteries, generators, etc.) that are transported aboard military aircraft.

d. Obtaining embark boxes or specialized containers for transportation of equipment.

e. Disposal of hazardous waste.

f. Repair of Marine Corps Equipment.

g. Vehicle dispatch and maintenance.

2. Supply support for operations includes but is not limited to the following:

a. Requisition and issue of Marine Corps equipment and supply.

b. Acquisition of non-standard supply items through open purchase.

c. Processing of Temp Loan requests for non-organic equipment.

3. Equipment checklists for all equipment required by the Mobile Team, to include personal gear, are located in Appendix A.

2006. **COMMUNICATIONS/ELECTRONICS.**

1. Temp Loan of necessary communications equipment must be arranged for each operation. With the advent of the RLST to the Detachment T/E this should fix the problem somewhat.

2. Frequency requests require lead time to process. The United States frequency lead time is 90 days. Frequency lead times for overseas areas vary.

CHAPTER THREE

TRAINING

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TRAINING

3000. **GENERAL.** This chapter contains information concerning MMT training requirements. A course of instruction is outlined and is intended to prepare Marine ATC for duty as MMT members. A physical conditioning program is paramount to the success of the team. The conditioning program will prepare Marines for the rigorous demands inherent in MMT operations. The physical conditioning program is a process that should cover six weeks to achieve the highest levels. However, training must be accomplished on a continuing basis in order to maintain an acceptable level of operational readiness. MAWTS-1 provides a Marine ATC Mobile Team Leader Instructor Course twice yearly during its WTI classes. This course qualifies Marines to be Enlisted Weapons and Tactics Instructors with an emphasis on MMT leader operations.

3001. **OUTLINE OF INSTRUCTION.**

1. LAND NAVIGATION (100)

101 Categories, types, and care of maps
102 Map symbols and Marginal information
103 Military Grid Reference System
104 Geographic Coordinate System
105 UTM to Geographic Coordinates
106 Azimuth and Declination
107 Distance, elevation and relief
108 Offsets and Detours
109 Map problems
110 Aerial Photos
111 Introduction to the Lensatic Compass
112 Orienting the map
113 Day compass course practical application
114 Night compass course practical application
115 Introduction to the Global Positioning System (GPS)
116 GPS course practical application
117 Land Navigation Final Examination
118 Incorporate detailed terminal training objective

2. AIR SITES (200)

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202 Tactical Landing Zones
203 Helicopter Landing Zones
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205 RGR Procedures
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3. MMT TACTICS (300)

301 Insertion and extraction
302 Tactical formations
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307 Nuclear Biological and Chemical operations
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309 Mission planning
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402 CH-53
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502 Command and Control interface
503 PRC-104
504 PRC-113
505 PRC-119
506 PRC-117F
507 PRC-138
508 Communications Security
509 AKAI
510 Field Expedient Antennas
511 Communications Examination

3002. **RECORD OF TRAINING.**

1. All training, both academic and physical, shall be recorded and maintained in the Marine's training jacket. Once the courses of instruction are completed, the Marine will receive a

certificate of qualification as an MMT member. Team leader designation authority resides with the Commanding Officer.

2. An annual re-certification is required of all fully certified MMT personnel. The re-certification process consists of three tests: written, physical and practical application. The written and practical application tests should be comprehensive and include all of the aforementioned areas. A minimum passing score of 80% on the written and practical application exams is required. **Physical Fitness Test results alone may be misleading as to the level of fitness the Marine has in relation to MMT operations.** Detachment Commanders and/or MMT Instructors shall retain the authority to sign T&R syllabus event completion. Detachment Commanders and MMT Instructors should develop standards for testing their Marines for such operations.

CHAPTER FOUR

MISSION PLANNING

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MISSION PLANNING

4000. **GENERAL.** Rapid response operations inherently involved in MAGTF operations rely on the level of training and readiness of the MAGTF and its assigned units to execute a mission before the enemy can react. Often there is little time for lengthy deliberate planning or rehearsals and planners must rely on SOPs and checklists to speed the planning process. The decision makers must consider the enemy's strength, intentions and capabilities. The determination of which tactics offer the best chance for mission accomplishment are based on a careful analysis of METT-TSL (mission, enemy, terrain and weather, troops and fire support available, time, space and logistics). Particular emphasis must be placed on evaluating the nature and composition of the threat and its potential impact on the mission. Detailed centralized planning and decentralized execution of the mission tactics is fundamental to mission accomplishment.

4001. **PLANNING PROCESS.** The MMT leader will be directly involved in the planning process and must adhere to the following steps in accordance with MCWP 5-1 for deliberate and effective mission planning:

1. Mission Analysis – purpose is to review and analyze orders, guidance, and other information provided by higher headquarters and to produce a unit mission statement.

2. Course of Action Development – each prospective COA is examined to ensure that it is suitable, feasible, acceptable, distinguishable, and complete with respect to the current and anticipated situation, mission and commanders intent.

3. Course of Action War Game – involves a detailed assessment of each COA as it pertains to the enemy and the battlespace. Friendly COAs are wargamed against possible enemy threat COAs.

4. Course of Action Comparison and Decision – the commander evaluates all friendly COAs against established criteria, then evaluates them against each other and selects the best to accomplish the mission.

5. Orders Development – orders are developed utilizing the commanders COA decision, mission statement, intent and guidance. These orders serve as the commander’s expression of his decision, intent and guidance.

6. Transition – this is the hand-over of a plan or order to those who execute. It provides situational awareness and rationale for key decisions in the shift from planning to execution.

Upon mission receipt, the planning cell will conduct a complete mission analysis. Analyze the specific mission for implied tasks that must be accomplished in order to execute the mission, always concentrating on the commander's intent. Ensure that you completely understand both the friendly and enemy situations and if important information is missing, ask for it. Know the enemy order of battle and his capabilities completely.

Once the mission and commander's intent are understood, continue to develop Essential

Elements of Information and courses of action. Courses of action should be briefed orally. The concept of operations is also general in nature and is a refinement of courses of action based on the commander's analysis, estimates and decisions. Plan thoroughly and quickly. Establish a timeline that begins in the objective area and works back to the planning process. Analyze actions in the objective area in great detail, as this is the area of greatest interest and generally where the threat may be the most lethal. Plan the withdrawal as thoroughly as the initial assault as this is an area that is often overlooked.

4002. **PLANNING CONSIDERATIONS.** As a guide to effective mission planning in rapid response situations, use the planning considerations checklist for specific mission types provided in the Appendices D-G.

4003. **TIME MANAGEMENT.** Driving the planning process is the element of time. MMTs will be assigned to a MEU(SOC) which is in a contingency posture and is designed to react quickly and decisively. Often times the MEU(SOC) may only have hours, rather than months or days to plan and execute. Time is of the essence and cannot be wasted. Utilize the Mission Planning Timeline in Appendix C to ensure that your planning moves along efficiently.

4004. **DIVISION OF LABOR.** In the rapid planning process every team member should be involved. The team should be broken down and assigned specific areas of responsibility as specified in the team Warning Order. The Rapid Planning Timeline provided in Appendix C should be followed. The MMT will need to be involved in planning for all aspects of an operation. MMT will have direct input in routing, LZ planning, communication, and each flying units planning.

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CHAPTER FIVE

MISSION BRIEFING

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MISSION BRIEFING

5000. **GENERAL.** Before each operation, a team Warning Order will be issued to drive the planning and preparation process. The Warning Order will be followed by a Team Leader's Mission Brief and any specialized briefings as required. The content of these briefings will depend upon the requirements of the specific mission to be accomplished, but should follow the formats as outlined in this SOP. This SOP should be used to the maximum extent possible in order to reduce briefing times and to eliminate confusion. There is no need to brief SOP items under normal circumstances.

5001. **MATERIALS**.

1. Maps. Place all maps pertinent to the brief in a location where everyone involved in the brief can see them.

2. Terrain Model. Build a model of the terrain for the briefing. This is particularly important for overland INSERTION to ensure the team has an accurate concept of the terrain that will be traversed during the operation.

3. Drawings and Aerial Photos. In situations where terrain models are unlikely (i.e. on board ship), drawings or aerial photos can be an effective substitute for the mission brief. These assets are available from the S-2. Other units involved with the operation should be consulted for available intelligence.

4. Briefing Guides. Each team member shall maintain standardized briefing formats in order to follow along, copy down all pertinent information, and ensure that all items are properly briefed. If certain items are overlooked, it is the responsibility of the individual team member to inform the Team Leader that pertinent information has been omitted.

5. Smart Packs. Pre-printed smart packs are being used extensively. These can be distributed among team members to ensure they are familiar with the information contained in them. They normally include call signs, frequencies, brevity codes, signals, time lines, rules of engagement and Escape & Evasion procedures. Extreme care must be taken to ensure their accuracy and to protect their security.

5002. **OPERATIONAL BRIEFS.**

1. Warning Order. The Team Warning Order will be presented verbally and will be posted in a prominent place in which all team members have immediate access. The standard format shown in Appendix D should be used, but if no copies are available, the following information must be included:

a. Situation - Only information personnel need to make mission preparations needs to be included.

b. Mission - A brief and concise statement of what the team has been assigned to do. (Who, What, Where, When and Why)

c. General Instructions –

(1) Team Members for the mission.

(2) Chain of Command.

(3) Tasks each individual will be assigned.

(4) Uniform and Equipment.

(5) Time Schedule – briefings, weapons test fire, rehearsal, etc.

d. Specific Instructions – individuals will be assigned the following duties in accordance with the checklist in Appendix D.

(1) S-1 and S-2 preparation.

(2) S-3 preparation.

(3) S-4 preparation.

(4) Supply preparation.

(5) Communications preparation.

2. Team Leader Mission Brief. This is an in depth briefing presented by the Team Leader covering all aspects pertinent to the assigned mission. This briefing should be prefaced by a security classification statement, roll call, time hack, instructions to secure the room and instructions to hold all questions until the end. Additionally, any smart-pack information will be distributed at this time. The format in Appendix E should be used.

3. Pilot Briefing. This briefing is used to inform the aviators of all pertinent information that they will need to safely operate in the assault zone. This brief should be issued to the pilot, face to face, but some missions may preclude this possibility. Any other means of issuing this brief (i.e. secure phone, secure FAX, message traffic, etc.) should be executed if face to face briefs are impossible. It is extremely important that the pilots be informed of all information to operate safely and efficiently with the MMT. The briefing checklist in Appendix D should be used to properly brief pilots when face to face briefings are otherwise impossible.

5003. **DEBRIEF.** All personnel involved with planning or execution of the mission should attend the debrief. The debrief should be held as soon as all participants can meet after the mission. For combat missions, the debrief should be held immediately after debriefing the Intelligence Officer. Always set the debrief time in the warning order. Every participant should be able to contribute to the debrief.

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CHAPTER SIX

TACTICAL LANDING ZONES

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TACTICAL LANDING ZONES

6000. **GENERAL.** Rapid establishment and control of TLZs in remote and otherwise non-permissive environments is the primary mission of the MMT. TLZs can be established to support transport aircraft to insert follow-on forces, extract noncombatants, deliver supplies, and refuel helicopters in addition to a wide variety of other missions. The TLZs provide the MAGTF commander with a dynamic force multiplier and a high degree of flexibility in projecting his power ashore.

6001. **CLASSIFICATION AND CRITERIA.**

1. CLASSIFICATION. Potential tactical landing zone areas fall into three basic categories: unprepared, prepared and surfaced. Unprepared surfaces are natural areas such as deserts, dry lake beds and flat valley floors. Prepared surfaces are short airstrips that have been constructed for limited use and may or may not have an aggregate surface. Surfaced areas include roads, highways and other paved surfaces. Individual missions will dictate which of these surfaces will be most useful.

a. USAF Special Tactics Teams are trained to perform tactical airfield surveys or assessments and have done so worldwide. They gather all available data on the airfield and perform site visits to evaluate approach zone obstruction clearances and weight bearing. These surveys can be obtained from the Assault Zone Surveys @ https://www.amc.scott.af.mil/do/dosub.cfm?page=division%2Ehtm. Follow the DOK Division link to current surveys. Airfield suitability and restrictions reports are located @ https://www.amc.af.mil/do/doa/dovs.htm. Both of these sources should be consulted when planning. Once the info is found it can be faxed on demand from DSN 576-2899 or Comm 618-256-2899. If further information is required call DSN 576-6055. Every effort should be made to obtain a STT survey before operating on an airfield.

b. MMTs should be equipped with hand held pocket transits to check approach zone clearances and the heights of obstructions in the nearby vicinity. Airfield or drop cone penetrometers are used to check weight-bearing capability (California Bearing Ratio CBR) of unsurfaced landing zones. They can be temp loaned from the appropriate MWSS or CSSD however training is required on the use of the penetrometers.

c. Semi-permanent runways should be surveyed by engineering units. However, semi-permanent installations such as captured enemy airfields, must be assessed for possible aircraft hazards and correct dimensions prior to use for operations. This can be accomplished through obtaining surveys, map and aerial photo analysis and a physical survey of the set-up during or prior to the operation.

2. CRITERIA. Short field LZs should be of sufficient size to permit rapid takeoff, landing and loading operations. Terrain may be of soil, dirt, sand or other suitable surface. Careful consideration must be given to the slope and elevation of the runway, aircraft capability and movement area restrictions.

a. Surface Conditions.

(1) High-strength airfields are permanent improved surface runways. Most airfields of this sort maintain runway strength data that may be available. However, when not available, most aircraft can operate satisfactorily from most smooth, relatively hard surfaced airfields.

(2) Marginal-strength airfields include temporary airfields with minimum surfacing or unsurfaced airfields such as would be encountered at forward area airfields in remote areas of the world. The minimum soil strength required for aircraft operation is within the CBR values of 3 to 5. Operational feasibility on unsurfaced airfields depends on the type soil, soil moisture content and operational frequency.

(3) At certain times, a forward airfield cannot be evaluated with scientific procedures. The first time an evaluation is made at some places, besides aerial photos and visual appearance, is when the first aircraft arrives. This situation is not a recommended method, but the mission may dictate that it occur. Rapid airfield assessments can be made with the use of a 5-Ton vehicle to simulate aircraft weights. This is not a foolproof method. Environmental conditions, to include rain, sun, and wind, can affect the surface. Extreme care should be taken to ensure the aircraft lands with as similar conditions as possible to the time when the assessment was taken. Table 6-1 lists C-130 trafficability for airfields assessed with the use of a 5 Ton.

RUT DEPTH	AIRCRAFT LOADING	NUMBER OF LANDINGS & T/Os
0.00"	EMPTY	100
0.10"	EMPTY	10 (UP TO 100 W/ RISK)
0.25"	EMPTY	1
0.00"	FULL(155,000 lb GWT)	10
0.10"	FULL(155,000 lb GWT)	0

Table 6-1 Rapid Airfield Assessment Criteria

b. Traffic Areas. Traffic Areas include runways, taxiways, overruns and parking aprons.

(1) Runway surface size criteria for conventional forces are shown in Table 6-2. For normal peacetime operations with C-130 and C-17 aircraft, increase the length of the TLZ by 500' and the 3 Point Turn width by 10'.

TYPE A/C	LENGTH	NO TURN	180 TURN	3 PT TURN
C-130	3,000'	60'	60'	50'
C-141	6,000'	98'	138'	N/A
C-5	6,000'	150'	150'	N/A
C-17	3,000'	90'	132'	80'

Table 6-2 TLZ Surface Sizes

(2) Taxiways for single direction C-130 operations will be no less than 30' wide, but should be made 60' wide to increase ease in turning off the runway.

(3) Parking apron hardstands for C-130 aircraft will be no less than 150' wide. The number of aircraft using the area will determine length of the apron. For a mass apron of ten C-130s, the apron will be 1500' long, for one C-130 with the ability to turn around the apron will be 150' long and for one C-130 requiring it to back into position, the apron must be 30' long.

(4) Overruns are the same width as the runway and extend 250' from both the arrival and departure ends.

(5) Rocks must be removed, embedded or interlocked with each other so that aircraft tires will traverse the area without causing displacements.

(6) Soil balls or dried dirt clods (excluding clay) up to six inches in diameter that will burst on tire impact can be allowed. Hardened clay clods that have similar characteristics as rocks and exceed four inches must be pulverized or removed from the traffic areas.

(7) Tree stumps must be clear of the traffic areas.

(8) Ditches must be eliminated and packed to the surrounding CBR.

(9) Plowed Fields usually contain a soft core and normally will not require modification. However, such dirt patterns should be examined carefully, when feasible, to determine the need for removal.

(10) Depressions and soil mounds do not have sharp corners and are recognized as oval or circular gradual downward sinks or rises. Depressions or mounds that exceed fifteen inches across on the top and six in depth or height will be filled or leveled until they meet grade tolerance criteria.

(11) Potholes are circular or oval in shape and distinguished from depressions by their smaller size and sharp corners. Potholes must be filled if they exceed fifteen inches at their widest point and six inches in depth. Potholes must be given careful consideration when aircraft with smaller tires, such as AV-8s, are expected to use the TLZ.

c. Shoulders.

(1) Shoulders parallel the length of the TLZ and extend ten feet laterally on both sides of the runway surface.

(2) Tree stumps should be cut flush with the ground.

(3) Rocks that can be ingested by engines and cause damage to the bottom of the aircraft should be removed.

d. Clear Zones and Clear Areas.

(1) Clear Areas are the length of the TLZ and extend 35 feet laterally from the outside edge of the shoulders on both sides of the runway.

(2) Clear Zones are 150 feet wide at the approach and departure ends of the runway and extend 500 feet in length to a final width of 500 feet.

(3) Tree stumps cut to within two inches of the ground.

(4) Rocks in excess of four inches in diameter should be removed.

(5) Ditches shall not be located within 65 feet of the runway centerline. The CBR of these ditch edges can be ten percent less than the CBR of the runway.

(6) Obstacles, except vegetation, over four inches above ground level will be cleared.

e. Lateral Safety Zone.

(1) Lateral Safety Zone is the length of the runway on its inner edge and extends 75 feet laterally from the outer edges of the clear areas, on both sides of the runway, to a final length that intersects with the clear zones on its outer edge.

(2) Obstacles extending higher than a 7:1 ratio from the inside lateral edge of the safety zone shall be reduced or eliminated.

f. Approach Zones.

(1) The approach zones are 500 feet wide at the outer edge of the clear zone extending out 10,500 feet from the outer edge of the clear zone to a final width of 2,500 feet.

(2) The approach zones have an elevation ratio of 35:1 which is measured from the thresholds, but does not take effect until the inner edge of the approach zone. All obstacles exceeding the limits of this zone shall be reduced or eliminated.

g. Depictions and Data.

(1) Depictions and data for training and combat airfield criteria are included in Appendix E.

6002. **MARKING EQUIPMENT.** TLZs are normally marked with VS-17 marker panels for day operations and ACR L-32 portable runway lighting for night operations. Any omni-directional, overt and visible lighting system is acceptable if all participating units are briefed and concur in its use. Some units may request the use of specialized covert (IR) lighting systems.

6003. **MARKING PATTERNS.** Specific details will be agreed upon at the planning conferences or briefs concerning the TLZ markings. Conventional or special operation TLZ markings consistent with flying safety shall be utilized. When landings can be anticipated at both ends of the TLZ, the first 500 feet of each end will be marked as the approach end. There are three standard types of airfield marking patterns (AMP) which follow:

1. AMP-1. Normally used to support day or night tactical operations. The Mobile Team Leader, with the concurrence of the supported squadron, is authorized to reduce this marking pattern down to the approach end, touchdown area and end of the runway on a well defined runway during day VMC operations. **(See Appendix E)**

2. AMP-2. Normally used for special operations when minimal set-up time is provided. Basically it is only the approach end and the left side of the runway marked. **(See Appendix E)**

3. AMP-3. Normally used for special operations when minimal personnel are available for the operation. This set-up is often referred to as the "box and one" and may be done with overt or covert lighting. **(See Appendix E)**

6004. **MARKING PROCEDURES.** Among the most difficult tasks to accomplish in TLZ operations is the establishment of a straight runway that has a centerline aligned with the usable surface of the runway. In order to ensure a straight and properly aligned runway, the following procedure is recommended:

1. REFERENCE MAN. The reference man will proceed as far as possible towards the departure end of the runway, but not less than, 3,500 feet visually surveying the surface for FOD or other hazards to aircraft operations. Once the reference man arrives at the predetermined distance down the runway, he will pace off the usable surface of the runway at that point, pace back to the centerline and then pace to half the width of the runway on the left side. The reference man will then mark this point by displaying a panel or light (may be overt or covert) and informing the other team members that the reference point has been established by means of a brevity code. The point the reference man has established effectively serves as a sight on which to align the entire runway.

2. BASE MAN. The base man will proceed to the approach end of the runway visually surveying the surface for FOD or other hazards to aircraft operations. Once at the approach end, the base man will determine the left side of the TLZ using the same procedure as the reference man. After receiving the brevity code from the reference man, the base man will use brevity codes or hand and light signals to align the pace man on the reference man at given distances down the runway. The base man will, if needed, proceed down the runway as each interval is marked to ensure the pace man is able to see the alignment signals.

3. PACE MAN. The pace man will proceed to the approach end of the runway and assist in the visual survey enroute. Immediately after arriving at the approach end, the pace man will pace down the runway to the appropriate distance and wait for alignment instructions. After being properly aligned, the pace man will mark the spot with a panel, light or battery and proceed to the next interval and repeat the process until the entire runway is marked.

4. SET-UP TEAM. The set-up team finishes marking the TLZ after the alignment has been accomplished at each interval on the runway. The team will proceed to the approach end of the runway and assist in the visual survey enroute. Immediately after the left side of the approach end has been established, the team will mark the left side with panels or lights and establish the proper width of the runway using a pre-cut length of cord. With the left side of the runway aligned, the pre-cut length of cord stretched across the runway at each marked interval will properly align the right side.

6005. **CONTROL POINT.** The control point for the TLZ will be established at the direction of the MMT leader. The team leader must take into account pertinent factors such as an unobstructed line of sight, winds, security, as well as positive control of the TLZ and surrounding airspace. The entire landing, taxiing and parking areas should be in full view of the control point. It should, when possible, be upwind of the landing area so the dust and debris rising from an unimproved TLZ will not obscure the vision of the controllers.

6006. **NAVAIDS.** MMTs have the capability to tactically employ and operate electronic NAVAIDS in support of air operations. Standard equipment and placement is listed below:

1. AN/TPN-30A, TACAN MODIFIED. When used in conjunction with TLZ operations, this NAVAID will provide TACAN radial and DME out to 40 nautical miles, 360 degrees. Additionally, it will provide ILS approach information out to 10 nautical miles on 20 degrees either side of the final approach course. It should be placed 30 feet abeam the left side of the 100' mark. Alignment should have the NAVAID's final approach course parallel that of the runway it is serving. The use of the TPN-30 inherently involves the use of some power source such as a HMMWV slave cable, MEP-15, or MEP-531A generator or silver-zinc batteries that need to be recharged. These power sources need to be thoroughly considered in mission planning.

2. AN/PPN-19. This radar beacon will provide directional information to any properly equipped aircraft. It should be placed 30 feet abeam the left side of the 100' mark.

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CHAPTER 7

HELICOPTER LANDING ZONES

CHAPTER SEVEN

HELICOPTER LANDING ZONES

7000. **GENERAL.** Although MMTs are primarily concerned with fixed-wing TLZ operations, knowledge of helicopter landing zones is essential in several operations. Fixed-wing operations may be used in conjunction with rotary-wing operations in MAGTF missions. C-130 aircraft may be used for Rapid Ground Refueling (RGRs) or for transporting personnel evacuated in Non-combatant Evacuation Operations (NEOs).

7001. **HLZ SELECTION.** During an amphibious assault operation or a helicopterborne assault operation, selection of HLZs is made by the MAGTF commander based on recommendations from the ACE and the GCE. Principle factors in the selection of HLZs are:

1. Landing Force concept of operations ashore

2. Enemy capabilities and dispositions with special consideration of enemy anti-air installations

3. Nature of the terrain over which helicopter units will maneuver after landing and proximity to initial objectives

4. Requirements for logistic support

5. Requirements for air, artillery and naval gunfire support

6. Available helicopter lanes to and from the HLZ and any restrictive effects on the employment of air, artillery, naval gunfire and fire support of other forces

7. Ease of identification from the air

8. Suitability and capacity for the landing and takeoff of helicopters

9. Located just behind the enemy's detection and engagement range

7002. **CRITERIA.**

1. SIZE. Appropriate HLZ size is determined by the number and type of helicopters to be employed. The landing of a helicopter in a small or restricted HLZ requires the employment of a precision type of approach, which exposes the aircraft to enemy observation and fire. Recommended single aircraft HLZ diameters are provided in the following table:

TYPE A/C	**SURROUNDING OBSTRUCTION HEIGHT**		
	5m - 15m	**15m - 30m**	**30m+**
AH/UH-1	35m	50m	70m
CH-46/53	60m	85m	120m

Table 7-1 HLZ Size Minimums

The size of a multi-ship HLZ should be increased in length and width for each additional aircraft in the formation. The increase in size of the zone should equal the separation distance between aircraft.

2. SLOPE. Selected HLZs should be as level as possible. Terrain with slopes in excess of 14 percent (eight degrees) is usually considered too steep for helicopter landings because of the dynamic rollover characteristics of all helicopters.

3. SURFACE MATERIAL. Surface materials in the HLZ must be considered during the planning stages. Dangers during the landing phase include restrictions to vision due to blowing dust or snow, foreign object damage to jet engines from blowing debris, obstruction of rocks, stumps and terrain faults by tall grasses. Soil trafficability must be considered to ensure that helicopterborne units are able to move from the selected HLZ to the objective area with all the required equipment.

4. OBSTACLES. Obstacles in and around the HLZ can affect a helicopters ability to land, take off, successfully avoid enemy detection or affect troop mobility once the landing is made.

5. ADJACENT TERRAIN AND EXITS. Adjacent terrain and exits must be studied for lanes of approach, lines of communication, observation, visibility, cover and concealment. Compatibility of surrounding terrain with terrain flying should be examined along with the avoidance of enemy detection and fire.

7003. **MARKING PATTERNS.** A variety of landing zone lighting patterns exists. MMT controllers should expect to provide a diversity of lighting patterns when participating in operations with different helicopter squadrons. The preferred method by most Marine Corps pilots is the lighted "T" pattern. When conducting combined or joint operations, lighting patterns in accordance with NATO Standardization Agreements, the NATO "Y", should be used. Depending upon the squadron supported, any of these patterns or a variation of them can be used as long as it is covered in the pilot briefing.

1. LIGHTED "T". The lighted "T" pattern is standard for most Marine aviation squadrons. It can be effectively used for all aircraft. The lights at the head of the "T" must be at least five meters apart and the lights in the stem must be at least eight meters apart. To indicate wind direction, the stem of the "T" should point into the wind. (See Appendix F)

2. The NATO "Y" pattern is standard for joint and combined operations. The lights in the split must be at least fourteen meters apart and the lights in stem must be at least seven meters apart. To indicate wind direction, the stem of the inverted "Y" should point into the wind. (See Appendix F)

3. FORMATION HLZs. Formation HLZs are established by building on the standard "T" or inverted "Y" patterns described above. The landing point for each additional aircraft is marked with a single light and wingmen will follow and align off the lead aircraft. There are three standard formation patterns used. The spacing between individual landing points for aircraft can be increased or decreased if the pilot is properly briefed, but should never be reduced to less than 50 meters. (See Appendix F)

7004. **MARKING EQUIPMENT.** The type of marking and ground signaling devices used will depend greatly on lighting conditions and whether or not the pilots' night vision is aided by NVGs. Various marking systems have been used successfully, but regardless of the system used, it should be easily visible to the pilot.

1. DAY OPERATIONS. Day HLZs are best marked with the use of the VS-17 air panels effectively secured to the ground. The panels are simply placed in the same pattern with the same dimensions as the lighting patterns described above. The panels should be raised at an angle in order to provide a better view at very low altitudes.

2. NIGHT OPERATIONS.

a. LZ Considerations. Due to the inherent danger involved in nighttime helicopter operations, special considerations need to be made in order to ensure the safe operation of helicopters into and out of landing zones. Extreme care should be taken to consider all of the following items in establishing night HLZs:

(1) Bright lighting. Align landing zones away from any bright lighting. This may include such things as a full moon during NVG operations.

(2) Obstacles. Approach and departure corridors should be free of any large obstacles or power lines.

(3) Wind direction. It is preferable to land helicopters into the wind. Consult the pilots concerning maximum cross and tail wind components that they will allow.

b. Unaided. Night HLZs where the pilots' vision is unaided require overt types of lighting. Standard ACR L-32 runway lights are extremely effective for this use when securely anchored. High intensity white chemlites are the next most preferable followed by any other color of chemlites.

c. NVGs. Night HLZs established for NVG operations are the most common, but require special consideration. Covert lighting is preferred in this case, but overt lighting may be used in the form of chemlites. However, some colors of chemlites are invisible or may be washed out by ambient light when using NVG devices. The following is a list of marking aids that should be used in this order of preference:

(1) IR Marking Kit (Peanut Lights) - may be too bright for low light level situations

(2) ACR L-32 Runway lights with IR dome - may be too bright for low light level situations

(3) Red Chemlites

(4) Green Chemlites

(5) IR Chemlites

4. GROUND TO AIR SIGNALING. Among the most difficult things for a pilot to do is locate the intended landing zone regardless of how effectively it is marked. Effective ground signaling devices are required to draw the pilot's attention to the general vicinity of the marked HLZ. The most effective means of drawing the pilot's attention is use of the ALDIS Lamp for night operations. IR filters can be acquired for use in NVG situations. The use of signal mirrors or smoke grenades in day operations has proven to be the most effective. Once the pilot has

acquired the general location of the landing zone, the signaling can be terminated on his request. At no time should the signaling device be used at a range of less than 100 meters. Strobe lights have been used with variable success in the past, but can be mistaken by helicopter gunners as flashes of enemy fire and friendly fire may be directed on them.

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CHAPTER EIGHT

RAPID GROUND REFUELING

CHAPTER EIGHT

RAPID GROUND REFUELING

8000. **GENERAL.** The ultimate objective in operating Rapid Ground Refueling (RGR) and Forward Arming and Refueling Points (FARP) is to minimize response time and decrease turn around time in support of sustained operations. Additionally, in limited objective raids, these sites can increase the combat radius, considered in both distance and time, and can be an invaluable asset in supporting ship launched over the horizon operations. Three methods of refueling can be used. The first is the Helicopter Expeditionary Refueling System (HERS) which can be delivered by helicopter or ground vehicle. The second, Tactical Bulk Refueling Dispensing System (TBFDS) is employed out of a CH-53. It can refuel up to two aircraft at a time and is usually used to refuel other helicopters. Third is the Rapid Ground Refueling (RGR) system using KC-130 assets, which usually require less than 20 minutes to establish. In most cases MWSS or CSSD personnel will be responsible for establishing refueling operation at FARPs. It is important however for Marine Air Traffic Controllers to understand refueling operations in order to ensure both their proper integration with airfield operations and to provide the most optimum traffic flow. Throughout this chapter, the term RGR will be used as a collective term for both RGR and FARP sites.

8001. **SITE LAYOUT.** Ideally, the RGR will be located approximately 17 to 25 kilometers from the FEBA or FLOT. This ensures positioning far enough to the rear to prevent enemy artillery preparatory fires from targeting the RGR, yet allows the quick return of helicopters and logistical support. The site should be planned around type of aircraft using the site as well as the following:

1. STAGING AREAS. Staging areas should be divided into pre-staging, post-staging and arm/de-arm areas. The pre-staging area should allow the pilots to observe the RGR site and remain a safe distance away from the site in the event of a mishap. However, it should not be an excessive distance away due to the difficulty experienced by some aircraft ground taxiing at night. 100 to 175 meters would be considered acceptable distances. Arm/De-arm headings will be offset from the refueling point by at least 45 degrees.

2. SPACING BETWEEN AIRCRAFT. There should be no less than 50 meters between refueling points in order to accommodate all aircraft types including the CH-53E.

3. WIND DIRECTION. The site should be arranged so aircraft can land, refuel and takeoff into the wind if at all possible. Consult the pilots on maximum allowable cross and tail wind components.

4. DRAINAGE. Spills should not drain into an area where equipment is located or into a refueling point.

5. CAMOUFLAGE. When possible, place pumps, separators, filters and bladders under camouflage or under surrounding vegetation. Place the site in a position where natural shadows will cover the site if possible. Consideration should be given to using netting or natural vegetation for aircraft that must remain in the RGR site for extended periods of time.

6. OBSTACLES. Approach and departure corridors must be free from large obstructions.

7. TROOPS. Troops must be debarked at the pre-stage and staged clear of the refueling point. Troops will be re-embarked in the post-stage. Attention during planning to ensure troops remain well clear of RGR site is essential. These troops can be used for additional site security if necessary.

8. SITE SECURITY. The RGR site should be located in a secure area. If this is not possible, consideration should be given to a sound security plan to include use of LAAD assets for protection of the site. An RGR should not remain in a fixed location for more than 24 hours without deliberate mission planning.

9. THREAT. A scatter plan should also be briefed. The KC-130 should be positioned so it always has access to a runway for immediate egress.

10. FOREIGN OBJECT DAMAGE. All aircraft are susceptible to FOD. The RGR sites and helicopter movement should be planned to minimize FOD Hazards.

11. CONTROL POINT. The control point should be established in a position in which the controllers can maintain constant visual contact with the refueling points. In the event of an emergency, the controller can immediately initiate a scatter plan.

8002. **RGR MARKING PATTERNS.** Although a standard marking pattern (an inverted "Y" with one light on the stem removed) is displayed in the Assault Support Helicopter Manual to mark staging areas, these provide poor reference for any more than a single aircraft at a time. A variety of markings may be used to mark these areas as long as they are readily visible to the pilots and they are properly briefed. Several marking techniques have been used successfully including large boxes marked on four corners indicating individual staging areas or single lights to mark holding points for individual aircraft. The second of these is most preferable because it not only allows use of the site by numerous aircraft, but also ensures separation of aircraft while holding in a given staging area. Fuel nozzles can be marked with chemlites to mark their position.

8003. **PERSONNEL REQUIREMENTS.** The following are minimum personnel requirements for RGR evolutions:

1. REFUELING PERSONNEL. TAFDS personnel should be assigned with the HERS. Normally five personnel are required to operate two refueling points. KC-130 RGRs will provide a team of seven personnel for establishing and operating the RGR site.

2. ORDNANCE. All aircraft are required to de-arm before receiving fuel. Four trained ordnance men are required during any arm/de-arm or loading/downloading sequence. It may be necessary to establish separate arm and de-arm areas but this will double the personnel support for this task.

3. MMT. A Marine ATC Mobile Team will be required to establish and mark the TLZ and RGR site as well as to control the aircraft into and out of the zone.

4. SECURITY PERSONNEL. An appropriate number of personnel will be required to provide ground security and air defense for the site.

5. LAAD. At a minimum, a LAAD team will be deployed for point defense of the RGR.

8004. **AIR TRAFFIC CONTROL.** All air traffic into and out of the RGR will be controlled by the MMT on site. However, once the aircraft have been positioned in the pre-staging area until they are ready to depart from the post-staging area, the RGR flight crew or TAFDS personnel control all ground movement of aircraft in the refueling area. Ground movement instructions can be issued via visual or radio communications.

8005. **EMERGENCY PROCEDURES.**

1. REFUELING PERSONNEL. In case of fire or accidents that could cause a fire, the refueling personnel will:

a. Stop the flow of fuel in the RGR

b. Free all aircraft from fuel lines

c. Sound alarm

d. If practical, fight fire

2. AFFECTED AIRCRAFT. Pilots and aircrew in the affected aircraft will:

a. Shutdown aircraft

b. Evacuate

c. If practical, fight fire

3. MMT. The MMT will instruct the unaffected aircraft to depart the site one at a time. Priority for departure will be to the aircraft closest to the fire. The team will also call for assistance.

CHAPTER NINE

AIR TRAFFIC CONTROL PROCEDURES

CHAPTER NINE

AIR TRAFFIC CONTROL PROCEDURES

9000. **GENERAL.** MMTs must maintain the capability to control VFR air traffic and conduct IFR approach control in support of tactical MAGTF operations. These operations require the establishment and operation of tactical terminal ATC facilities used for short term and sustained periods. Careful planning is essential to ensure a safe, orderly and expeditious flow of air traffic. All aircraft operations and ATC procedures shall be performed in accordance with applicable orders and directives. The procedures in this chapter apply specifically to MMTs.

9001. **RESPONSIBILITIES.**

1. Overall airspace authority will reside with the ACE acting for the MAGTF commander. This authority may be delegated to elements of the Marine Air Control Group (MACG). When a TLZ is established and activated, the MMT will exercise control authority within their control zone. All aircraft must contact the controlling MMT for clearance prior to entering the airspace. Procedures for activation and deactivation will be as coordinated with the ACE or designated representative.

2. MMT controllers on duty are responsible for the following:

a. Maintaining continuous surveillance of all known air traffic operating within the designated airspace, as well as all aircraft, vehicles and personnel on the movement areas of the landing site.

b. Issuing clearances, instructions and advisories necessary for the safe and orderly flow of air traffic.

c. Initiating a Letter of Agreement (LOA) to delineate responsibilities within a terminal control area when the MMT is co-located with other control or air defense agencies.

9002. **RUNWAY SELECTION.**

1. Runway selection is essential for effective terminal control of traffic. Some of the most important factors to consider in selecting the runway are:

a. Wind direction and speed

b. Length and condition of runway

c. Obstructions in the area

d. Approach and departure paths

e. Tactical situation

2. Change in landing and takeoff direction is the responsibility of the MMT, after coordination with affected units.

9003. **LIGHTING AIDS.** The MMT must ensure that the lights within the zone are working properly and that any hazards in the maneuvering area are marked as conspicuously as required.

9004. **VISUAL TRAFFIC MOVEMENT SIGNALS.** Visual control of vehicle and personnel movement, visible from the control point, is maintained by using an ALDIS lamp or other coordinated visual signal. Standard air traffic control light signals will be used.

SIGNAL	A/C ON GROUND	A/C IN AIR
STEADY GREEN/ STEADY IR	CLEARED FOR T/O	CLEARED TO LAND
FLASHING GREEN/ FLASHING IR	CLEARED TO TAXI	RETURN FOR LANDING
STEADY RED/ LEFT TO RIGHT IR	STOP	GIVE WAY; CONTINUE CIRCLING
FLASHING RED/ SIDEWAYS FIGURE 8 IR	TAXI CLEAR OF RWY; RWY IN USE	AIRPORT UNSAFE; DO NOT LAND
FLASHING WHITE/ UP AND DOWN IR	RETURN TO STARTING POINT ON AIRFIELD	N/A

Table 9-1 Light Gun Signals

9005. **TACTICAL INSTRUMENT APPROACH.** In any operation of substantial duration that involves the employment of MMT Terminal NAVAIDS, the MMT will assume responsibility for the development of terminal instrument approach procedures.

1. TACTICAL EMERGENCY. This procedure should be used only under extreme emergency conditions, where time restrictions prevent a normal site survey and flight check prior to use.

a. If no published approach procedures are available, the mission briefing shall include a written description for approach procedures.

b. If necessary, the MMT transmits a complete verbal description of the desired approach procedures to the approaching aircraft.

2. TACTICAL NON-SURVEYED. When time constraints prevent a pre-siting survey, approach procedures will be developed from maps, charts, photos, or any other available information. MMT NAVAID equipment will be site surveyed by the MMT and checked during VFR conditions by any available tactical aircraft, but preferably by a KC-130, for safety.

3. TACTICAL SURVEYED. When time and the situation permit, MMT personnel in accordance with existing siting criteria will conduct a pre-siting survey. During VFR conditions, it will be checked for operational and safety by an available tactical aircraft. In this case, the MMT NAVAID system will be considered "tactical surveyed" and cleared for use by the ACE

Commander who has tactical responsibility of the aircraft that will fly the approach in accordance with published minimums.

9006. **TACTICAL NON-RADAR APPROACH CONTROL.** MMTs may be tasked to conduct non-radar terminal approach control operations at specific tactical airfields. This capability offers the ACE more planning flexibility since the flow of aircraft will be affected by low ceiling conditions.

1. OPERATIONAL PROCEDURES. The aircrews, MMT and other air control agencies involved in the operation must have copies of the approach procedures. These procedures must include holding, letdown, and missed approach and departure procedures. MMTs will effect control of this airspace in accordance with applicable manuals. Use of vehicle mounted radios, if available, will be used as a primary means of communication and personnel carried radios as an alternate means of communication. MMTs can also incorporate the use/interface with CATF control agencies, i.e. E-2C, TACRON, HDC etc.

2. RESPONSIBILITY. In all exercise instances, aircraft shall be controlled in a manner, which is in keeping with provisions of applicable ATC directives, orders, handbooks and manuals.

a. When a MACCS radar unit is the controlling agency for military aircraft in airspace outside assigned MMT terminal control airspace; a procedures agreement will be established for transfer of control points or holding areas.

b. When an air traffic control agency is to provide separation between enroute, arrival and departure aircraft, a standard procedure will be agreed upon for transferring control of aircraft between agencies involved. Aircraft arriving at the same holding fixes or approach fix will have separation assured prior to being released to control of the MMT.

c. When no air control agency other than the MMT exists, the mission planners ensure each aircraft is provided an IMC enroute altitude prior to departure from the originating airfield. When possible, an altitude may be assigned by the MMT controlling at the destination airfield through the agency controlling the departure airfield.

d. The MMT at the destination airfield ensures that controllers are available to provide IMC control. All radio frequencies will be monitored during operational hours.

3. HANDOFFS. Tactical agencies in control of enroute air traffic will not relinquish control of aircraft until such time as the aircraft is in contact with the terminal area MMT. Where no enroute controlling agency exists, the aircraft will not enter the holding pattern airspace at its destination airfield until such time as it has established radio contact and received a clearance from the controlling MMT. Aircraft may proceed to the destination airfield holding pattern if weather conditions permit flight as specified under VMC. If unable to maintain VMC, aircraft will request Special VFR approach or return to the originating or alternate airfield.

4. TRAFFIC FLOW. Aircraft flow will normally be determined at unilateral or joint planning conferences. The size of the ramp (if available), runways, landing surface condition, weather and mission requirements will dictate the arrival flow at the destination airport.

9007. **SPECIAL VFR PROCEDURES.** Weather conditions may deteriorate to below VFR

minimums, but SVFR may be a preferable option to the MMT rather than non-radar approach control. This assures the commander a continuous and expeditious flow of air traffic even in severely reduced meteorological conditions.

1. OPERATIONAL PROCEDURES. The aircrews and the MMT must maintain a copy of the SVFR procedures for the control zones in which they are operating. These procedures must include visual reporting points, routes, maximum altitudes, known obstructions and any restrictions.

2. RESPONSIBILITY. Separation of all aircraft operating within the Class D airspace is the sole responsibility of the MMT. Visual separation rules may be applied, but only after the controller ensures adequate separation both before and after the application of the visual separation.

a. The MMT at the destination airfield ensures that controllers are available to provide SVFR control.

b. In all exercise instances, aircraft shall be controlled in a manner which is in keeping with provisions of applicable ATC directives, orders, handbooks and manuals.

9008. **AIRSPACE PLANNING.** The ACE staff, with the assistance of MACG representatives, will establish control points, approach procedures, departure procedures and transfer of control responsibilities between MMTs and other air control agencies involved. Due to numerous situations that will cause confusion in both tactical exercises as well as actual combat, these control points and deconfliction plans should always be developed and used by the MMT executing the mission regardless of the weather conditions expected.

1. CONTROL POINT DESIGNATION. Prior coordination must be effected between all control agencies to establish release points, control zones and other pertinent data. These procedures may be devised utilizing any combination of several types of NAVAIDS that are already in place, NAVAIDS tactically deployed by the MMT, GPS systems in the aircraft or visual reporting points. Full consideration needs to be given to procedures for control of airspace in all weather conditions.

2. MULTIPLE TERMINAL ENVIRONMENTS. Mission planning involving several tactical airfields must first consider procedures for each airfield separately, then in total to preclude overlap of controlled airspace, conflicting holding patterns and arrival/departure routes.

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CHAPTER TEN

COMMUNICATIONS

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COMMUNICATIONS

10000. **GENERAL.** Effective communications are required in every MMT operation. Even the most detailed brief cannot totally compensate for the absence of radio communication in allowing for responsiveness and flexibility in tactical missions. While there are situations in which strict radio silence is necessary, this can often be the exception in actual combat operations. However, the MMTs must train as often as possible in EMCON conditions in order to become less dependent on radio communications. With proper training, visual signals and brevity codes can be an effective and safe means of communication in training and combat operations.

10001. **EMISSION CONTROL (EMCON).** EMCON is a general term referring to the degree of restriction on electrical emissions of all types. The sources of these emissions from the MMT include radio communications and NAVAIDS. Communications can be limited with the use of brevity codes and visual signals. AN/TPN-30A NAVAID transmissions can be limited with the use of the service demand mode. Normally, radio silence will be maintained to deny the enemy any intelligence information and to prevent the enemy from using direction-finding equipment. Only those transmissions necessary for mission accomplishment should be made. Proper authentication procedures should be used to avoid enemy imitative deception.

10002. **CHATTERMARK PROCEDURES.** Chattermark is the sequential switching of frequencies employed to counter enemy jamming. This is usually used as a final option by aircraft when all other measures to avoid enemy jamming have proven ineffective. Chattermark procedures should be established in the operations brief if the enemy is known to have jamming capabilities.

10003. **ZIP LIP CONDITIONS.** Zip lip conditions can be found in various MAGTF Operations Plans. Some clarification is provided below:

1. ZIP LIP 1.

    a. Most stringent

    b. ALDIS Lamp signals used

    c. Mode IV squawk on aircraft only

2. ZIP LIP 2.

    a. Contact ground for taxi using MINCOM

    b. Contact tower for takeoff using MINCOM

3. ZIP LIP 3.

    a. Standard communications procedures

10004. **COMMUNICATIONS EQUIPMENT.**

1. PRC-104. The PRC-104 is a manpacked HF radio used primarily for long range communications and facilitates interoperability with other agencies involved in the operation in addition to other ATC units. The KY-99 is used to provide communications security for this radio.

2. PRC-113. The PRC-113 radio is an UHF/VHF-AM capable radio used as the primary means of communications and control of all aircraft within the airspace. Additionally, the radio has a HAVE QUICK frequency hopping capability that provides Electronic Protection to prevent enemy detection and jamming. KY-57s are used to provide communications security for this radio.

3. PRC-119. The PRC-119 is a VHF-FM radio. The PRC-119 is used as an alternate means of communication with aircraft under MMTs control, as well as a means of short-range communications between the MMT and other ground units supporting the operation. This radio activates the ACR L-32 runway lights when used with a remote dialer unit. The PRC-119 also has internal frequency hopping capabilities as well as internal communications security.

4. PRC-117F. The PRC-117F is a VHF-UHF radio. This radio will become the primary means of communication with aircraft under MMT control and control of ACR L-32 lights. This radio will serve as a means of short range ground communications with other ground units. This radio has embedded crypto capabilities with frequency hopping, single channel and HAVE Quick I/II.

5. There are various hand-held radios that can be utilized for communication in and around the airfield.

6. Equipment changes are a constant within the communications spectrum. This SOP provides basic information for the current communication systems utilized today. It is imperative that the Team Leader and members are proficient with current communications equipment to effectively complete their mission and ensure safety of flight.

10005. **EQUIPMENT PREPARATIONS.**

1. ASSIGNMENTS. Due to the extensive communications requirements of MMT operations, most missions will require nearly every team member to carry at least one radio and its corresponding communications security equipment, if required. Equipment assignments will be made in the warning order. All members assigned radios are responsible for loading two sets of spare batteries and a water-resistant bag for all communications equipment assigned.

2. FREQUENCIES. Those team members designated in the warning order for being responsible for communications equipment will acquire the mission Aviation Communications Electronic Operation Instruction (ACEOI) and preset all frequencies. Once all frequencies are preset, communications checks will be accomplished to ensure proper operation of each radio and corresponding communications security equipment. Final inspections just prior to the time of departure will also include communications checks. The following is a list of standard frequencies to be preset to the UHF/VHF radios:

a. PST 1 - UHF GUARD

b. PST 2 - VHF GUARD

c. PST 3 - MMT PRIMARY

d. PST 4 - MMT SECONDARY

10006. **MMT COMMUNICATIONS CHART**

EQUIPMENT TYPE	BAND	EMISSION	FREQUENCY RANGE(MHz)	POWER OUT	FREQ HOPPING	EMBEDDED CRYPTO
AN/PRC-104	HF	AM	2.0-29.9999	20 watts	NO	NO
AN/PRC-138	HF VHF	AM FM	1.6-29.9999 30-59.9999	1.5/20 watts	ALE (1)	NO
AN/PRC-113	VHF UHF	AM AM	116-149.975 225-399.975	2/10 watts	HAVEQUICK	NO (3)
AN/PRC-119	VHF	FM	30-87.975	.4/1.5/4.5 watts	SINCGARS	YES
AN/PRC-117F	VHF UHF SATCOM	AM/FM	30-224.9999 225-512 243.0-270.0 292.0-318.0	1/10 watts 1/10 watts 2/20 watts 2/20 watts	SINCGARS HAVEQUICK	YES
PSC-5 DAMA Capable	VHF LOS UHF LOS UHF SATCOM	FM AM	30-87.975 108-173.975 225-399.975	9 watts 5 watts 18 watts	NO	YES (2)

Notes (1) ALE – Automatic Link Establishment
(2) DAMA – Demand Assigned Multiple Access
(3) PRC-113 must get TOD for HaveQuick operations from another radio; will not accept time from a PSN-11 (PLGR)

10007. **FIELD EXPEDIENT ANTENNAS**

1. Field expedient antennas are a viable means for HF communications in an austere environment. MMT leaders and members should be able to construct these antennas when needed. Procedures for this can be found in the Joint Spectrum Center Field Antenna Handbook JSC-HDBK-98-091.

CHAPTER ELEVEN

ELECTRONIC WARFARE

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ELECTRONIC WARFARE

11000. **GENERAL.** MMT members must become familiar with the electronic warfare capabilities of enemy forces in order to minimize their effect on MMT operations. It is expected an enemy would employ signal intercept, direction finding, deception, jamming and meaconing as component parts of an integrated electronic warfare plan. Threat forces will attempt to monitor, disrupt and locate friendly command, control and communications. The unrestricted use of communications will not be possible in a sophisticated threat environment. MMT members must be well versed in the use of Electronic Protection (EP) capabilities of their equipment in order to guarantee success on the modern battlefield.

11001. **SIGNALS INTELLIGENCE.** The enemy will employ forces within the combined arms framework with the specific mission of intercepting and analyzing friendly communications for intelligence purposes. Threat forces consider SIGINT a primary source of intelligence gathering. Through pattern analysis, traffic analysis and message content, threat forces are able to determine the opposing force structure, capabilities and intentions. Mobile Teams must be aware their transmissions are being monitored and analyzed and therefore train to meet the threat.

11002. **DIRECTION FINDING.** This is the technique of determining the location of an emitter by intersecting on a map, lines of bearing determined by two or more receiving stations. Emitters located in this manner are targeted for destruction. The following techniques will reduce the risk of intercept and direction finding:

1. Limit transmissions to those required for mission accomplishment

2. Use brevity codes whenever possible

3. Use frequency agile radios

11003. **DECEPTION.** Communications deception is used by hostile radio electronic combat units to gather intelligence and to confuse and disrupt friendly C3. There are two categories of deception; manipulative and imitative. Manipulative deception consists of the insertion of erroneous information to a communications net to cause an enemy to act based on false information. Imitative deception is the active participation of an unauthorized station in the communications net with the intention of eliciting information concerning capabilities, disposition, strength or intentions. The primary means of countering the deception threat is by use of authentication. When a communicator suspects an unauthorized station has entered the net, the communicator shall require that station to authenticate. If that station is unable to authenticate, it shall be identified to all other stations on the net using the term GINGERBREAD.

11004. **JAMMING.** Jamming is the use of portions of the electromagnetic spectrum by an enemy to deny friendly forces the use of their own communications networks. Not all radio interference is jamming. Jamming effectiveness is dependent upon radiated power, distance and frequency band. Three types of jamming are currently employed by threat forces; spot, barrage and sweep. Spot jamming concentrates the radiated power of the jammer on a specific narrow frequency band, permitting effectiveness up to relatively large distances. Barrage

jamming spreads the radiated power over a wide band of frequencies, thus increasing coverage but decreasing effective range. Sweep jamming combines the two concepts by jamming only one frequency at a given instant but sweeping so rapidly through the frequency band that it is highly effective when the station being jammed does not realize it. If the enemy is unaware of our communications, it is unlikely he will utilize his equipment "in the blind." When a controller believes he is being jammed, he should first check his equipment for internal malfunction. Care must be taken to prevent disclosing to the enemy the effectiveness of his efforts. The following protection measures should be employed if jamming is suspected or confirmed:

1. CONTINUE TO OPERATE. Even though an annoying signal is being experienced, the controller should continue to operate as long as communications can be maintained. Do not acknowledge the presence of the disturbing signal for it will indicate to the enemy that his jamming is effective. When operating with COMSEC equipment, do not immediately assume that the crypto gear is malfunctioning. Enemy jamming efforts may be concentrated around forcing friendly forces to operate on uncovered nets. **When able complete and submit a MIJI report about the incident. (See Appendix I)**

2. RAPID BURST TRANSMISSION. Jamming is often not continuous because the enemy "looks through" his jamming to determine whether a station is still transmitting. Brief messages may be transmitted during these gaps.

3. PARALLEL CIRCUIT. Many times the station that the controller is attempting to contact will monitor several nets to which the team has access. By use of these parallel circuits, the team may pass its traffic around the jammed net.

4. VISUAL SIGNALS. Use of signals to send messages represents an effective method of circumventing jamming.

5. HAVE QUICK AND FREQUENCY HOPPING. HAVE QUICK operations are one of the most effective means of allowing maximum communications with a minimum chance of jamming and detection. Even the most effective jamming systems in use today are not effective against proper HAVE QUICK operations.

11005. **AUTHENTICATION.** The most effective technique for defeating imitative communications deception is to perform authentication. The alphanumeric cipher systems most often used for encryption and authentication is the AKAC 1662 or 874. The following general guidelines for use of authentication are provided:

1. Authenticate whenever a net is initially established.

2. Authenticate whenever daily call signs and frequencies are changed.

3. Authenticate whenever a bogus station is suspected.

4. Authenticate whenever important tactical instructions or commands are transmitted.

5. Authenticate whenever information of high intelligence value is requested or transmitted.

6. Do not authenticate after every transmission.

7. Do not authenticate on a secure circuit unless you suspect intrusion or interference.

8. Be suspicious of long delays and authenticate again if a station delays in excess of thirty seconds.

9. Never use the same authentication combination twice.

10. AUTHENTICATION PROCEDURES. The following are examples of authentication procedures.

a. Two Way Authentication. First a challenge consists of two letters randomly selected. The first letter would be found on the set indicator column (far left) and the second letter would be found on the same line to the right of the first letter. The reply to the challenge is the code letter found directly under the second letter of the challenge. If there is no line under the challenge letters, go back to the top of the chart and use the first line.

EXAMPLE:	B	MHU	DFR	SIO	PKJ
	C	GYT	KLO	NBV	AWS

Gator this is Sumo, over.
Sumo this is Gator, authenticate "BP," over.
Gator this is Sumo, I authenticate "A," over.
Sumo this is Gator, roger, go ahead.

Both stations will then place a line through the "A" on line "C" so that the same combination will not be used again.

b. TRIAD Airborne Matrix System. This system is used for airborne and air to ground authentication. The ACEOI that pilots carry on their kneeboards requires the Alpha authentication. When challenging aircraft select a three-letter combination beginning with the letter A. The authentication just adds one more step as outlined above beginning on the Alpha line. The airborne matrix and the standard matrix are designed to work together so to reply if you have a ground ACEOI disregard the A and use the next two letters as described above.

c. One Way Authentication. The reverse side of the AKAC is used for agencies utilizing one way authentication. These are used when an agency is providing information for more than one agency and urgency does not allow every station on the net to call back. A station will state a two-letter authentication code followed by the two minute time period in minutes. First find the two-minute window of the current time in the left column. Next locate the column of the current time and read across to confirm the letter authentication.

EXAMPLE: Bandits seven miles north of the objective, I authenticate "CM," time now 08 past.

DAY 01	**0900**	**1000**	**1100**
02	AK	BC	CJ
04	GH	UT	IT
06	OR	EO	TP
08	RI	CM	QP
10	CM	WP	KG

11006. **ENCRYPTION.** When it is necessary to transmit messages containing unit locations, injury reports or other information that could aid the enemy, the numbers must be changed to code before transmission. To encrypt numbers, first select a "set indicator". The set indicator will consist of two letters randomly selected to identify the actual line, which will be used to encrypt the numbers. The following is an example of encryption procedures. Two letters will be selected at random and used to determine the line, which will be used to encrypt the numbers, known as the set line. The set line is determined in a similar process as authentication, but instead of reading the letter immediately under the second letter, the set line letter will be immediately to the right of the second letter. You will then use any one of the letters in the groups of three under the appropriate numbers that are located at the top in the reading guides. The following rules apply:

1. Never encrypt more than 15 digits on one set line.

2. Never encrypt and say in the clear what it means.

3. Add zeros occasionally to confuse the enemy (i.e. encrypt 5 KIA's as 005).

4. Use the acronym "READ" in remembering encryption procedures (Right Encrypt, Authenticate Down).

EXAMPLE:	0	1	2	3
A	SDF	GHJ	ERT	IOP
B	REF	CML	PQN	ZTO
C	XRD	IYM	ERG	OAH

Sumo this is Gator, I set "CO."
Sumo this is Gator, I shackle "G, E, I, S," unshackle.

NOTE: The encrypted numbers were 1230.

11007. **BEADWINDOW.** Beadwindow is the term used to indicate essential elements of friendly information are being transmitted.

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CHAPTER TWELVE

OVERLAND INSERTIONS

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OVERLAND INSERTIONS

12000. **GENERAL.** Although overland insertion is among the least desirable means of insertion for the MMTs, it can still be a viable and effective means for a successful mission. MMTs must be intimately familiar with ground movement techniques in order to accomplish those missions that demand it. This chapter describes patrol techniques and immediate actions accepted by Marine Corps doctrine in the event that the MMT is attached to a larger unit. However, due to the small size and limited firepower of the MMTs, break contact situations should be initiated on every clash with enemy forces. This will allow the team to proceed with the mission with minimal losses.

12001. **PREPARATION FOR MOVEMENT.**

1. MAP RECONNAISSANCE. The team leader will make a thorough map reconnaissance of the terrain over which the team will be required to move. Consider the terrain in relation to all available information on the threat as well as friendly forces. You should conduct your map evaluation from the enemy point of view. Aerial photo reconnaissance or aerial reconnaissance should be conducted if available.

2. ROUTE SELECTION. Routes should be selected taking the following into consideration:

a. Cover and Concealment. Cover and concealment are desirable but a route with these characteristics may also present obstacles to movement. The desirability of these features must be weighed against the requirements for speed of movement. Terrain that provides cover and concealment to a moving unit also provides the enemy with ample ambush sites.

b. Observation and fields of fire. The team leader must consider a route, which offers the appropriate balance between fields of fire and cover and concealment. This will effect your decisions about formations, rate of movement and method of control.

c. Key terrain. Key terrain includes features that have a controlling effect on the surrounding terrain. The team leader must plan around these pieces of key terrain in order to avoid being compromised or engaged by the enemy.

d. Rally Points. Establish non-consecutively numbered rally points along the route in order to provide areas to reassemble and reorganize the team if dispersed during movement, to reconnoiter the objective area or for exiting and entering friendly lines. Rally points will be easily locatable areas that can provide good cover and concealment for re-assembly of the team. The team leader using the appropriate hand and arm signal will designate these points during movement.

3. INTELLIGENCE. As in all situations, the team leader needs to thoroughly consider the threat. All available intelligence information is collected and considered before the patrol departs. Concentrate on known, suspected, and likely enemy positions.

4. COMMUNICATIONS. The team leader will need to plan his means of communication with other units involved in the operation. Additionally, lines of communications between with the

higher headquarters, supported, and supporting agencies need to be considered.

5. FIRE SUPPORT. All available supporting arms should be considered and coordinated to deliver fires in support of the operation. Special attention should be paid to key terrain and danger areas along the route.

12002. **MOVEMENT.**

1. FORMATIONS. The column formation will be used as standard for MMTs. Although this formation lacks sufficient combat power to reduce an ambush to its front or rear, it greatly facilitates speed, control and effective immediate actions to break contact from several situations. The order of formation for a six-man team will be point man, navigator, team leader, radio operator, assistant team leader and rear security. This standard file formation will count personnel starting from the rear and go forward (i.e. the point man is number six and the rear security man is, as always, number one).

2. SECURITY. Security is maintained through the organization for movement and every man keeping alert at all times. The following general rules apply for security in movement:

a. Point man provides 180 degree security to the front

b. Rear security man provides 180 degree security to the rear

c. Navigator provides aerial security

d. Even numbers provide right security

e. Odd numbers provide left security

f. Weapons will always be pointed in the direction of responsibility

g. Security halts will be made in numerous situations, such as when team members need to confer, check maps, reconnoiter a route, listen for enemy movement or arrive at a danger area. When the signal "HALT" is passed, all team members will pass the signal and take two steps towards their area of responsibility, odd to the left and even to the right, and take a knee. While providing 360 degree security, the team members must still maintain sight of his teammates to his front and rear in order to receive and pass any signals. Longer security halts may be required at which time the team leader will pass the "GET DOWN" signal and all personnel will assume a prone position.

3. AVOID DETECTION. Patrols must move with stealth and exploit cover and concealment. Move when visibility is reduced and use the noise of the environment to cover your movement. Make irregular stops so that you can detect any enemy attempting to infiltrate or locate your patrol. Use hand and arm signals and communicate vocally only when absolutely necessary. Hand and arm signals should be used that only require one hand and are below the head.

4. MAINTAIN CONTACT. Maintain visual contact with the team members to your front and rear at all times. Team members should continually look to the team leader and other team members for hand and arm signals or other instructions.

12003. **DANGER AREAS.** Danger areas are those areas that will increase the team's chances of detection if crossed. All danger areas will be avoided at all costs. As the point man encounters a danger area, he will stop the patrol by passing the "HALT" and "DANGER AREA" signals. The team leader will then evaluate the situation and determine which of the following actions to take. A head count will be conducted after crossing any danger area.

1. OPEN AREAS/CROSS COMPARTMENT. When large open areas cannot be avoided, the team leader will pass the "LINE FORMATION" signal and all personnel will transition to a line formation to provide flank security for crossing the danger area. The team leader will designate the near side as a rally point and instruct the point man and navigator to conduct a box shaped reconnaissance of the far side, large enough to fit the entire patrol. Once the far side is determined safe enough to cross the team, the point man will take position at the head of the reconnoitered area while the navigator will signal for the remainder of the team to cross. The team leader will then signal for the team to cross the area in a line formation and transition to the file formation upon reaching the far side. The far side of the danger area will be designated as a rally point. The team will then move a safe distance away from the danger area, conduct a head count and listen for any enemy that may be following.

2. LINEAR. The team will deal with linear danger areas in a similar manner. All procedures are the same until just after the reconnaissance of the far side. When the signal to cross is received on the near side of the danger area, the team members will cross one at a time following the same path as the point man. As each member reaches the other side, they will assume the far side covering position and tap the member he is replacing who will then take his place in the normal file formation on the far side. This process will continue until all team members cross the danger area. The far side will be designated a rally point. The team will then move a safe distance away from the danger area, conduct a head count and listen for any enemy that may be following.

3. In given situations, these methods of crossing danger areas may not be suitable. Other options are available such as crossing on line, by two man elements, successive bounds or bounding overwatch. The team leader will always decide which option is most suitable for the situation.

12004. **IMMEDIATE ACTIONS.** Immediate action drills are designed to provide an aggressive and violent reaction to enemy contact. They are simple courses of action in which all men are so well trained that their reaction to all types of enemy contact are instinctive and require no thought on the part of the team members.

1. GENERAL RULES. The following general guidelines should be followed in conducting immediate actions:

a. The twelve o'clock position is always the original direction of movement of the patrol.

b. When instructions to halt are issued, take two steps outboard and take a knee facing in the direction of security responsibility - this will be known as a "cigar" shaped formation.

c. Always pass visual and verbal commands to ensure all personnel have seen or heard them.

d. Always roll prior to moving in break contact situations.

e. Always use hand and arm signals unless detected by the enemy.

f. Always conduct a head count after executing any immediate actions.

2. CHANCE CONTACT. Used when any team member sights the enemy not directly approaching the patrol and believes the enemy has not sighted the team. That patrol member will immediately signal "FREEZE." All team members will halt in place and remain motionless and quiet until receiving further instructions. The enemy will be allowed to pass unless the enemy sees a team member. Any team member seen by the enemy will quickly aim in and open fire and initiate a break contact situation.

3. HASTY AMBUSH. This immediate action is used as a defensive measure for the MMTs when enemy personnel are sighted approaching the patrol directly and it is believed that the enemy has not sighted the team. This can also be used as an offensive measure, but will not be done so by an MMT acting alone. The team member sighting the enemy in this instance will signal "ENEMY IN SIGHT" followed by the team leader signaling "HASTY AMBUSH" and indicate a direction. The team will move quickly into a line formation in the direction indicated and establish an effective firing position. The team will remain in this position, motionless, until the enemy has passed. If the enemy detects the patrol or if it is an offensive measure, the team leader, or the first person realizing detection, will initiate the ambush by opening fire and shouting "FIRE."

4. AIR OBSERVATION. When an enemy or unidentified aircraft which could detect the patrol is heard or observed, the signal "FREEZE" will be passed. If time is available, the signal "TAKE COVER" will be passed by the team leader and each patrol member will take the nearest available cover. Every team member will freeze in that position until further instructions are issued.

5. AIR ATTACKS. When an aircraft has detected the patrol and has begun an attack, the teams only choice is to take cover and return fire. The team leader will shout "AIR ATTACK" followed by the clock direction of the aircraft from the patrols movement. The team will immediately move into a line formation perpendicular to the heading of the aircraft, lay on their backs and fire into the air providing a wall of lead through which the aircraft must fly. Fire should lead helicopters by 100 meters and jet aircraft by 300 meters.

6. CONTACT FRONT/REAR. Any contact situations to the front and rear of the patrol will be handled by using an "Australian Peel" to break contact. Upon receiving enemy fire from the front, the team member detecting the enemy will shout "CONTACT FRONT." All team members will immediately move to the flanks and assume a prone firing position aiming at the enemy position. The point man or forward most surviving member will fire a burst into the enemy position, then turn outboard and run to a point behind the rear security man. Successively, from front to rear, each member will roll, rise and run to the rear of the team position. Even numbers will turn to the right and odd numbers to the left. The team members' movement will be covered by the fire of the members now at the head of the formation. This process will continue until the team leader issues further instructions. A contact rear situation is handled the same way, but all team members will first take two steps outboard and assume a prone firing position in the six

o'clock direction and the peel will begin with the rear security man. Remember that in a contact rear situation, the left/right side of the patrol refers to the original direction of movement.

7. CONTACT LEFT/RIGHT. Breaking contact is once again desired when encountering the enemy on the flanks. When enemy fire is received from the left or right, the team member detecting the enemy position will shout "CONTACT LEFT" or "CONTACT RIGHT." If "CONTACT LEFT" is shouted, all odd numbered personnel will immediately take a prone firing position towards the enemy. Their fire will protect the movement of the even numbered personnel who will immediately move fifteen meters to the right of the formation, take a prone position to cover the movement of the odd numbered personnel and shout "MOVE" to indicate when to begin moving. The odd numbered personnel will then move fifteen meters beyond the even numbers and repeat the same process until the team leader issues further instructions. The same procedure is used for contact right situations, but the even numbered personnel will provide cover fire first while the odd numbered personnel move to break contact.

8. NEAR AMBUSH. In a near ambush, the team would be caught in a kill zone of heavily concentrated fire at close range. There is little time or space for team members to maneuver or seek cover. Any team member will shout "NEAR AMBUSH" followed by the clock position of the ambush. Team members caught in the kill zone will immediately take a prone position and fire directly into the enemy ambush site. Team members not caught in the kill zone will take covered positions and expend as much ordnance as possible into the enemy position. Violence of action in this case is the only means of escape. Turn the enemy's attention away from the ambush by making a rapid egress with the maximum firepower available.

9. INDIRECT FIRE. After receiving indirect fire, the team leader will shout a clock position and distance to move that leads the patrol 180 degrees away from the fire. For example, if indirect fire impacts at the patrol's three o'clock, the team leader will shout "NINE O'CLOCK, 100 METERS." The team will then immediately run 100 meters to the nine o'clock position, take cover, and await further instructions from the team leader.

CHAPTER THIRTEEN

HELICOPTER OPERATIONS

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HELICOPTER OPERATIONS

13000. **GENERAL.** Helicopterborne forces will be used during amphibious assaults and subsequent operations ashore to achieve shock and surprise over enemy forces. MMTs will be attached to a ground combat unit whose mission is to seize and secure areas suitable for TLZ operations. MMTs should be inserted at the earliest possible time in order to allow proper set-up time.

13001. **PRE-LOADING PROCEDURES.** Marines departing from an HLZ will assemble at a designated rally point. Personnel scheduled to debark the amphibious ships by helicopter will assemble in a designated location, such as the berthing compartment, with all required equipment. Upon notification of their assigned helicopter serial number over the IC, heliteams will move to the Troop Acclimatization Room or Hanger Deck as directed. Personnel will remain in their sticks unless the stick or team leader grants a Marine permission to leave. The following considerations should be taken prior to embarkation:

1. Place all short antennas on radios.

2. Unbuckle 782 gear and open flack jacket for easy removal in the event of a crash.

3. Life Preservers (LPPs) will be worn.

4. Collect embark cards (Appendix J) and leave them with the combat cargo personnel or other embark representative when loading.

5. Secure helmet and hearing protection.

6. Test fire weapons (if able).

7. Conduct last minute inspections.

13002. **LOADING PROCEDURES.** Helicopter serials will be called to the front of the hanger bay and will be met by the helicopter control team members. The sticks will then be lead to the helicopters on deck and the team leader should ensure that they are loading the proper aircraft by tail number. When loading the aircraft:

1. Only approach the aircraft on the crew chief's instructions and from an angle at which he can see you.

2. The team/stick leader will lead the team/stick to the aircraft followed immediately by the assistant team/stick leader.

3. Ensure you have a complete safe weapon. When boarding a CH-53 or CH-46 invert weapons before embarking. If embarking on a UH-1N keep muzzle pointed up.

4. The assistant team leader will count the Marines loading by physically tapping each Marine as he boards and give the team leader two thumbs up when all have been counted aboard. The

team leader will then give the aircraft crew chief a thumbs up.

5. Load the aircraft rapidly in tactical formation order (i.e. point man first, navigator second, etc.) with the exception of the team and assistant team leaders; team members will be seated with even numbers left, odd on the right.

6. Remove packs and buckle seat belts; give the stick leader two thumbs up when ready for takeoff.

7. Stick/Team leader will be seated at the right front seat with an ICS cranial; before strapping-in, hand the pilot an LZ slate (Tab 10) to insure insertion into proper LZ; it is the responsibility of the team leader to be inserted in the proper LZ.

13003. **DEBARK PROCEDURES.**

1. Stick leader will coordinate with aircrew for a two minute and one minute warning and ensure the helicopter lands in the appropriate LZ as well as obtain an initial heading for the team.

2. Two minute warning will be passed by the stick leader verbally and visually with an "UNBUCKLE" hand signal; all stick members will repeat both signals and remove LPPs, close flak jacket, buckle 782 gear, unbuckle seat belts, and don packs.

3. One minute warning will be passed verbally and visually with a "LOCK AND LOAD" hand signal; all stick members will repeat both signals and load and charge their weapons keeping the muzzle down.

4. When the ramp is lowered, the assistant stick leader will be the first off the aircraft and physically count stick members coming off; stick will immediately offload in reverse formation order.

5. Establish a standard cigar shaped formation and be ready to react to hostile fire in the zone via immediate actions or to move to briefed locations immediately.

13004. **ACTIONS IN A HOT LZ.** Every effort will be made to avoid a hot LZ. However, if the mission warrants a debarkation in a hot LZ, the stick leader will pass the “HOT LZ” hand signal. Team members will exit the helo as fast as possible and establish a standard cigar shaped formation. This allows for rapid response through immediate actions to any threatening force in the LZ and provides a break contact situation.

13005. **NAVIGATION.** It is absolutely essential that all mobile team members be able to navigate while airborne. The inherent speed of heliborne movement makes such navigation difficult and requires constant training. Prior to each heliborne movement, leaders must have executed the following:

1. Determine present location.

2. Know primary and alternate LZ.

3. Execute map and photo recon of the route and LZs.

4. Locate key terrain features or landmarks to assist in your navigation (i.e. lighthouses, towers, etc).

13006. **COMMUNICATIONS.** During helicopter movement it is essential that the team leader be able to communicate with the crew of the aircraft. The inherent noise involved in the helicopter makes verbal communication impractical and unreliable. Accordingly, each team leader will use the following means to ensure positive and reliable communications during flight:

1. Stick leader will identify himself immediately upon boarding the aircraft and don the ICS cranial, and conduct an ICS check.

2. Stick leader will use a laminated LZ slate to communicate with the aircrew.

3. Any additional information that needs to be passed to the team or pilots can be done on the blank side of the slate; team members can also ask questions using the same slate and pass them back to the stick leader; for effective use of this slate at night, a blue or green chemlite and alcohol pen/grease pencil should be used.

APPENDIX A

INDIVIDUAL PREDEPLOYMENT CHECKLIST FOR MARINES

Do all my dependents (over 10) have valid ID cards?

Do my dependents have access to sufficient funds should my deployment extend for any length of time?

Do my dependents know the location of important documents such as wills, POA's, Insurance Policies, rental agreements, etc?

Do my dependents know the name and phone number of the command's family readiness officer?

Have I verified that my RED and SGLI are current?

Do I have a valid and serviceable ID card, weapons card, meal card and two sets of ID tags?

Is my shot record current?

Are my dental (class 1 or 2) and medical records current?

Do I have a current will?

Do I have a current Power of Attorney?

Do I have adequate access to funds for the duration of the deployment?

Am I on direct deposit?

Am I prepared to deploy at any time on short notice.

Signature_____ Date_____

APPENDIX A

TEAM LEADER'S PREDEPLOYMENT CHECKLIST

1. **Administrative**.

a. Have requirements for ADCON of Admin support of the MMT been determined?

b. Has the command best suited to provide the identified support been determined and the tasking request initiated?

c. Has a formal DEFAP request been forwarded and received by the appropriate command?

d. Have TAD/Field orders on detachment Marines been generated?

e. Have meal cards been issued to the MMT?

f. Have the team members not on direct deposit made arrangements for their paycheck while deployed?

g. Have SRBs/OQRs, Health and Dental records been received, secured and prepared for transfer?

h. Has each Marine been counseled on creating a will or Power of Attorney?

i. Does each Marine have accurate ID tags and ID card?

j. Do all team members meet the deployment time frame, reference their EAS or RTD?

k. Does the squadron have accurate REDs and current addresses and phone numbers of dependents?

l. Do any dependents require new ID cards?

m. Have medical and dental records been screened and required work completed?

n. Are mail handling procedures understood by all and have all team members made arrangements for the handling of their mail?

o. Have administrative supplies been identified and packed?

p. Has a detachment roster been developed?

q. Have all personnel eligible for FSA been identified? (FSA can only be filed upon completion of TAD on Form NAVCOMPT OCR 3057)

r. Do all team members have adequate security clearances?

s. Has necessary paperwork been completed to receive classified material or equipment? Have appropriate storage areas been located?

2. **Operations**.

a. Have necessary maps, charts and surveys been secured for the deployment?

b. Has photo imagery been requested?

c. Have required security and deployment briefs been conducted for all team members?

d. Has a written or verbal tasking been received with a specific mission?

e. Has a deployment file with separate message correspondence sections been established?

f. Has a Letter of Instruction been drafted? (Ref FMFM 3-1)

g. Have ATC Letters of Agreement been drafted?

h. Has duration of deployment been identified?

i. Has the team been identified by name?

j. Has the threat in terms of ground, air and EA been identified? Defense units considered?

k. Have external communications support been identified and secured?

l. Have deployment training objectives that parallel and reference pertinent paragraphs of MCO 3500.14, MCWP 3-25.8 and MCCRES been documented?

m. Have MACCS agencies been briefed on MMT procedures and communications links?

n. Have MMT briefings for senior commanders and other users been coordinated and conducted?

o. Have operations summary and equipment status reports been designed?

p. Have all frequency requirements been identified and coordinated through the Communications and Electronics Officer?

q. Are all required publications, sectionals and maps on-hand and current?

3. **Logistics and Supply**.

a. Have POL requirements been requested and established procedures for resupply been identified?

b. Has supply been notified of MRE requirements?

c. Have arrangements for messing during all phases of the deployment been identified, requested and secured?

d. Have arrangements for the resupply of water been identified, requested and secured?

e. Have Motor Transport requirements been identified and support commitments requested including fuel requirements?

f. Have all squadron vehicles and drivers been prepared for employment? (SOFA stamps)

g. Have requests for appropriation data as well as procedures for the continuing fiscal requirements of the detachment (Green dollars) been submitted?

h. Have all sea and airlift support requests been completed and support commitments secured?

i. Has billeting been coordinated and secured?

j. Have heads and showers been secured?

k. Has weapons storage been arranged at the deployment area?

l. Have SERV-MART requirements been purchased?

m. Do all team members have required individual equipment?

n. Has TAP gear been requested and a pick-up date assigned?

o. Has all equipment been Op checked?

4. **Communications and Electronics.**

a. Have required frequencies been requested?

b. Has the Contingency Support Package (CSP) been requested?

c. Have all special funding (Blue dollars), supply and technician support requirements been identified and support commitments received?

APPENDIX B

EQUIPMENT CHECKLIST

ITEM
AS-2259 ANTENNA
AN/PRC-104 RADIO
AN/PRC-113 RADIO
AN/PRC-117F RADIO
AN/PRC-119 RADIO
KOI-18
KYK-13
CYZ-10
SOFTWARE (KY-57)
SOFTWARE (PRC-119)
KY-57 WITH CABLES
BATTERY CASE Z-AIJ
BATTERY CASE Z-AKG
DRAFTING SET
CAMO SCREEN SUPPORT
CSS WWT, SCATTER WOODLAND
WATER CANS
M1038 HMMWV
AN/PVS-7 NVG
AN/TPN-30A
GEN SET MEP-015/531
TPN-30 ACCESSORY BOX
TPN-30 CABLES, VEHICLE POWER SOURCE
AN/PPN-19
PLGR GPS
WD-1/TT COMM WIRE
TELEPHONE SET TA-312
CAN, GAS MILITARY
COMPASS LENSATIC
PANEL MARKERS VS-17/GVX
SPOUT, CAN, FLEXIBLE
ANEMOMETER
M22 FIELD BINOCULARS
LIGHT GUN
ACR L-32RCL FIELD MARKER LIGHTS
CC-1 REMOTE CODE CONTROLLER
RED DOMES
GREEN DOMES
SPARE BULBS
WHITE DOMES
IR DOMES
KITS MARKER, IR LIGHT ASSEMBLY
ROCK SALT
MOTOR OIL

ITEM
DEXTRON II
2 LB HAMMER
MOSQUITO NETTING
SAND BAGS
"AAA" BATTERIES (REMOTE CODE CONT.)
BA-1372 BATTERIES (KY-57,KOI-18,KYK-13)
BA-3030 BATTERIES-"D" CELL (TA-312, LIGHT GUN)
BA-3090 BATTERIES-9V TRANS (PEANUT LIGHTS)
BA-5567/1567 ALT BATTERIES (NVG)
BA-5590 BATTERIES (PRC-104, 113, 117F, 119)
BA-5598/4386 BATTERIES (ACR L-32RCL)
CHEM LIGHTS IR
CHEM LIGHTS RED
CHEM LIGHTS GREEN
CHEM LIGHTS HIGH INTENSITY WHITE
CHEM LIGHTS BLUE
CHEM LIGHTS YELLOW
CHEM LIGHTS ORANGE
100 MI/HR TAPE
ELECTRICAL TAPE
550 TEST CORD
TRASH BAGS
TAPE MEASURE
PADS OF PAPER
PENS
PENCILS
GREASE PENCILS
MARKERS
GREEN LOG BOOKS
FOLDERS
BLANK DASH 2 FORMS
EMBARKATION TAGS
5.56 AMMUNITION
9MM AMMUNITION
RATIONS

APPENDIX B

SUPPLY EQUIPMENT REQUEST LIST

TAMCN	QNTY	NOMENCLATURE
B0510	1	DRAFTING SET
D4260	4	CAMO SCREEN SUPPORT
C4261	4	CSS WWT, SCATTER WOODLAND
C4436	10	WATER CANS
C5430	1	FILING CABINET
E1151	3	AN/PVS-7 NVG
H2105	5	WD-1/TT (ROLLS)
H2443	4	TELEPHONE SET TA-312
HL858	1	PLGR GPS
K4128	4	CAN, MILITARY GAS
K4665	36	PANEL MARKERS VS-17/GVX
K4895	1	SPOUT, CAN, FLEXIBLE
N/R	1	MOSQUITO NETTING (PER TEAM MEMBER)
N/R	32	ACR L-32 FIELD MARKER LIGHTS
N/R	32	ACR L-32RC REMOTE CONTROL UNITS
N/R	2	REMOTE DIALERS
N/R	50	ROCK SALT (LBS)
N/R	6	DEXTRON II (QT)
N/R	12	MOTOR OIL (QT)
N/R	2	ANEMOMETER
N/R	1	LIGHT GUN
N/R	8	CHEM LIGHTS, RED (BOXES)
N/R	2	BLUE
N/R	8	HIGH INTENSITY WHITE
N/R	8	GREEN
N/R	2	ORANGE
N/R	2	YELLOW
N/R	75	IR CHEMLIGHTS

APPENDIX B

TEMP LOAN REQUEST ITEMS

TAMCN	QNTY	NOMENCLATURE
A2044	2	AS-2259 ANTENNA
A2065	2	AN/PRC-104 RADIOS
A2069	2	AN/PRC-113 RADIOS
	2	AN/PRC-117F RADIOS
A2070	2	AN/PRC-119 RADIOS
	6	MX-360 RADIOS
A8024	1	KOI-18
A8025	2	KYK-13
	1	CYZ-10
A8031	2	KY-57 WITH CABLES
A8050	2	BATTERY CASE Z-AIJ
A8071	2	BATTERY CASE Z-AKG
	2	AN/GRA-39

APPENDIX B

S-4 EQUIPMENT REQUEST LIST

TAMCN	QNTY	NOMENCLATURE
D1158	1	M1038 HMMWV
E0050	1	BAYONET (PER TEAM MEMBER PVT - SGT)
E1250	1	PISTOL 9MM (PER SNCO/OFFICER)
E1441	1	RIFLE, M16A2, 5.56MM (PER TEAM MEMBER PVT -SGT)
K4222	4	COMPASS, LENSATIC
N6001	2	M22 FIELD BINOCULARS

APPENDIX B

C & E EQUIPMENT REQUEST LIST

TAMCN	QNTY	NOMENCLATURE
F0615	2	AN/TPN-30A
F0016	1	GEN SET MEP-015
F0018	1	TPN-30 ACCESSORY KIT
N/R	2	TPN-30 CABLES-VEHILCE POWER SOURCE

APPENDIX C

RAPID PLANNING TIMELINE

TIME	TEAM PLANNING GUIDELINE
R+00	1. Team leader receives Warning Order. 2. Team leader develops course of action.
R+30	1. Team leader issues warning order to team.
R+40	1. Team prepares personal equipment. 2. Team leader conducts airspace planning.
R+1:00	1. Team members complete planning checklists. 2. Team leader coordinates with ground units.
R+2:00	1. Team packs all equipment. 2. Team leader briefs supported aviation units.
R+3:00	1. Mission order issued to team
R+4:00	1. Team inspections. 2. Team rehearsals. 3. Team leader attends confirmation brief.
R+5:00	1. Issue ammunition. 2. Test fire weapons. 3. Conduct final inspections. 4. Conduct final communications checks. 5. Camouflage. 6. Chow if able. 7. Prepare for departure.
R+6:00	1. Load aircraft.

TIMELINE REPRESENTS A GUIDELINE FOR AN MMT DEPLOYED WITH A MEU

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APPENDIX D

MISSION BRIEFS AND CHECKLISTS

TEAM WARNING ORDER (SAMPLE)

WARNING ORDER 1 to OPORD XXXXXXX
References:
Time Zone Used:

1. **SITUATION.**

   a. Enemy Forces.
      (1) Disposition, composition, and strength.
      (2) Enemy COA.

   b. Friendly Forces.
      (1) Higher, lower, and adjacent.

2. **MISSION**.

   a. General description of mission for MMT as gleaned from the commanders intent and possible courses of action.

   b. Assignment of tasks for team members.

3. **EXECUTION**.

   a. Intent: The key tasks to be accomplished.
      (1) Concept of operation.
      (2) Maneuver:

         a. Team leader initial concept

      (3) Coordinating instructions.

         a. Timeline: Additional Warning Orders
         Team Brief
         Team Rehearsal
         Team Final Rehearsal
         Departure

4. **ADMIN AND LOGISTICS**. To be published.

5. **COMMAND AND SIGNAL**. To be published.

APPENDIX D

TEAM LEADER MISSION CHECKLIST

- DEVELOP COURSES OF ACTION

- ISSUE WARNING ORDER

- COORDINATE WITH GCE FOR BOAT SPACES ON ASSAULT FORCE

- DEVELOP CONTROL PROCEDURES - CPs, IPs, TRAFFIC PATTERNS

- COORDINATE AIRSPACE WITH OTHER AIR CONTROL AGENCIES

- DEVELOP DECONFILICTION PLAN FOR ALL A/C EXPECTED IN OPERATION

- DEVELOP HANDOFF PROCEDURES

- ISSUE PILOT BRIEFING

- DEVELOP EXECUTION CHECKLIST

- COORDINATE FIRE SUPPORT

APPENDIX D

ADMINISTRATION AND INTELLIGENCE MISSION CHECKLIST

- DEVELOP TEAM MANIFEST AND SUBMIT TO APPROPRIATE PERSON

- DEVELOP RFI's AND SUBMIT TO S-2

- COLLECT ALL MAPS, AERIAL PHOTOS AND SURVEYS

- TERP APPROACHES IF NECESSARY

- COLLECT ALL PERTINENT ATC PUBLICATIONS NEEDED

- PREPARE ALL ADMINISTRATIVE ITEMS

- OBTAIN LANDING FORCE CHALLENGE AND PASSWORDS

- OBTAIN LANDING FORCE E & E PLAN

- OBTAIN WEATHER DATA

APPENDIX D

OPERATIONS MISSION CHECKLIST

- SET-UP AND TEAR-DOWN PLAN

- ROUTE PLANNING

- INDIVIDUAL EQUIPMENT ASSIGNMENTS

- INDIVIDUAL DUTY ASSIGNMENTS

- BUILD TERRAIN MODEL OR DIAGRAM

APPENDIX D

LOGISTICS MISSION CHECKLIST

- COORDINATE AMMUNITION ISSUE

- COORDINATE FOR WATER/CHOW

- COORDINATE FOR FUEL ISSUE (VEHICLES AND GENERATOR)

- OP CHECK VEHICLES

- DEVISE LOAD PLAN FOR PERSONNEL AND EQUIPMENT

- COORDINATE FOR WEAPONS PICKUP

- COORDINATE RESUPPLY WITH APPROPRIATE PERSONNEL

APPENDIX D

SUPPLY MISSION CHECKLIST

- OP CHECK AND PREPARE LIGHTS
- OP CHECK AND PREPARE NVG's
- SET ASIDE SANDBAGS
- SET ASIDE IR MARKING KITS
- SET ASIDE HAMMERS
- SET ASIDE BINOCULARS
- SET ASIDE PANELS
- SET ASIDE ANEMOMETER
- PACK CAMOUFLAGE NETTING AND POLES
- OP CHECK AND PROGRAM GPS
- OP CHECK LIGHT GUN

APPENDIX D

COMMUNICATIONS AND ELECTRONICS MISSION CHECKLIST

- OBTAIN LANDING FORCE CEOI

- PRESET AND OP CHECK ALL RADIOS

- OBTAIN KEYS FOR AND FILL KY EQUIPMENT

- CUT ANTENNA WIRES

- OP CHECK FIELD PHONES

- SET ASIDE RESISTORS AND GROUNDING STAKES

- OP CHECK AND PRESET ALL NAVAIDS

APPENDIX D

MISSION BRIEF

1. **ORIENTATION** -

PRESENT LOCATION
KEY TERRAIN
VEGETATION
CONTROL MEASURES -
- ASSEMBLY AREA
- LINE OF DEPARTURE
- INSERTION TARGET
- ROUTE OF MARCH
- CHECK POINTS (GROUND)
- OBJECTIVE RALLY POINT
- OBJECTIVE
- LIMIT OF ADVANCE
- EXTRACTION RALLY POINT

WEATHER - ENROUTE
OBJECTIVE

2. **SITUATION** –

ENEMY (SALUTE/DRAW-D)
FRIENDLY (HASS)
- ATTACHMENTS AND DETACHMENTS

ESCAPE AND EVASION PROCEDURES -
- SAFE AREAS
- CONTACTS
- SAR PROCEDURES

3. **MISSION** - WHO, WHAT, WHERE, WHEN AND WHY

4. **EXECUTION** -

COMMANDER'S INTENT
HIGHER COMMANDER'S INTENT
CONCEPT OF OPERATIONS
SCHEME OF MANEUVER
FIRE SUPPORT AVAILABLE
TASKS -
- ENROUTE
- OBJECTIVE
- EXTRACTION

COORDINATING INSTRUCTIONS -
- TIME OF DEPARTURE
- INSERTION TIME
- TIME IN OBJECTIVE AREA

TIME AZ OPERATIONAL
ROUTE AND RALLY POINTS INITIAL FORMATIONS
ACTIONS AT DANGER AREAS
ACTIONS ON ENEMY CONTACT
PRIORITY OF WORKS AT OBJECTIVE
MOPP LEVEL
% ALERT IN DARKNESS

ATC PROCEDURES -
RUNWAY IN USE ASSAULT ZONE MARKINGS TRAFFIC PATTERNS
CONTROL POINTS
APPROACH PROCEDURES
MISSED APPROACH PROCEDURES
DEPARTURE PROCEDURES SVFR PROCEDURES
NAVAIDS
TERPS MINIMA
HOLDING POINTS
OBSTACLES
EMERGENCY PROCEDURES

5. **ADMINISTRATION AND LOGISTICS** –

MAPS, PHOTOS AND SURVEYS
UNIFORM
INDIVIDUAL EQUIPMENT
AMMUNITION
CHOW
FUEL
RESUPPLY AND WHEN
KIA
WIA
EPW

6. **COMMAND AND SIGNAL** –

MISSION COMMANDER
TEAM LEADER
ASSISTANT TEAM LEADER
CHALLENGE AND PASSWORDS
VISUAL SIGNALS
COMMUNICATIONS -
NETS AND FREQUENCIES
NAVAIDS CHANNELS AND FREQUENCIES
COMMUNICATIONS SECURITY

7. **EXECUTION CHECKLIST** -

APPENDIX D

PILOT'S MISSION BRIEF

1. **ORIENTATION** -

   OBJECTIVE
   CONTROL POINTS

2. **SITUATION** -

   ENEMY
   FRIENDLY
   E & E PROCEDURES
   SAR PROCEDURES

3. **MISSION** -

4. **EXECUTION** -

   MISSION COMMANDER'S INTENT
   CONCEPT OF OPERATIONS
   TASKS
   COORDINATING INSTRUCTIONS
   ETD
   TOT
   C130 ON STATION
   TLZ OPERATIONAL
   DURATION OF OPERATION
   ATC PROCEDURES
      RUNWAY IN USE
      TLZ MARKINGS
      APPROACH PROCEDURES
      MISSED APPROACH PROCEDURES
      DEPARTURE PROCEDURES SVFR PROCEDURES
   NAVAIDS -
      PLACEMENT AND CHANNELS
         HOLDING POINTS
         INGRESS POINTS
         OBSTACLES
   EMERGENCY PROCEDURES

5. **ADMINISTRATION AND LOGISTICS** -

   MAPS
   C130 CONFIGURATION
   FUEL REQUIREMENTS

6. **COMMAND AND SIGNAL** -

MISSION COMMANDER
POINT OF CONTACT AND HOW TO CONTACT
MMT SIGNALS
FREQUENCIES
CALLSIGNS
COMMUNICATIONS SECURITY
CHALLENGE AND PASSWORD

7. **EXECUTION CHECKLIST** -

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APPENDIX E

TLZ PLANNING CHECKLIST

1. **TLZ LOCATION** -

   PRIMARY
   ALTERNATE

2. **INTELLIGENCE** -

   PHOTO RECONNAISSANCE
   SATTELITE IMAGERY
   TOPOGRAPHIC SUPPORT
   LZ SURVEY
   SURFACE TYPE
   TRAFFIC AREAS
   CLEAR ZONES
   CLEAR AREAS
   APPROACH ZONES
   PROMINENT TERRAIN FEATURES
   OBSTACLES
   ARM/DE-ARM AREAS

3. **OPERATIONS** -

   EXPECTED OPERATIONS TEMPO
   DURATION OF OPERATIONS
   CONTROLLING AGENCY AND LOCATION
   DAY OR NIGHT OPERATIONS
   NAVAIDS

4. **THREAT CONSIDERATION** -

   GROUND THREAT
   AIR THREAT
   AIR DEFENSE

5. **BASE DEFENSE ZONE** -

   GROUND SECURITY
   AIR DEFENSE
   RULES OF ENGAGEMENT

6. **LOGISTICS** -

   ACCESSIBILITY FOR LOGISTICAL SUPPORT
   EMBARKATION
   FOOD AND WATER

FUEL AND LUBRICANTS RESUPPLY
MEDICAL
ENGINEER SUPPORT
AMMUNITION
ORDNANCE
TRASH

7. **COMMUNICATIONS** -

NETS
FREQUENCIES
CALL SIGNS
CODEWORDS
EMCON
ENCRYPTION
VISUAL SIGNALS
LAME DUCK PROCEDURES

8. **CONTROL PROCEDURES** -

CONTROLLING AGENCY AND LOCATION
ADJACENT CONTROLLING AGENCIES
HANDOFF PROCEDURES
CONTROL POINTS
INGRESS AND EGRESS ROUTES
APPROACH, MISSED APPROACH AND DEPARTURE PROCEDURES
SVFR PROCEDURES
TRAFFIC PATTERN
RUNWAY IN USE
AIRFIELD MARKING PATTERN
DIVERT/LAUNCH AUTHORITY
LOADING POINTS
STAGING AREAS

9. **WITHDRAWAL PROCEDURES** -

DELIBERATE
HASTY
E & E PLAN

10. **EMERGENCY PROCEDURES** -

MEDICAL
CRASH FIRE RESCUE

APPENDIX E

TRAINING AIRFIELD CRITERIA

	C-5	C-141A	C-141B	C-130
1. **RUNWAY** -				
LENGTH	6000	6000	6000	3500
WIDTH	147	100	100	60
WIDTH (180 TURN)	150	105	137	74
SHOULDER	20	10	10	10
CLEAR AREA	105	100	100	35
LATERAL SAFETY ZONE	96	75	75	75
LATERAL SAFETY ZONE SLOPE	7:1 (ALL CATEGORIES)			
2. **RUNWAY CLEAR ZONE** -				
LENGTH	500	500	500	500
WIDTH INNER	397	320	320	150
WIDTH OUTER	2500	2500	2500	2500
3. **RUNWAY APPROACH ZONE** -				
LENGTH	32000	32000	32000	10500
WIDTH INNER	750	500	500	500
WIDTH OUTER	2500	2500	2500	2500
GLIDE SLOPE	50:1	50:1	50:1	35:1
4. **TURNAROUNDS** -				
LENGTH	260	181	232	UNK
WIDTH	151	105	137	74
SHOULDER	20	10	10	10
5. **OVERRUNS** -				
LENGTH	500	500	500	300
WIDTH	147	100	100	60
6. **TAXIWAY** -				
RWY C/L TO TAXIWAY EDGE	350	350	246	UNK
WIDTH	75	60	60	30
TURN RADIUS	100	75	75	70
CLEAR AREA	135	75	75	70

	C-5	C-141A	C-141B	C-130
7. **PARKING APRONS** -				
APRON EDGE TO FIXED OBJECT	135	100	100	65

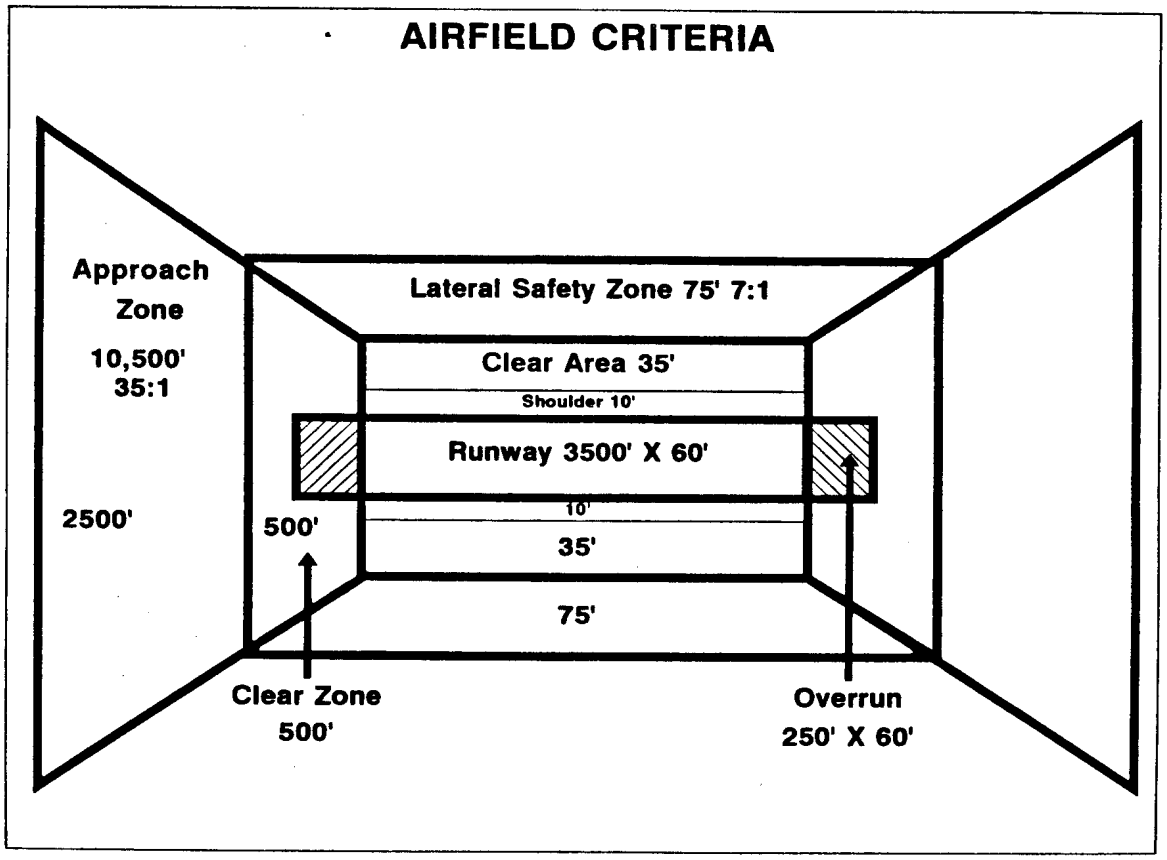
APPENDIX E

COMBAT AIRFIELD CRITERIA

	C-5	C-141A	C-141B	C-130
1. **RUNWAY** -				
LENGTH	5000	5000	5000	3000
WIDTH	90	90	90	60
SHOULDER	20	10	10	10
CLEAR AREA 105	90	90	35	
LATERAL SAFETY ZONE	96	75	75	60
LATERAL SAFETY ZONE SLOPE	7:1 (ALL CATEGORIES)			
2. **RUNWAY CLEAR ZONE** -				
LENGTH	500	500	500	500
WIDTH INNER	333	272	272	150
WIDTH OUTER	750	500	225	225
3. **RUNWAY APPROACH ZONE** -				
LENGTH	32000	10000	10000	5280
WIDTH INNER	750	500	500	225
WIDTH OUTER	2500	2500	2500	2000
GLIDE SLOPE	35:1 (ALL CATEGORIES)			
4. **TURNAROUNDS** -				
LENGTH	260	181	232	UNK
WIDTH	151	105	137	UNK
SHOULDER	20	10	10	10
5. **OVERRUNS** -				
LENGTH	500	500	500	100
WIDTH	90	90	90	60

6. **TAXIWAYS** -

WIDTH	60	50	50	30
TURN RADIUS	100	75	75	70
CLEAR AREA	135	75	75	65



RUT DEPTH	AIRCRAFT LOADING	NUMBER OF LANDINGS & TAKE OFFS
0.00”	EMPTY	100
0.10”	EMPTY	10 (UP TO 100 W/RISK)
0.25”	EMPTY	1
0.00”	FULL (155,000 lb.)	10
0.10”	FULL (155,000 lb.)	0

TYPE A/C	LENGTH	NO OF TURNS	WIDTH 180 deg TURN	3 PT TURN
C-130	3000' 3500' normal	60 ft	60 ft	50 ft 60 ft normal
C-141	6000 ft	98 ft	138 ft	N/A
C-5	6000 ft	150 ft	150 ft	N/A
C-17	3000' 3500' normal	90 ft	132 ft	80 ft 90 ft normal

DISTANCE FROM INNER EDGE TO OUTER EDGE OF THE LATERAL SAFETY ZONE	MAXIMUM HEIGHT ALLOWED FOR OBSTACLES
7 feet	1 foot
14 feet	2 feet
21 feet	3 feet
28 feet	4 feet
35 feet	5 feet
42 feet	6 feet
49 feet	7 feet
56 feet	8 feet
63 feet	9 feet
70 feet	10 feet
75 feet	10 feet, 8.5 inches

DISTANCE FROM INNER EDGE TO OUTER EDGE OF THE APPROACH ZONE	MAXIMUM HEIGHT ALLOWED FOR OBSTACLES
0 feet	14 feet, 3.5 inches
375 feet	25 feet
1075 feet	45 feet
1775 feet	65 feet
2475 feet	85 feet
3175 feet	105 feet
3875 feet	125 feet
4575 feet	145 feet
5275 feet	165 feet
5975 feet	185 feet
6675 feet	205 feet
7375 feet	225 feet
8075 feet	245 feet
8775 feet	265 feet
9475 feet	285 feet
10175 feet	305 feet
10500 feet	314 ft, 3.5 inches

APPENDIX E

TLZ PILOT BRIEF

1. LOCATION (PRIMARY AND ALTERNATE)
2. TIME ESTABLISHED AND DURATION
3. CONTROL POINTS
4. INGRESS AND EGRESS ROUTES
5. APPROACH, MISSED APPROACH AND DEPARTURE PROCEDURES
6. SVFR PROCEDURES
7. TLZ HEADINGS AND MARKINGS
8. OBSTACLES
9. NAVAIDS
10. MMT LOCATION
11. FREQUENCIES, CALLSIGNS, VISUAL SIGNALS AND BREVITY CODES
12. EMERGENCIES

APPENDIX E

NIGHT TLZ BRIEF SHEET

TLZ LOCATION:

GENERAL DESCRIPTION:

TIME ESTABLISHED:

MAP:

OBSTACLES:

NAVAIDS:

FREQ: PRIMARY:
ALTERNATE:
CTAF:

CALL SIGNS:
AIRCRAFT:
MMT:

ADJACENT UNITS:

T

APPENDIX E

DAY TLZ BRIEF SHEET

TLZ LOCATION:

GENERAL DESCRIPTION:

TIME ESTABLISHED:

MAP:

OBSTACLES:

NAVAIDS:

FREQ: PRIMARY:
ALTERNATE:
CTAF:

CALL SIGNS:
AIRCRAFT:
MMT:

ADJACENT UNITS:

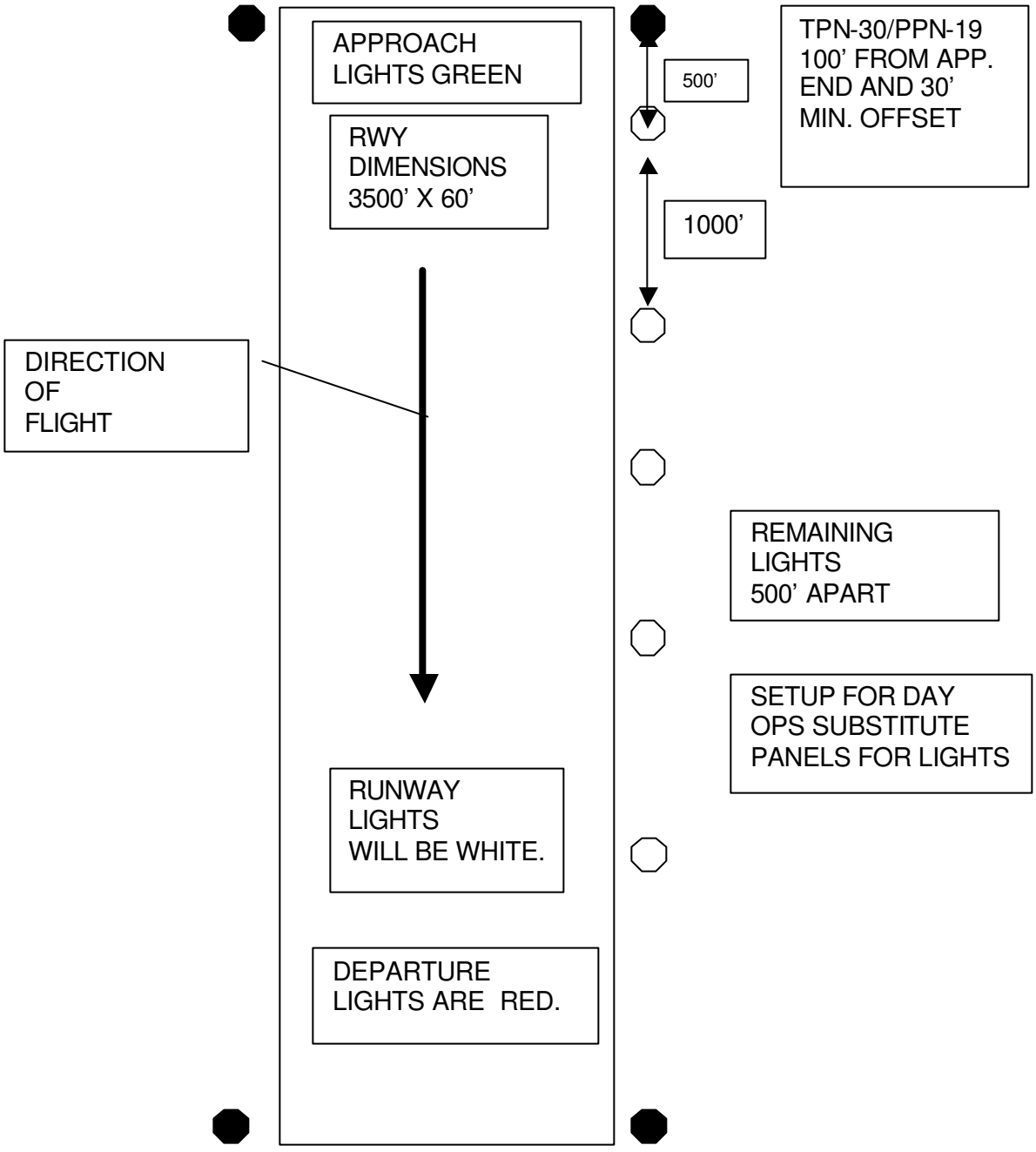
APPENDIX E

TLZ EXECUTION CHECKLIST (EXAMPLE)

LINE#	EVENT	NET	FROM	TO	CODE	TIME
1	MMT AT AIR SITE		MMT		HOOSIERS	
2	C130 ON STATION		C130	MMT	FALCONS	
3	C130 BEGIN APPROACH		MMT	C130	TARHEELS	
4	TLZ LIGHTS ON		C130	MMT	RAZORBACKS	
5	C130 ON DECK		MMT		SPARTANS	
6	C130 RDY FOR DEP		C130	MMT	BADGERS	
7	MMT RDY FOR EXTRACT		MMT		VOLUNTEERS	
8	MISSION COMPLETE		MMT		SOONERS	
9						
10						
11						
12						
13						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33	ALTERNATE PLAN				CAVALIERS	
34	LZ HOT				DEVILS	
35	TIME LINE CHANGE				SEIKO (+/-)	

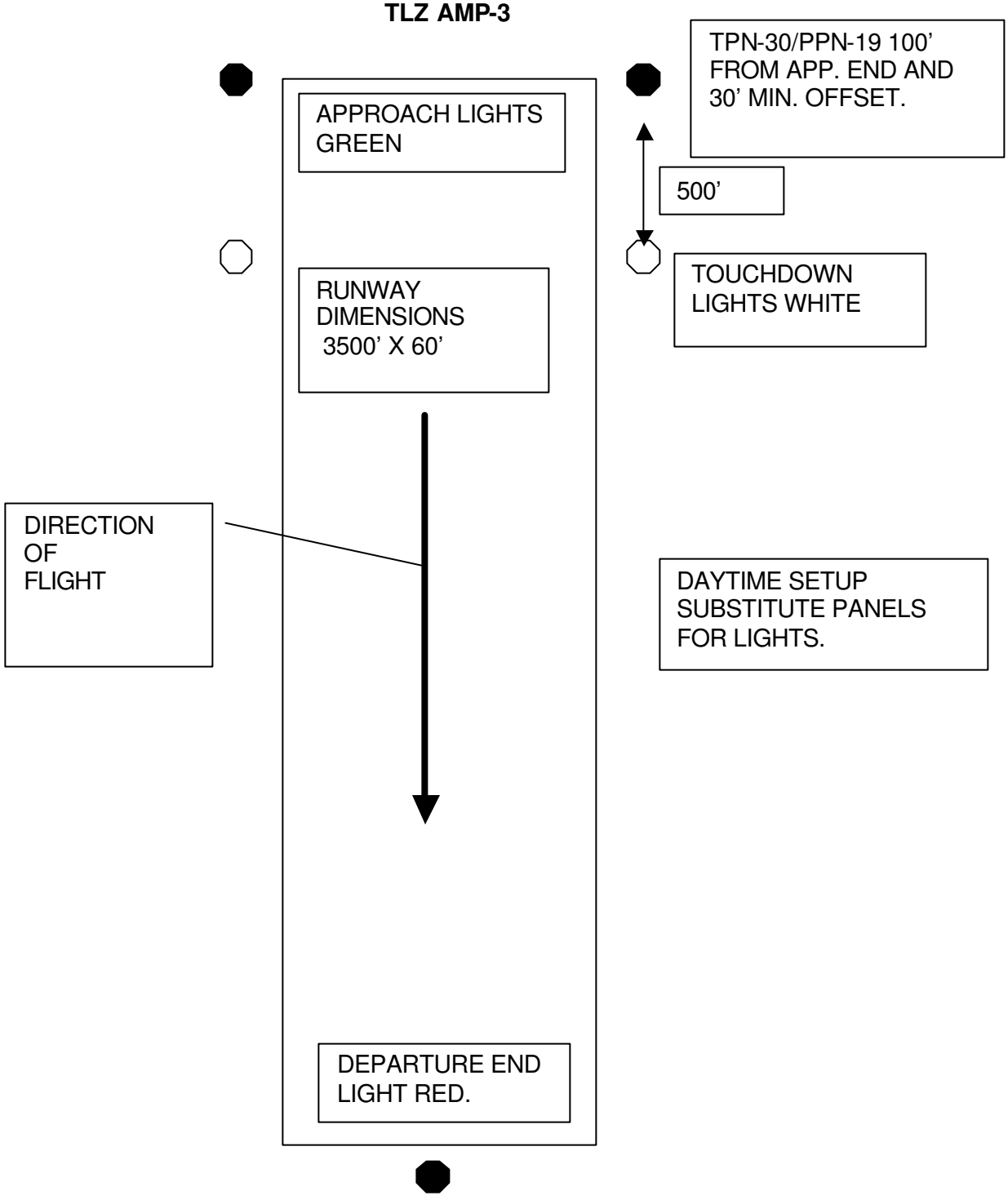
APPENDIX E

TLZ AMP-2



APPENDIX E

TLZ AMP-3



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APPENDIX F

HLZ PLANNING CHECKLIST

1. **LOCATION** -

   PRIMARY
   ALTERNATE

2. **INTELLIGENCE** -

   PHOTO RECONNAISSANCE
   SIZE
   SLOPE
   SURFACE TYPE AND MATERIAL
   PROMINENT TERRAIN FEATURES
   OBSTRUCTIONS AND HEIGHTS

3. **OPERATIONS** -

   TYPE AND NUMBER OF AIRCRAFT
   LANDING POINT SPACING
   TRAFFIC AND WAVE-OFF PATTERNS

   DURATION OF OPERATIONS
   CONTROL AGENCY AND LOCATION
   DAY OR NIGHT
   MARKING AIDS AND PATTERNS
   INGRESS/EGRESS ROUTES
   CONTROL POINTS
   SVFR PROCEDURES
   DECONFILICTION PLAN

4. **THREAT** -

   GROUND
   AIR
   AIR DEFENSE

5. **BASE DEFENSE ZONE** -

   GROUND
   AIR DEFENSE
   RULES OF ENGAGEMENT

6. **COMMUNICATIONS** -

   NETS
   FREQUENCIES

CALLSIGNS
EMCON
ENCRYPTION
VISUAL SIGNALS

7. **EMERGENCY PROCEDURES** -

TRAP
CASEVAC

APPENDIX F

HLZ PILOT BRIEF

1. LOCATION (PRIMARY AND ALTERNATE)
2. TIME ESTABLISHED AND DURATION
3. CONTROL POINTS AND INGRESS POINTS
4. SITE HEADINGS AND MARKINGS
5. HLZ SIZE AND SURFACE MATERIAL
6. APPROACH/DEPARTURE CORRIDORS AND OBSTACLES
7. SVFR PROCEDURES
8. MMT LOCATION
9. FREQUENCIES, CALLSIGNS, VISUAL SIGNALS AND BREVITY CODES
10. EMERGENCY PROCEDURES

APPENDIX F

HLZ EXECUTION CHECKLIST
(EXAMPLE)

LINE#	EVENT	NET	FROM	TO	CODE	TIME
1	MMT AT AIR SITE		MMT		HOOSIERS	
2	HLZ ESTABLISHED		MMT		LONGHORNS	
3	HELOS MAKE APPROACH		MMT	HELOS	TARHEELS	
4	HELOS ON DECK		MMT		SPARTANS	
5	MMT RDY FOR EXTRACT		MMT		VOLUNTEERS	
6	MISSION COMPLETE		MMT		SOONERS	
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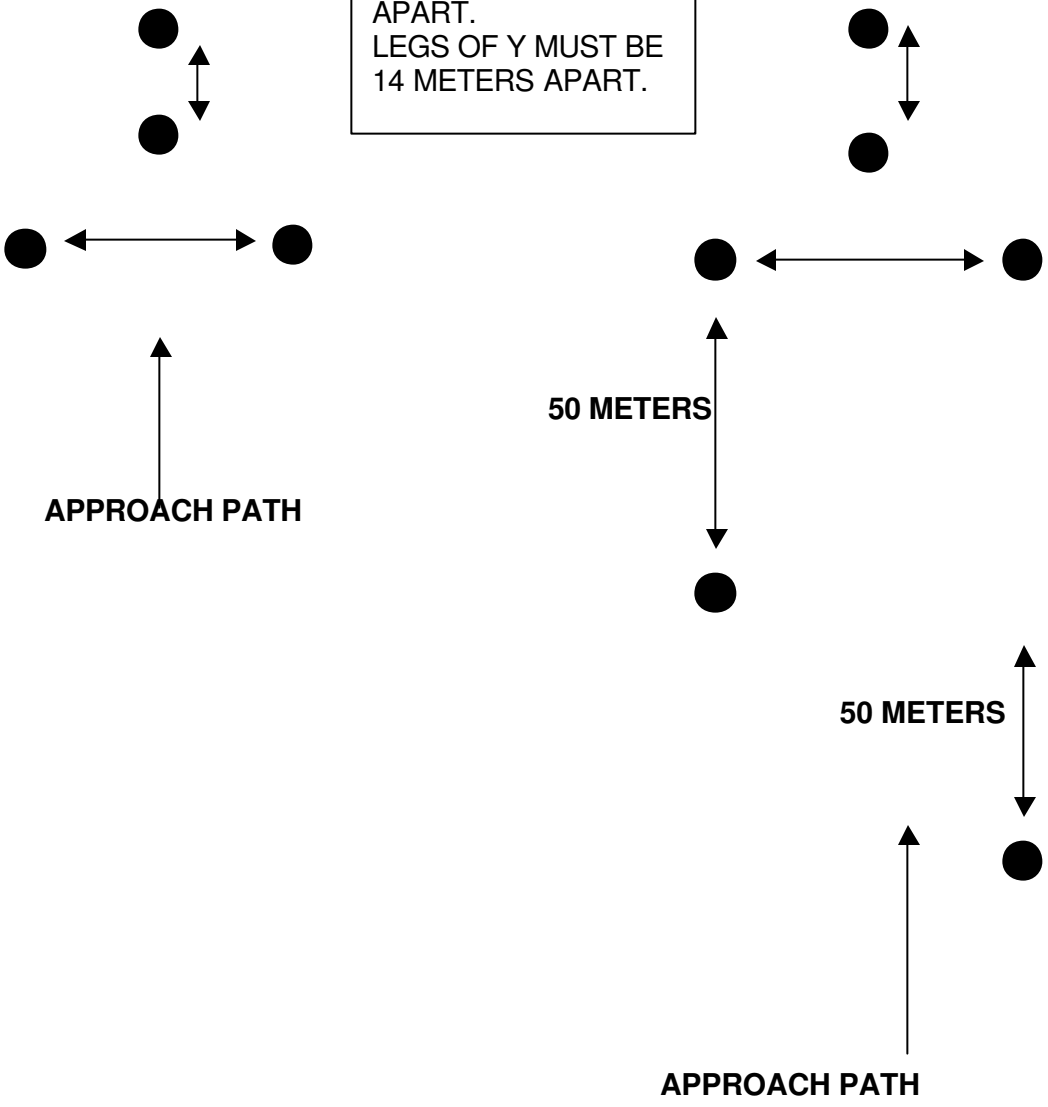
33	ALTERNATE PLAN				CAVALIERS	
34	LZ HOT				DEVILS	
35	TIME LINE CHANGE				SEIKO (+/-)	

APPENDIX F

NATO Y
SINGLE SHIP

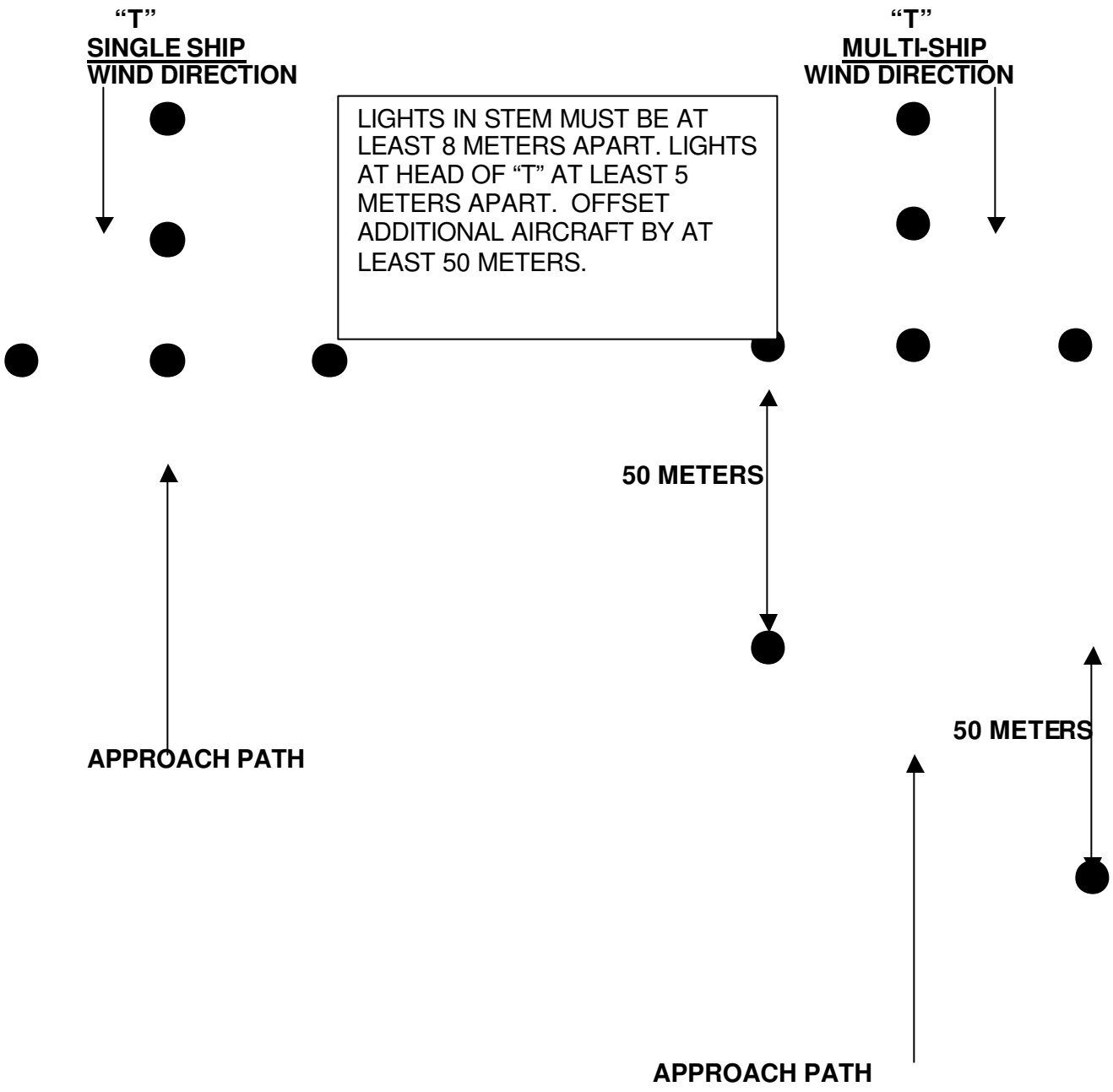
NATO Y
MULTI-SHIP

STEM SEGMENTS MUST BE 7 METERS APART.
LEGS OF Y MUST BE 14 METERS APART.



NOTE: SPECIFIC AIRCRAFT MAY REQUIRE LARGER DISTANCES BETWEEN LIGHTS OR MARKER PANELS. DIFFERENT SETUPS MAY BE USED WHEN MMT AND ACE ARE IN CONCURRENCE.

APPENDIX F



NOTE: SPECIFIC AIRCRAFT MAY REQUIRE LARGER DISTANCES BETWEEN LIGHTS OR MARKER PANELS. DIFFERENT SETUPS MAY BE USED WHEN MMT AND ACE ARE IN CONCURRENCE.

APPENDIX G

RGR PLANNING CHECKLIST

1. **LOCATION (PRIMARY/ALTERNATE)** -

   TLZ SURVEY INFORMATION
   COORDINATES
   AREA DESCRIPTION
   OBSTACLES
   ELEVATION
   SLOPE

2. **SET-UP** -

   NUMBER OF POINTS
   TYPE OF RGR
   GALLONS REQUIRED (OFFLOAD)
   PUMPING START/END TIME
   BREAKDOWN TIME
   RGR HEADING
   ZONE MARKINGS
   TRAFFIC AND WAVE-OFF PATTERNS
   PERSONNEL -
     MMT
     TAFDS
     ORDNANCE
     GROUND SECURITY
     AIR DEFENSE
   MMT LOCATION

3. **PRE-STAGING, POST-STAGING AND ARM/DE-ARM AREAS** -

   LOCATION OF EACH
   SPACING OF EACH
   MARKING OF EACH
   HEADING OF EACH
   LOCATION OF BUILT-UP ORDNANCE

4. **MOVEMENT AT RGR SITE** -

   NUMBER AND TYPE AIRCRAFT EXPECTED AND ETA
   PRIORITY OF AIRCRAFT
   PATTERN
   PROCEDURES -
     INGRESS POINTS
     APPROACH, MISSED APPROACH AND DEPARTURE
     SVFR
     STAGING AREAS

TROOP DEBARK/EMBARK
REFUELING POINTS
SCATTER PLAN

5. **GROUND BASED AIR DEFENSE** -

SET UP IN OR OUT OF ENGAGEMENT ZONE
LOCAL GROUND SECURITY
AIR DEFENSE

6. **COMMUNICATIONS** -

FREQUENCIES
CALLSIGNS
VISUAL SIGNALS

7. **EMERGENCIES** -

WAVE OFFS
FIRES
TRAP

8. **FUEL PLANNING GUIDE** -

a. JP-5 = 6.8 lbs. PER GALLON
b. JP-8 = 6.8 lbs. PER GALLON
c. AIRCRAFT CAPACITY -

AIRCRAFT	CAPACITY(lbs)	FUEL FLOW(lbs/hr)	TIME
CH-46	4,400	1,200	1+40
CH-53D	12,500	2,000	5+00
CH-53E	15,545	3,100	4+30
AH-1	2,100	850	2+15
UH-1	1,350	700	1+50
KC-130F TANKER	62,000	5,000	per hour airborne
CARGO	2,000	5,000	" "
KC-130R TANKER	75,000	5,000	" "
CARGO	60,000	5,000	" "

APPENDIX G

RGR PILOT BRIEF

1. LOCATION (PRIMARY AND ALTERNATE)
2. TIME ESTABLISHED AND DURATION
3. CONTROL POINTS
4. INGRESS AND EGRESS ROUTES
5. APPROACH, MISSED APPROACH AND DEPARTURE PROCEDURES
6. SVFR PROCEDURES
7. SITE LAYOUT, MARKINGS AND HEADINGS
8. PATTERNS AND MOVEMENT IN SITE
9. FUEL AND ORDNANCE AVAILABLE
10. FREQUENCIES, CALLSIGNS AND VISUAL SIGNALS
11. EMERGENCY PROCEDURES
12. RESTRICTIONS

APPENDIX G

RGR EXECUTION CHECKLIST (EXAMPLE)

#	EVENT	NET	FROM	TO	CODE	TIME
1	MMT AT AIR SITE		MMT		HOOSIERS	
2	HLZ ESTABLISHED		MMT		LONGHORNS	
3	HELOS MAKE APPROACH		MMT	HELOS	TARHEELS	
4	HELOS ON DECK		MMT		SPARTANS	
5	MMT RDY FOR EXTRACT		MMT		VOLUNTEERS	
6	MISSION COMPLETE		MMT		SOONERS	
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33	ALTERNATE PLAN				CAVALIERS	
34	LZ HOT				DEVILS	
35	TIME LINE CHANGE				SEIKO	

APPENDIX H

COMMUNICATIONS

PRC-104 INFORMATION

EQUIPMENT DATA

FREQUENCY RANGE	2 TO 29.9999 MHz
CHANNEL SPACING	100 Hz
MODULATION	AM
POWER OUTPUT	20 WATTS
ANTENNAS	10' MULTISECTION WHIP ANY HF ANTENNA
DISTANCE RANGE	10 Mi/16 Km W/10' WHIP CONDITION DEPENDENT
POWER SOURCE AND LIFE	TWO BA-5590 (3 DAYS)
OPERATING WEIGHT	17 LBS.

SET-UP AND OPERATING PROCEDURES

1. ENSURE THE RADIO IS SWITCHED OFF
2. INSTALL BATTERY
3. ATTACH REQUIRED ANTENNA
4. ATTACH THE HANDSET
5. SET THE FUNCTION SWITCH TO V/TR
6. SET THE MODE SWITCH TO USB
7. SET THE ANTENNA TO THE DESIRED POSITION
8. SELECT THE DESIRED FREQUENCY
9. SWITCH THE RADIO ON (DIAL LIGHT SHOULD COME ON)
10. PRESS AND RELEASE PTT SWITCH TO TUNE ANTENNA
11. ADJUST VOLUME CONTROL KNOB

TEST PROCEDURE

1. SET UP RADIO AS NORMAL
2. SELECT FREQUENCY TO 2221.2 KHz (USB)
3. PRESS AND RELEASE PTT SWITCH TO TUNE ANTENNA
4. TRANSMIT TO ANOTHER HF RADIO
5. CARRY OUT STEPS 1 TO 4 ON THE FOLLOWING FREQUENCIES:
   334.3 KHz (LSB) 6665.6 KHz (USB) 8889.8 KHz (LSB)
   15554.5 KHz (USB) 27778.7 KHz (LSB)
6. SELECT STANDARD TIME BROADCAST FREQUENCIES 5, 10, 15, 20, AND 25 MHz. ATTEMPT ALL TO GET THE BEST SIGNAL. MONITOR THE BEST SIGNAL AND SWITCH SIDEBANDS TO VERIFY THAT THE AUDIBLE SIGNAL DOES NOT CHANGE, INDICATING THE FREQUENCY ACCURACY OF THE RADIO IS WITHIN SPECIFICATION.

APPENDIX H

PRC-113 INFORMATION

EQUIPMENT DATA

FREQUENCY RANGE	116.000 TO 149.975 MHz (VHF) 225.000 TO 399.975 MHz (UHF)
CHANNEL SPACING	25 KHz
MODULATION	AM
POWER OUTPUT	2 WATTS (LOW POWER) 10 WATTS (HIGH POWER)
ANTENNAS	UHF/VHF COMBINED
DISTANCE RANGE	2 Mi/1.2 Km (LOW POWER) 10 Mi/16 Km (HIGH POWER)
POWER SOURCE AND LIFE	BA-5590 (24 HOURS)
OPERATING WEIGHT	14 LBS.
PRESET CHANNELS	8

SET-UP AND OPERATING PROCEDURES

1. ENSURE THE RADIO IS SWITCHED OFF
2. INSTALL BATTERY
3. ATTACH ANTENNA
4. ATTACH THE HANDSET
5. SWITCH THE RADIO ON
6. SET FREQUENCY ON KEYPAD BY PRESSING NUMBERS THEN "ENT"
7. PUSH THE PTT SWITCH ON THE HANDSET RELEASE AND LISTEN
8. ADJUST THE VOLUME CONTROL KNOB TO DESIRED LEVEL
9. ADJUST THE SQUELCH CONTROL KNOB TO ELIMINATE RUSHING NOISE

PRESET CHANNELS

1. SET THE FREQUENCY ON KEYPAD BY PRESSING NUMBERS THEN "PST"
2. THE DISPLAY WILL SHOW "LP -" THEN PRESS 1 - 8 FOR CHANNEL NUMBER
3. PRESS "ENT" TO LOAD INTO MEMORY
4. CHECK FOR PROPER FREQUENCY NOW SHOWN IN DISPLAY WINDOW
5. REPEAT FOR EACH PRESET CHANNEL
6. SELECT THE PRESET CHANNEL BY PRESSING "PST", THE CHANNEL NUMBER AND "ENT"

HAVE QUICK SET-UP

1. LOAD WOD IN PRESETS 15 TO 20 AS DESCRIBED ABOVE
2. SET RADIO TO NET STATION FREQUENCY

APPENDIX H

3. NET CONTROL STATION ONLY WILL PRESS "3" THEN "ENT" TO SET EMERGENCY CLOCK
4. NET STATIONS PRESS "TOD" TO RECEIVE TOD WHILE NET CONTROL PRESSES "DF" TO SEND TOD (DISPLAY WILL SHOW "2. tod" OR "3. tod" WHEN RECEIVED)
5. PRESS "ACT" TO SET IN HAVE QUICK OPERATION MODE
6. ALL STATIONS WILL CHECK IN WITH NET CONTROL

PRC-119 INFORMATION

EQUIPMENT DATA

FREQUENCY RANGE	30.000 MHz TO 87.975 MHz
CHANNEL SPACING	25 KHz
MODULATION	FM
POWER OUTPUT	500 MICROWATTS (LOW POWER) 160 MILLIWATTS (MEDIUM POWER) 4 WATTS (HIGH POWER) 50 WATTS (POWER AMPLIFIER)
ANTENNAS	FM/VHF COMBINED
DISTANCE RANGE	0-330 YARDS (LOW POWER) 330 YARDS – 2 MILES (MEDIUM POWER) 2.5 MILES – 5 MILES (HIGH POWER) 22 MILES – POWER AMPLIFIER
POWER SOURCE AND LIFE	BA-5590 (24 HOURS)
OPERATING WEIGHT	22 LBS. W/ BATTERIES
PRESET CHANNELS	8 SINGLE CHANNEL 6 FREQUENCY HOPPING MODE
COMSEC	SINGLE CHANNEL OPS - KYK-13, KYX-15 OR KOI-18 FREQUENCY HOPPING OR SINGLE CHANNEL – DTD

PRC-117F INFORMATION

EQUIPMENT DATA

FREQUENCY RANGE	30.000 - 89.999990 MHz (VHF Low) 90.000 – 224.999990 MHz (VHF High) 225.000 – 512 MHz (UHF) 243.000 – 270.000 (UHF SATCOM) 292 – 318 MHz (UHF SATCOM)
CHANNEL SPACING	VHF Low 25 kHz VHF High 5 or 6.25 kHz UHF 5 kHz
POWER OUTPUT	VHF – 1-10 Watts UHF – 2-20

APPENDIX H

ANTENNAS	VHF/UHF COMBINED
POWER SOURCE AND LIFE	BA-5590 (24 HOURS)
OPERATING WEIGHT	15.9 LBS. W/ BATTERIES
PRESET CHANNELS	10 FULLY PROGRAMMABLE
COMSEC	EMBEDDED COMSEC CAPABILITY FILL DEVICES - KYK-13, KYX-15 KOI-18. CYZ-10 DTD FREQUENCY HOPPING OR SINGLE CHANNEL HAVE QUICK I/II UHF ECCM

KYK-13/KOI-18 INSTRUCTIONS

LOADING KYK-13 WITH KOI 18

1. ENSURE BATTERIES ARE LOADED INTO BOTH DEVICES
2. CONNECT KOI-18 TO KYK-13
3. TURN KYK-13 SWITCH TO "ON" AND SELECT REGISTER TO BE FILLED
4. PRESS AND RELEASE KYK-13 INITIATE BUTTON
5. PULL TAPE THROUGH KOI-18 AT A STEADY RATE; RED LIGHT SHOULD FLASH IF VARIABLE RECEIVED
6. TURN KYK-13 SWITCH TO "OFF/CHECK"; PRESS AND RELEASE INITIATE BUTTON; IF RED LIGHT FLASHES ON RELEASE, VARIABLE IS PRESENT
7. LOAD OTHER VARIABLES TO OTHER REGISTERS
8. DISCONNECT KOI-18 FROM KYK-13

LOADING KY-57

1. ENSURE BATTERIES ARE LOADED IN KY-57
2. TURN ON KY-57
3. PULL AND TURN MODE SWITCH TO "C" (CIPHER)
4. A CONTINUOUS AUDIBLE ALARM TONE SHOULD BE HEARD IN THE HANDSET; PRESS AND RELEASE PTT SWITCH TO CLEAR ALARM
5. TURN KY-57 TO "LD" (LOAD)
6. CONNECT KYK-13 IN "OFF" POSITION OR KOI-18 WITH ADAPTER CABLE TO KY-57
7. TURN KY-57 TO REGISTER TO BE FILLED
8. KYK-13: TURN KYK-13 TO "ON" POSITION TO REGISTER OF FILL KOI-18: INSERT TAPE LEADER INTO KOI-18
9. KYK-13: PRESS AND RELEASE PTT SWITCH; BEEP AND RED LIGHT FLASH ON KYK-13 INDICATES TRANSFER OF VARIABLE KOI-18: PRESS AND RELEASE PTT SWITCH; PULL TAPE AT STEADY RATE ALARM WILL STOP ON GOOD TRANSFER
10. REPEAT STEPS 6 TO 9 TO FILL ADDITIONAL REGISTERS
11. DISCONNECT LOADER AND SWITCH KY-57 TO "C"
12. CONNECT KY-57 TO RADIO

APPENDIX H

PPN-19 INFORMATION

EQUIPMENT DATA

FREQUENCY RANGE	I BAND
	J BAND
MODULATION	PULSE
POWER OUTPUT	200 WATTS
DISTANCE RANGE	LINE OF SIGHT
POWER SOURCE	BA-5590
	ANY EXTERNAL DC 17 TO 30 VOLTS

ANTENNA SET UP AND OPERATION

1. ENSURE SET IS SWITCHED OFF
2. CONNECT POWER SOURCE
3. REMOVE DESIRED ANTENNA FORM STORAGE AREA AND REMOVE SWITCH CAP FOR TOP OF TRANSPONDER CASE
4. POSITION ANTENNA TO MATCH KEY WITH KEY SLOT AND TIGHTEN; PLACE SWITCH CAP IN STORAGE AREA
5. SET POWER TO "INTL"
6. SET MODE TO "STBY"
7. SELECT CODE (A TO G) AND FREQUENCY BAND (I, J, I+J, OR GAR-I)
   (USMC KC-130 UTILIZE “I” BAND)
8. OMNIDIRECTIONAL: SET AGC SWITCH TO "OFF" DIRECTIONAL: SET AGC SWITCH TO "ON"
9. SET MONITOR MODE SWITCH TO "XMT"
10. SET MODE SWITCH TO "NORM"; TRANSPONDER WILL BE OPERABLE IN 3O SECONDS
11. AFTER TRANSMISSION IS COMPLETE, SET MODE SWITCH TO "STBY 1" TO CONSERVE BATTERIES

REMOTE CONTROL OPERATION

1. CONNECT REMOTE CONTROL ASSEMBLY TO UNIT WITH UP TO 50 METERS OF SLASH WIRE
2. SET POWER SWITCH TO "INTL"
3. SET REMOTE CONTROL ON/OFF SWITCH TO "ON"
4. IF MODE SWITCH IS SET TO "STBY", SET WILL REPLY TO INTERROGATION AT 30 SECONDS; IF MODE SWITCH IS SET TO "NORM", SET WILL REPLY INSTANTANEOUSLY
5. AFTER TRANSMISSION IS COMPLETE, SET REMOTE CONTROL SWITCH TO "OFF"

APPENDIX H

QUARTER WAVELENGTH ANTENNAS

FREQ (MHz)	LENGTH (FEET)	FREQ (MHz)	LENGTH (FEET)
2.0	117.0	12.0	19.5
2.2	106.0	13.0	18.0
2.4	97.5	14.0	16.7
2.6	90.0	15.0	15.6
2.8	83.5	16.0	14.6
3.0	78.0	17.0	13.7
3.3	70.9	18.0	13.0
3.6	65.0	19.0	12.3
4.0	58.5	20.0	11.7
4.5	52.0	21.0	11.1
5.0	46.8	22.0	10.6
5.5	42.5	23.0	10.1
6.0	39.0	24.0	9.7
6.5	36.0	25.0	9.3
7.0	33.4	26.0	9.0
8.0	29.2	27.0	8.6
9.0	26.0	28.0	8.3
10.0	23.4	29.0	8.0
11.0	21.2	30.0	7.8

APPENDIX H

ACE COMMUNICATION NET DESCRIPTIONS

ACE COMMAND NET (HF) (ACE CMD) - PROVIDES A PATH FOR THE COMMANDER TO EXERCISE COMMAND OF SUBORDINATE UNITS.

ACE COMM COORDINATION NET (HF) (COM COORD) - PROVIDES A MEANS FOR THE COMMUNICATORS TO ENGINEER, MANAGE AND RESTORE THE ACE'S COMMUNICATIONS SYSTEM.

AIR DEFENSE ALERT NET (UHF) (ADA) - PROVIDES A MEANS FOR AIR DEFENSE SYSTEMS TO PASS EARLY WARNING INFO, TO INCLUDE LEAKER CALLS.

AIR OPS CONTROL NET (HF/MUX) (AOC) - PROVIDES A MEANS FOR THE TAOC TO REQUEST AAW ASSETS AND UPDATE THE TACC ON AAW ISSUES.

ANTIAIRCRAFT CONTROL NET (MUX/HF) (AAC) - PROVIDES A MEANS TO CONTROL HAWK F.P.s INFO PASSED INCLUDES: TARGET ASSIGNMENTS, FIRE CNTL ORDERS, WPNS CNTL STATUSES, ETC...

ANTIAIRCRAFT INTELLIGENCE (MUX/HF) (AAI) - PROVIDES A MEANS TO PASS EARLY WARNING INFO BTW TAOC/EWC AND HAWK F.P.s

APPROACH CONTROL NET (UHF/VHF) (APP/CNTL) - PROVIDES A MEANS FOR THE MATCD TO COORDINATE RADAR TRAFFIC INTO THE TERMINAL AIRSPACE. MAY REQUIRE MULTIPLE NETS.

COMMAND ACTION NET (HF/MUX) (CA) - PROVIDES A MEANS FOR THE TAC TO COORDINATE AAW ISSUES WITH THE SAAWC.

COMBAT INFO/DETECTION (HF/MUX) (CID) - PROVIDES A MEANS FOR REPORTING ON UNIDENTIFIED AND HOSTILE A/C.

CRASH FIRE AND RESCUE (VHF) (CFR) - PROVIDES A MEANS TO COORDINATE CRASH RECOVERIES ON OR AROUND THE AIRFIELD.

DATALINK COORD NET (MUX/UHF/HF) (DCN) - PROVIDES A MEANS FOR MAINTENANCE COORDINATION OF DATALINK OPERATIONS. MAY BE COMBINED WITH TSN. USUALLY ONE PER DATALINK (I.E. MUX TADIL B, HF TADIL A ETC.)

DEPARTURE CONTROL NET (UHF/VHF) (DEP/CNTL) - PROVIDES A MEANS TO COORDINATE RADAR TRAFFIC OUT OF THE TERMINAL AIRSPACE. MAY REQUIRE MULTIPLE NETS.

APPENDIX H

ACE COMMUNICATION NET DESCRIPTIONS

DIRECT AIR SUPPORT NET (HF/MUX) (DAS) - PROVIDES A MEANS FOR THE DASC TO REQUEST DIRECT AIR SUPPORT AIRCRAFT FROM THE TACC AND PROVIDE UPDATED INFO ON MISSIONS.

FIRE DIRECTION NET (VHF/HF) (FD) - PROVIDES A MEANS TO PASS EARLY WARNING AND CUEING FROM THE FIRING PLATOONS TO THE CONTINGENCY FIRE UNITS AND SENSOR ACQUISITION SECTIONS.

FIGHTER AIR DIRECTION NET (UHF/VHF) (FAD) - PROVIDES A MEANS FOR AGENCIES TO CONTROL FIGHTER AIRCRAFT MANNING COMBAT AIR PATROLS.

GROUND BASED DATALINK (VHF/FREQ HOP) (GBDL) - PROVIDES A MEANS TO PASS EARLY WARNING INFO AND FIRE CONTROL ORDERS BTW HAWK FP AND CFUs; SAS AND CFU; AND SAS AND LAAD ELEMENTS. CURRENTLY USED WITH WPNS DIRECTOR UNITS.

GROUND CONTROL APPROACH NET (VHF/UHF) (GCA) - PROVIDES A MEANS FOR GROUND CONTROL APPROACH BEARING AND ALTITUDE INFO TO A/C.

GROUND CONTROL NET (UHF/VHF) (GRND/CNTL) - PROVIDES A MEANS FOR THE GROUND CONTROLLER TO COORDINATE MOVEMENT OF ALL GROUND AIRCRAFT, VEHICLES, AND PERSONNEL ON TAXIWAYS AND RUNWAYS. MULTIPLE NETS MAY BE REQUIRED.

GROUP COMMON (UHF/VHF) (GRP CMN) - PROVIDES A MEANS FOR GROUP HEADQUARTERS TO COORDINATE WITH AIRBORNE AIRCRAFT. EACH AIRCRAFT IS ASSIGNED ITS OWN.

GUARD (UHF/VHF) (GRD) - PROVIDES AN EMERGENCY DISTRESS NET USED BY AIRCRAFT AND CONTROL AGENCIES.

HANDOVER/CROSSTELL NET (HF/MUX) (H/O XTEL) - PROVIDES A MEANS FOR THE EXCHANGE OF A/C CONTROL BETWEEN AIR CONTROL AGENCIES.

HELICOPTER DIRECTION NET (UHF/VHF/HF) (HD) - PROVIDES A MEANS TO CONTROL HELOS WITHIN THE OBJECTIVE AREA.

HELICOPTER REQUEST NET (HF/UHF) (HR) - PROVIDES A MEANS FOR REQUESTING IMMEDIATE HELO SUPPORT IN AMPHIBIOUS OPS.

INTERFACE COORD NET (HF/UHF/MUX) (ICN) - PROVIDES A MEANS FOR COMMAND LEVEL COORD OF JOINT DATALINK EMPLOYMENT.

APPENDIX H

ACE COMMUNICATION NET DESCRIPTIONS

LAAD BATTALION COMMAND (HF) (LBC) - PROVIDES A MEANS FOR THE PASSAGE OF ADMIN AND LOGISTICS SUPPORT BTW BN HQ AND SUBORDINATE BATTERIES.

LAAD COMMAND (HF) (LC) - PROVIDES A MEANS FOR THE COMMANDER TO PASS ADMIN AND LOGISTICS INFO, AND TO EXERCISE TACTICAL EMPLOYMENT OF LAAD PLTS.

LAAD TEAM CONTROL NET (VHF) (LTC) - PROVIDES A MEANS FOR THE PASSAGE OF CRITICAL AIR DEFENSE INFO BTW SECT LDRS AND TEAMS.

LAAD WEAPONS CONTROL NET (HF) (LWC) - PROVIDES A MEANS FOR THE PASSAGE OF CRITICAL AIR DEFENSE INFO BTW PLT CDRS AND SECTION LEADERS.

LZ CONTROL NET (UHF/VHF) (LZ CNTL) - PROVIDES A MEANS FOR THE LZ CONTROL TEAM TO CONTROL AIRCRAFT EN ROUTE FROM THE INITIAL POINT TO THE LANDING ZONE. MULTIPLE NETS REQUIRED.

MAGTF COMMAND NET (HF/SAT) (MAGTF CMD) - PROVIDES A MEANS FOR THE COMMANDER TO EXERCISE COMMAND OF SUBORDINATE UNITS.

MAGTF INTELLIGENCE (HF/SAT) (MAGTF INTEL) - PROVIDES A PATH FOR RAPID COLLECTION & DISSEMINATION OF INTEL AND COMBAT INFO.

MAGTF TACTICAL NET (HF/SAT) (MAGTF TAC) - PROVIDES A PATH FOR TACTICAL TRAFFIC BETWEEN MAGTF AND SUBORDINATE UNITS.

RADAR REMOTE COORDINATION (VHF/HF) (RRC) - PROVIDES RADAR REMOTE LINKS BETWEEN EW/C SITES AND THE TAOC.

SEARCH AND RESCUE (UHF/VHF) (SAR) - PROVIDES A MEANS FOR CONTROL AND COORDINATION OF AIR RESCUE MISSIONS. MULTIPLE NETS ARE REQUIRED.

SQUADRON COMMON NET (UHF/VHF) (SQDN CMN) - PROVIDES A MEANS FOR SQUADRON HQ TO COORDINATE WITH AIRBORNE AIRCRAFT. EACH SQUADRON IS ASSIGNED ITS OWN.

APPENDIX H

ACE COMMUNICATION NET DESCRIPTIONS

TACTICAL AIR COMMAND NET (HF) (TACMD) - PROVIDES A MEANS FOR THE TAC TO TASK SUBORDINATE UNITS TO MEET THE SIX FUNCTIONS OF MARINE AVIATION.

TACTICAL AIR DIRECTION NET (UHF/VHF) (TAD) - PROVIDES A MEANS FOR THE DIRECTION OF A/C CONDUCTING OAS MISSIONS. DASC, FAC, FAC(A) AND TAC(A) MAY REQUIRE OWN NET.

TACTICAL AIR REQUEST NET (VHF/HF) (TAR) - PROVIDES A MEANS FOR GROUND UNITS TO REQUEST IMMEDIATE AIR SUPPORT FROM THE DASC.

TACTICAL AIR TRAFFIC CONTROL (UHF/VHF) (TATC) - PROVIDES A MEANS FOR CONTROL AGENCIES TO CONTROL ALL TACTICAL AND ITINERANT AIRCRAFT W/IN THEIR AREA OF RESPONSIBILITY. EACH AGENCY REQUIRES OWN NET.

TANKER NET (VHF/HF) (TNKR CMN) - PROVIDES A MEANS FOR INFLIGHT REFUELING A/C TO COMMUNICATE WITH THE TANKER.

TOWER PRIMARY NET (UHF/VHF) (TWR) - PROVIDES A MEANS FOR THE LOCAL CONTROLLER TO ISSUE TRAFFIC ADVISORIES AND AIRCRAFT CLEARANCES WITHIN THE CLASS D AIRSPACE. MULTIPLE NETS MAY BE REQUIRED.

TRACK SUPERVISION NET (HF/MUX/UHF) (TSN) - PROVIDES A MEANS FOR TRACK SURVEILLANCE PERSONNEL TO EXCHANGE INFO TO MAINTAIN A CLEAR RECOGNIZED AIR PICTURE.

VOICE PRODUCT NET (UHF/HF) (VPN) - TO DISSEMINATE NONDIGITAL SIGINT INFO.

ARMY TACTICAL DATA LINK-1 (MUX) (ADTL-1) - PROVIDES A POINT-TO-POINT EXCHANGE OF DIGITAL INFO BTW HAWK FIRING PLATOONS AND THE TAOC OR AUTOMATED EW/C. FULL DUPLEX.

LINK-1 (NATO) (MUX) (LNK-1) - PROVIDES A MEANS FOR THE TACC AND TAOC TO EXCHANGE DIGITAL INFO IN A POINT-TO-POINT MODE WITH NADGE AGENCIES.

TADIL A (HF/UHF) (TDL A) - PROVIDES A MEANS TO PASS AUTOMATICALLY PROCESSED DIGITAL INFO IN A NETTED CONFIGURATION.

TADIL B (CABLE/MUX) (TDL B) - PROVIDES A MEANS TO PASS DIGITAL INFO IN A POINT-TO-POINT CONFIGURATION.

TADIL C (UHF; 300 - 324.95MHz) (TDL C) - PROVIDES A MEANS TO PASS DIGITAL INFO BETWEEN THE TAOC AND FIGHTER A/C; AND THE MATCD AND FIGHTER A/C.

APPENDIX I

STANDARD REPORT FORMATS

CASEVAC REQUEST

A. PRECEDENCE - Urgent: Move immediately to save life or limb.
Priority: Prompt medical care within 24 hrs.
Routine: Minor injury/KIA pickup within 72 hrs.

B. NUMBER OF CASEVACS

C. AIRBORNE MEDICAL ASSISTANCE REQUIRED/NOT REQUIRED

D. PICK-UP COORDINATES

E. LZ FREQUENCIES/CALL SIGN

F. LZ SECURE/UNSECURE

APPENDIX I

SITREP

A. LOCATION

B. SUMMARY OF LAST 6 HOURS

C. ENEMY CONTACT & COORDINATES

D. SIGNIFICANT EVENTS

E. PLANS FOR NEXT 6 HOURS

F. CASUALTIES IN PAST 6 HOURS

G. FRIENDLY KIA

H. FRIENDLY WIA

I. ENEMY KIA

J. ENEMY WIA

K. ENEMY POW

APPENDIX I

SPOT REPORT

A. SIZE

B. ACTIVITY

C. LOCATION

D. UNIT

E. TIME

F. EQUIPMENT

G. REMARKS

APPENDIX I

CASUALTY REPORT

A. MEDEVAC # (INITIAL & LAST 4 DIGITS OF SSN)

B. DTG OF INCIDENT

C. LOCATION

D. TYPE OF WOUND

1. GUNSHOT
2. SHRAPNEL
3. OTHER (SPECIFY)

E. PORTION OF BODY AFFECTED

F. EXTENT OF INJURY

1. NON-SERIOUS
2. SERIOUS
3. DEAD

G. MEDEVAC: (YES/NO)

H. ACTIVITY

1. PATROL
2. OFFENSIVE OPERATION
3. DEFENSIVE OPERATION
4. OTHER (EXPLAIN)

I. CAUSED BY:

1. SNIPER
2. GRENADE
3. MINE
4. BOOBY TRAP
5. INDIRECT FIRE
6. OTHER

APPENDIX I

ALPHA FORMAT --TLZ SURVEY

A. TLZ NAME

B. LOCATION

C. MAGNETIC RWY HEADING

D. LENGTHS

1. RUNWAY
2. OVERRUN APPROACH END
3. OVERRUN DEPARTURE END
4. TAXIWAY

E. WIDTHS

1. RUNWAY
2. LEFT SHOULDER
3. RIGHT SHOULDER
4. LEFT CLEAR ZONE
5. RIGHT CLEAR ZONE
6. LEFT LATERAL SAFETY ZONE
7. RIGHT LATERAL SAFETY ZONE
8. TAXIWAY

F. SURFACE CONDITION

G. GLIDE SLOPE REQUIRED

H. OBSTRUCTIONS

I. RUNWAY MARKINGS

J. REMARKS

APPENDIX I

JOINT SPECTRUM INTERFERENCE RESOLUTION (JSIR) REPORT EXAMPLE FORMAT

(1) Organization affected by EMI. Point of contact information (POC) (Name and telephone number). Make sure when listing a POC that the individual is familiar with the problem.

(2) Place name, latitude, and longitude where EMI occurred.

(3) Times, dates, periods EMI occurred. Indicate whether the duration of the interference is continuous or intermittent, the approximate repetition rate of interference, and whether the amplitude of the interference is varying or constant. Indicate if the interference is occurring at a regular or irregular time of day.

(4) Systems and equipment affected by the EMI. Affected system function, name, nomenclature, manufacturer with model number, or other system description.

(5) Allocated frequency band or authorized frequency of equipment affected.

(6) Station and/or equipment causing the interference and the location or call sign, if known.

(7) Allocated frequency band or authorized frequency of the station and/or equipment causing the interference, if known.

(8) Probable cause of interference (for example, co-channel assignment, harmonics, inter-modulation, spurious products, jamming, etc.).

(9) Extent of impairment to operational capability of affected equipment. Characteristics of interference (reduced range, false targets, reduced intelligibility, data errors, etc.)

(10) Corrective measures taken to resolve or work around the interference.

(11) Effect of corrective measures.

(12) Any additional useful remarks. Provide a clear, unstructured narrative summary on the interference and local actions that have been taken to resolve the problem.

APPENDIX J

HELICOPTER OPERATIONS AIDS

HELITEAM LEADER COMMUNICATIONS SLATE

HELITEAM LEADER NAME -

CALLSIGN -

SERIAL ASSIGNMENT NUMBER -

DESIRED LANDING IN LZ -

SECTOR -

GRID COORDINATE -

ALTERNATE LZ IS -

IS LZ HOT - OR COLD -

OUR FREQUENCY IS - BUTTON -

OUR CALLSIGN IS -

WHAT WILL YOUR LANDING DIRECTION BE?

ANY OTHER INFORMATION YOU HAVE?

INFORM ME OF ANY CHANGES

GIVE ME 2 MINUTE AND 1 MINUTE WARNINGS

APPENDIX J

EMBARKATION CARD FORMAT

MMT EMBARK CARD

NAME: _____ RANK: _____

SSN: _____ BLD TYP: _____

ORGANIZATION: _____

APPENDIX K

ACRONYMS/SYMBOLS LIST

A2C2	Army Airspace Command and Control
AA	Air to Air
AAA	Antiaircraft Artillery
AADC	Area Air Defense Commander
AAM	Air to Air Missile
AAW	Antiair Warfare
AAWC	Antiair Warfare Commander (USN)
ABCCC	Airborne Battlefield Command and Control Center
ACA	Airspace Coordination Area Airspace Control Area Airspace Control Authority
ACE	Aviation Combat Element
ACEOI	Automated Communications Electronics Operating Instruction
ACLS	Automatic Carrier Landing System
ACM	Air Combat Maneuver
ACO	Airspace Control Order
ACP	Airspace Control Plan
AD	Aerial Delivery
ADA	Air Defense Alert (Net) Air Defense Artillery Air Defense Area
ADS	Airspace Deconfliction System
AEW	Airborne Early Warning
AFL	Assault Flight Leader
AGL	Above Ground Level
A/G	Air to Ground
AGM	Air-to-Ground Missile
AGS	Aviation Ground Support
AI	Airborne Interceptor
AIC	Air Intercept Controller
AIM	Air Intercept Missile
AIO	Air Intelligence Officer
AIZ	Air Intercept Zone
ALO	Artillery Liaison Officer
ALTRV	Altitude Reservation
AMC	Air Mission Commander Air Mobility Command
AMRAAM	Advanced Medium Range Air to Air Missile
ANVIS	Aviator Night Vision Imaging System

APPENDIX K

ACRONYMS/SYMBOLS LIST

AO	Aerial Observer
	Air Officer
	Area of Operation
AOA	Amphibious Objective Area
AOB	Air Order of Battle
	Advanced Operations Base
AOR	Area of Responsibility (JFC only)
APU	Auxiliary Power Unit
AR	Aerial Refueling
	Area of Responsibility
	Armed Reconnaissance
ARCP	Aerial Refueling Control Point
ARCT	Aerial Refueling Control Time
ARG	Amphibious Ready Group
ARM	Antiradiation Missile
ARTY	Artillery
ASC (A)	Assault Support Coordinator (Airborne)
ASCIET	All Service Combat Identification Evaluation Team
ASE	Aircraft Survivability Equipment
	Air Support Element
ASLT	Air Support Liaison Team
ASM	Air-to-Surface Missile
ASR	Assault Support Request
ASW	Antisubmarine Warfare
ATARS	Advanced Tactical Aerial Reconnaissance System
ATBM	Anti-Tactical Ballistic Missile
ATC	Air Traffic Control
ATCF	Air Traffic Control Facility
ATDL-1	Army Tactical Data Link-1
ATDS	Airborne Tactical Data System (E-2)
ATF	Amphibious Task Force
ATGM	Antitank Guided Missile
ATO	Air Tasking Order
AWACS	Airborne Warning And Control System (E-3)
AWC	Assistant Weapons Controller
Bald Eagle	Quick reaction helicopterborne company
Bandit	Known enemy aircraft, does not necessarily imply clearance to fire.
BARCAP	Barrier Combat Air Patrol
BDZ	Base Defense Zone
Bingo	Fuel Required for ACFT RTB
BLT	Battalion Landing Team
BMNT	Beginning of Morning Nautical Twilight

APPENDIX K

ACRONYMS/SYMBOLS LIST

Bogey	Radar or visual contact which is unidentified but assumed to be hostile.
Bump Plan	A contingency plan to replace pilots or aircraft in the event an aircraft goes down
Buzzer	Slang for electronic jamming
C2 W	Command and Control Warfare
C3	Command, Control and Communications
C3I	Command, Control, Communications and Intelligence
CAP	Combat Air Patrol
CAS	Close Air Support
CASEVAC	Casualty Evacuation
CATF	Commander Amphibious Task Force
CBR	California Bearing Ratio
CCIR	Commanders Critical Intelligence Requirements
CCM	Counter-Counter Measures
CCS	Command and Control Subsystem
CE	Command Element
CEO	Communications Electronic Officer
CEOI	Communications Electronics Operating Instruction
CFL	Coordinated Fire Line
CFR	Crash Fire Rescue
Chattermark	Overcoming enemy communications jamming by switching frequencies using a pre-briefed frequency rotation plan.
CI	Counter Intelligence
CIC	Combat Information Center
CI/D	Combat Information/Detection (Net)
CINCLANTFLT	Commander-in-Chief, Atlantic Fleet
CINCPACFLT	Commander-in-Chief, Pacific Fleet
CIT	Counterintelligence Team
CLF	Commander Landing Force
CM	Counter Measures
CMCC	Classified Material Control Center
CNX/CANX	Cancel
COC	Combat Operations Center
COMMARFORLANT	Commander Marine Forces Atlantic
COMMARFORPAC	Commander Marine Forces Pacific
COMINT	Communications Intelligence
COMSEC	Communications Security
CONUS	Continental United States
CP	Control Point Contact Point Command Post

APPENDIX K

ACRONYMS/SYMBOLS LIST

CRP	Combat Readiness Percentage
CSAR	Combat Search and Rescue
CSP	Contingency Support Package
CSSE	Combat Service Support Element
CSS	Combat Service Support
CW	Continuous Wave
CWAR	Continuous Wave Acquisition Radar
DAS	Direct Air Support
	Direct Air Support (Net)
	Deep Air Support
	Direct Access Service
DASC	Direct Air Support Center
DASC(A)	Direct Air Support Center (Airborne)
DEFCON	Defense Readiness Condition
DEFTAC	Defensive Tactics
DF	Direction Finding
DIA	Defense Intelligence Agency
DISUM	Daily Intelligence Summary
DME	Distance Measuring Equipment
DPICM	Dual Purpose Improved Conventional Munitions
DR	Dead Reckoning
DTG	Date-Time-Group
DZ	Drop Zone
EA	Electronic Attack
	Engagement Area
EAF	Expeditionary Airfield
ECC	Evacuation Control Center
E&E	Escape & Evasion
EENT	End of Evening Nautical Twilight
EEI	Essential Elements of Information
EFL	Escort Flight Leader
ELINT	Electronic Intelligence
EMCON	Emission Control
EMI	Electromagnetic Interference
EOB	Electronic Order of Battle
	Enemy Order of Battle
EP	Electronic Protection
ES	Electronic Warfare Support
ETA	Estimated Time of Arrival
ETE	Estimated Time Enroute
EW	Electronic Warfare
	Early Warning
EW/C	Early Warning and Control
FAC	Forward Air Controller
FAC(A)	Forward Air Controller (Airborne)

APPENDIX K

ACRONYMS/SYMBOLS LIST

FACSFAC	Fleet Area Control and Surveillance Facility
FAD	Fighter Air Direction (Net)
FARP	Forward Arming and Refueling Point
FASCAM	Family of Scatterable Mines
FDC	Fire Direction Center
FDO	Fire Direction Officer
FEBA	Forward Edge of the Battle Area
FEZ	Fighter Engagement Zone
FFA	Free Fire Area
FFCC	Force Fires Coordination Center
FLOT	Forward Line of Own Troops
FO	Forward Observer
FOB	Forward Operating Base
	Friendly Order of Battle
FOD	Foreign Object Damage
FOE	Focus of Effort
FSC	Fire Support Coordinator
FSCC	Fire Support Coordination Center
FSCL	Fire Support Coordination Line
FWAR	Fixed Wing Aerial Refueling
GAIL	Glide Angle Indicator Light (GAIL) System
GBAD	Ground Based Air Defense
GBDL	Ground Based Data Link
GCCS	Global Command and Control System
GCE	Ground Combat Element
GPS	Global Positioning System
GSE	Ground Support Equipment
HA	Holding Area
HAC	Helicopter Aircraft Commander
HAO	Humanitarian Assistance Operation
HAR	Helicopter Aerial Refueling
HARM	High Speed Anti-radiation Missile
HAT	Helicopter Availability Table
HCZ	Helicopter Control Zone
HD	Helicopter Direction (Net)
	Helicopter Director
HDC	Helicopter Direction Center (USN)
HEALT	Helicopter Employment and Assault Landing Table
HEDP	High Explosive Dual Purpose
HERO	Hazards of Electromagnetic Radiation to Ordnance
HERS	Helicopter Expedient Refueling System
HF	High Frequency

APPENDIX K

ACRONYMS/SYMBOLS LIST

H-Hour	The specific time at which an operation/exercise commences or is due to commence.
HIDACZ	High Density Airspace Control Zone
HLA	Helicopter Landing Area
HLZ	Helicopter Landing Zone
HMD DASC	High Mobility Downsized Direct Air Support Center
HMH	Marine Heavy Helicopter Squadron
HML/A	Marine Light Attack Helicopter Squadron
HMM	Marine Medium Helicopter Squadron
HMMWV	High mobility multi-purpose wheeled vehicle
HNVS	Helicopter Night Vision System (CH-53)
Hostile	A known threat Aircraft: implies clearance to fire
HR	Helicopter Request (Net)
HST	Helicopter Support Team
HUC	Helicopterborne Unit Commander
HUMINT	Human Intelligence; collection by agents
HVA	High Value Asset
HVAA	High Value Airborne Asset
HWSAT	Helicopter Wave and Serial Assignment Table
IADS	Integrated Air Defense System
ICAO	International Civil Aviation Organization
ICN	Interface Coordination Net
ICO	Interface Coordination Officer Interface Control Officer
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
IJMS	Interim JTIDS Message Specification
IMC	Instrument Meteorological Conditions
IMINT	Imagery Intelligence
INS	Inertial Navigation System
INTREP	Intelligence Report
INTSUM	Intelligence Summary
IP	Initial Point
IPB	Intelligence Preparation of the Battlespace
IR	Infrared
IRCM	Infrared Countermeasures
IRCCM	Infrared Counter-Counter Measures
ISOPREP	Isolated Personnel Report
IT/ITT	Interrogator/Interrogator Translator Team
ITG	Initial Terminal Guidance
IW	Information Warfare

APPENDIX K

ACRONYMS/SYMBOLS LIST

Jamming	The deliberate radiation of electromagnetic energy with the object of degrading the use of the enemy's electronic equipment.
JADO	Joint Air Defense Operations
JAOC	Joint Air Operations Center
JATF	Joint Amphibious Task Force
JATO	Jet-assisted Takeoff
JDISS	Joint Deployable Intelligence Support System
JEZ	Joint Engagement Zone
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JINTACCS	Joint Interoperability of Tactical Command and Control Systems
JOG (A,G,R)	Joint Operations Graphic (Scale 1:250,000) (A=Air, G=Ground, R=Radar)
JSRC	Joint Search and Rescue Center
JSTARS	Joint Surveillance Target Attack Radar System
JTADS	Joint Tadil-A Distribution Systems
JTAO	Joint Tactical Air Operations
JTAR	Joint Tactical Airstrike Request Joint Tactical Airlift Request
JTF	Joint Task Force
JTIDS	Joint Tactical Information Distribution System
KIAS	Knots Indicated Air Speed
Knot	Nautical mile per hour
Knock it off	Immediately cease all training and proceed as briefed or return to base.
LAAD BN	Low Altitude Air Defense Battalion
LAN	Local Area Network
LAR	Light Armored Reconnaissance
LAV	Light Armored Vehicle
LF	Landing Force Low Frequency
LFOC	Landing Force Operations Center
LFSP	Landing Force Support Party
LHA	Amphibious Assault Ship (General Purpose)
LHD	Amphibious Assault Ship (Multi Purpose)
L-Hour	The time at which the first helicopter of the helicopterborne assault wave touches down in the landing zone.
LIC	Low Intensity Conflict
LOD	Line of Departure
LOI	Letter Of Instruction

APPENDIX K

ACRONYMS/SYMBOLS LIST

LOS	Line of Sight
LLTR	Low Level Transit Route
LPD	Amphibious Transport Dock Ship
LZ	Landing Zone
LZCT	Landing Zone Control Team
MAAP	Master Air Attack Plan
MACCS	Marine Air Command and Control System
MACG	Marine Air Control Group
Mach	The speed of sound
MACS	Marine Air Control Squadron
MAG	Marine Aircraft Group
MAGTF	Marine Air Ground Task Force
MALS	Marine Aviation Logistics Squadron
MANPADS	Man Portable Air Defense Systems
MARLO	Marine Liaison Officer
MASS	Marine Air Support Squadron
MATCALS	Marine Air Traffic Control and Landing System
MATCD	Marine Air Traffic Control Detachment
MAW	Marine Aircraft Wing
MBA	Main Battle Area
MC and G	Mapping Charting and Geodesy
MCAT	Mechanized Combined Arms Team
MCCRES	Marine Corps Combat Readiness Evaluation System
MCDP	Marine Corps Doctrinal Publication
MCRP	Marine Corps Reference Publication
MCWP	Marine Corps Warfighting Publication
Meaconing	The generation or retransmission of a radio navigational signal in order to confuse navigation.
MEB	Marine Expeditionary Brigade
MEDEVAC	Medical Evacuation
MEF	Marine Expeditionary Force
MEF (FWD)	Marine Expeditionary Force (Forward)
METOC	Meteorology and Oceanography
METT-TSL	Mission, Enemy, Terrain & weather, Troops & fire support available – Time, Space and Logistics.
MEU	Marine Expeditionary Unit
MEZ	Missile Engagement Zone
MGRS	Military Grid Referencing System
MIJI	Meaconing, Interference, Jamming, Intrusion
MIL	Short for milliradian (Trigonometric ratio Denoting angular measurement) 10'= 17.78 mils 1' = 1 mil @ 1000' slant range 6400 mils in a circle

APPENDIX K

ACRONYMS/SYMBOLS LIST

MLA	Mission Load Allowance
MLG	Marine Liaison Group (formerly ANGLICO)
MMT	Marine Air Traffic Control Mobile Team
MOBA	Military Operations in Built up Areas
MOOTW	Military Operations Other Than War
MOPP	Mission Oriented Protective Posture
MOUT	Military Operations in Urban Terrain
MPRS	Multiple Point Refueling System (USAF KC-130)
MPS	Mission Performance Standard
MRR	Minimum Risk Route
MSALT	Military Survey and Liaison Team
MSC	Major Subordinate Command Military Sealift Command
MSEL	Master Scenario Events List
MSI	Multispectral Imagery
MSL	Mean Sea Level
MSSG	MEU Service Support Group
MSR	Main Supply Route
MTACS	Marine Tactical Air Command Squadron
MTDS	Marine Tactical Data System
MTI	Moving Target Indicator
Music	Electronic Jamming observed on radar
Mutual Support	Two or more friendly aircraft providing each other aid in visual lookout, jamming, weapons employment, etc.
MUX	Multichannel/Multiplexed Radio Systems
MWCS	Marine Wing Communications Squadron
MWSG	Marine Wing Support Group
MWSS	Marine Wing Support Squadron
NATO	North Atlantic Treaty Organization
NATOPS	Naval Air Training and Operating Procedures Standardization Program
NAVFAC	Naval Facility
NBC	Nuclear, Biological, and Chemical
NCA	National Command Authority
NEO	Non-combatant Evacuation Operation
NFA	No-fire Area
NGF	Naval Gun Fire
NGLO	Naval Gunfire Liaison Officer
NIMA	National Imagery and Mapping Agency
NIS	National Intelligence Survey Naval Investigative Service
NISC	Naval Intelligence Support Center
NM	Nautical Mile

APPENDIX K

ACRONYMS/SYMBOLS LIST

NOB	Naval Order of Battle
NOE	Nap Of the Earth
No Joy	Refers to no visual contact with an enemy or Flight. In air intercept, a code meaning, "I have been unsuccessful," or, "I have no information."
NORDO	Short for "no radio" (e.g., radio failure)
NOTAM	Notice to Airmen; flight advisory bulletins
NSA	National Security Agency
NSC	National Security Council Naval Space Command
NSFS	Naval Surface Fire Support
NSWG	Naval Special Warfare Group
NSWTE	Naval Special Warfare Task Element
NSWTG	Naval Special Warfare Task Group
NSWTU	Naval Special Warfare Task Unit
NTCSA	Naval Tactical Command System Afloat
NTDS	Naval Tactical Data System
NVD	Night Vision Device
NVG	Night Vision Goggles
NVIS	Night Vision Imaging System
NWIP	Naval Warfare Information Publication
NWP	Naval Warfare Publication
OAAW	Offensive Anti-Air Warfare
OAS	Offensive Air Support
OAT	Outside Air Temperature
OLF	Outlying Field
ONC	Operational Navigation Chart (Scale 1:1,000,000)
OOB	Order of Battle
OPCON	Operational Control
OPORD	Operation Order
OPLAN	Operations Plan
OPSEC	Operations Security
OSC	On Scene Commander
Padlock	An aircraft or crewmember is dedicated to maintaining visual contact with an enemy aircraft.
PAR	Precision Approach Radar (MATC)
PARROT	Identification Friend or Foe transponder equipment.
PDF	Principle Direction of Fire
PDS	Passive Detection System
PFPS	Portable Flight Planning Software
PGM	Precision Guided Munitions

APPENDIX K

ACRONYMS/SYMBOLS LIST

PHIBGRU	Amphibious Group
PHIBRON	Amphibious Squadron
PHOTINT	Photographic Intelligence
PL	Phase Line
POL	Petroleum, Oil, and Lubricants
Port	Left-hand side
POW	Prisoner Of War
PP	Penetration Point
PRF	Pulse Repetition Frequency
PRI	Pulse Repetition interval
PRT	Pulse Recurrence Time
PSYOP	Psychological Operations
PSYWAR	Psychological Warfare
PW	Pulse Width
PZ	Pickup Zone
RADAR	Radio Detection And Ranging
RADCON	Radiation Control
RADHAZ	Radiation Hazard
RADINT	Radar Intelligence
RAOC	Rear Area Operations Center
RAS	Rear Area Security
RASO	Refueling Area and Safety Officer
RCC	Rescue Coordination Center
RCS	Radar Cross Section
Resume	In tactical maneuvering, usage code meaning resume original heading.
RESCAP	Rescue Combat Air Patrol
RESCORT	Rescue Escort
RF	Radio/Radar Frequency
RFA	Restricted Fire Area
RFC	Raid Force Commander
RFI	Request for Information
RFL	Restricted Firing Line
RGR	Rapid Ground Refueling
RHAW	Radar Homing and Warning (same as RWR)
RIO	Radio In/Out
RLT	Regimental Landing Team
RO	Radio/Radar Operator
ROA	Restricted Operations Area
ROC	Rules of Conduct Required Operational Capability Reconnaissance Operations Center
ROE	Rules of Engagement
RP	Rendezvous Point
RRS	Remote Receiving Station

APPENDIX K

ACRONYMS/SYMBOLS LIST

RRT	Radio Recon Team
RSI	Radar Signal Indicator
R&S	Reconnaissance and Surveillance
RT	Radio Transmission(s) or transmitters
RTB	Return to Base
RTF	Return To Force
RTM	Radar Terrain Masking
RWR	Radar Warning Receiver
SA	Situational Awareness
SAAWC	Sector Antiair Warfare Commander (USN) Sector Antiair Warfare Coordinator (USMC)
SAC	Strategic Air Command Senior Air Coordinator (TACC)
SACC	Supporting Arms Coordination Center
SAD	Senior Air Director (DASC/TAOC)
SAFE	Selected Area For Evasion
SAM	Surface-to-Air Missile
SARC	Surveillance and Reconnaissance Center
SAR	Search and Rescue Synthetic Aperture Radar
SARSAT	Search And Rescue Satellite Aided Tracking
SATCOM	Satellite Communications
SCATANA	Security of Air Traffic and Navigational Aids
Scatter	A call made to indicate that a flight should disperse according to a pre-arranged plan.
SCR	Single Channel Radio
SEAD	Suppression of Enemy Air Defense
SERE	Survival, Evasion, Resistance, Escape
SHF	Super High Frequency
SHORADEZ	Short Range Air Defense Engagement Zone
SID	Surveillance Identification Director (TAOC)
SIGINT	Signals Intelligence
SINCGARS	Single Channel Ground and Airborne Radio System
SITREP	Situation Report
SLAP	Solar/Lunar Almanac Program
SOC	Special Operations Capable; MEU(SOC) Special Operations Command
SOF	Special Operations Forces
SOFA	Status Of Forces Agreement
SOP	Standard Operating Procedure
Sortie	In air operations, an operational flight by one aircraft
Sparrowhawk	Quick reaction helicopterborne platoon
SPIE	Special Patrol Insertion/Extraction

APPENDIX K

ACRONYMS/SYMBOLS LIST

Spintcom	Special Intelligence CommunicationsSpotrep A voice report that gives Situation, Position, Observation, Time
Squawk	To identify oneself by means of IFF
Starboard	Right-hand side
STD	Senior Traffic Director (TAOC)
STOL	Short Take-off and Landing
STOVL	Short Takeoff and Vertical Landing aircraft
SWD	Senior Weapons Director (TAOC)
SWO	Senior Watch Officer
TAC	Tactical Air Commander (USMC)
TAC(A)	Tactical Air Coordinator (Airborne)
TACAN	Tactical Air Navigation Aid
TACC	Tactical Air Command Center (USMC) Tactical Air Control Center (USN) Tanker Airlift Control Center
TACGRU	Tactical Control Group (USN)
TACON	Tactical Control
TACP	Tactical Air Control Party (USMC/USAF)
TACRON	Tactical Control Squadron (USN)
TACS	Theater Airspace Control System (USAF)
TACTS	Tactical Aircrew Combat Training System
TAD	Tactical Air Direction (Net) Tactical Air Director
TADC	Tactical Air Direction Center
TADIL	Tactical Digital Information Link
TADIL- A	A datalink that employs two or more stations (HF or UHF) in a netted configuration
TADIL- B	A point to point datalink (multi-channel or wire).
TADIL- C	A UHF datalink used between air control agencies and interceptors
TADIL- J	A secure UHF, Jam resistant datalink which uses JTIDS for information exchange from air, ground, maritime, EW and intelligence platform.
TADIX	Tactical Data Information Exchange
TAFDS	Tactical Airfield Fuel Dispensing System
Tally	Refers to visual contact with a hostile aircraft or flight.
TAMPS	Tactical Aircrew Mission Planning System
TAOC	Tactical Air Operations Center
TAOM	Tactical Air Operations Module
TAOR	Tactical Area Of Responsibility
TAR	Tactical Air Request (Net)

APPENDIX K

ACRONYMS/SYMBOLS LIST

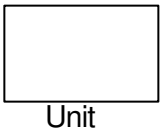
TATC	Tactical Air Traffic Control (Net) Tactical Air Traffic Controller (TAOC/DASC)
TBFDS	Tactical Bulk Fuel Delivery System
TBMCS	Theater Battle Management Core System
TCA	Terminal Control Area Tactical Control Assistant
TDAR	Tactical Defense Alert Radar (LAAD)
TDC	Track Data Coordinator
TEEP	Training Exercise Employment Plan
TENCAP	Tactical Exploitation of National Capabilities
TERF	Terrain Flight
Terminate	Call made to end a single ACM/DM training engagement or maneuver. Used when learning objectives have been met or safety parameters exceeded.
TERPES	Tactical Electronic Reconnaissance Processing & Evaluation System
TEWT	Tactical Exercise Without Troops
TIS	Thermal Imaging System
TLAM	Tomahawk Land Attack Missile
TLZ	Temporary Landing Zone
TMD	Theater Missile Defense
TO	Takeoff
TOC	Tactical Operations Center
TOF	Time Of Flight
TOS	Time On Station
TOT	Time On Target
TPFDL	Time Phased Force Deployment List
TRAP	Tactical Recovery of Aircraft and Personnel
TRAP BROADCAST	Tactical and Related Applications Broadcast
TRUE	Training in an Urban Environment
TRP	Target Reference Point
TTO	Transit to Objective
TTT	Time To Target
TWS	Track While Scan
UAV	Unmanned Aerial Vehicle
UHF	Ultra-high Frequency
UW	Unconventional Warfare
VFR	Visual Flight Rules
VHF	Very-high Frequency
VID	Visual Identification
VISCAP	Visual (Non-Radar) Combat Air Patrol
VMA	Marine Fixed Wing Attack Squadron

VMAQ	Marine Fixed Wing Electronic Attack Squadron
VMC	Visual Meteorological Conditions VMFA Marine Fixed Wing Fighter Attack Squadron
VMGR	Marine Fixed Wing Aerial Refueling Transport Squadron
V/STOL	Vertical/Short Takeoff and Landing aircraft
WEZ	Weapons Engagement Zone
WP	White Phosphorous
WSO	Weapons Systems Officer
WTI	Weapons and Tactics Instructor
WTL	Weapon Target Line
WTTP	Weapons and Tactics Training Program
WX	Weather
Z	ZULU (Universal Time)

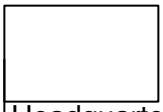
APPENDIX K

MILITARY SYMBOLS

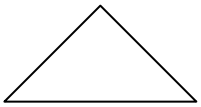
I. Basic Symbol. Geometric Figures form the basic symbols which represent units, installations and activities.



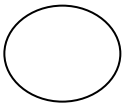
Unit



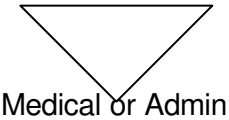
Headquarters



Observation Post

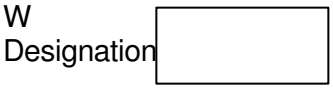


Logistical



Medical or Admin
Installation
Electronic Installation

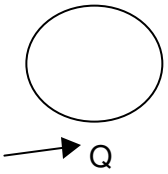
II. Location and Content of Fields. Each basic symbol requires minimal additional information to be clearly understood. This information is conveyed by its placement around the basic symbol in designated fields. Certain fields are mandatory and other are optional. The following subparagraphs contain a discussion of the most commonly used fields.



Mandatory Fields:
A Role Indicator
B Size Indicator
T Unique

P Addressing Number (for enemy units)

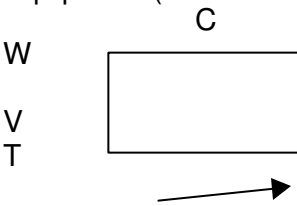
Conditional Fields:
D Special Size Indicator
F Reinforced or Detached
N Enemy (when no coloring is used)



G
H J K ***INSTALLATIONS***
P

Optional Fields:
C Quantity of
E Unconfirmed Reporting (indicated by "?")
G Additional Information
H Free Text
J Evaluation Rating
K Combat Effectiveness
L Electronic Signature

Equipment (indicated by "!")

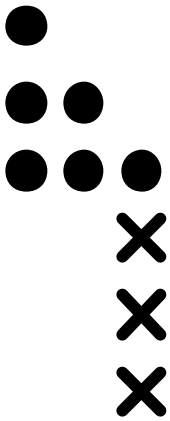


E
G
H J L ***EQUIPMENT***
M N P

M Higher Headquarters
Q Direction of Movement Arrow
R Mobility Indicator
S Headquarters

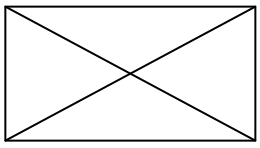
V Type of Equipment
W Date Time Group

III. Unit Size. The size of the units and installations is shown by placing the appropriate size indicator directly above the basic symbol (**Field "B"**).

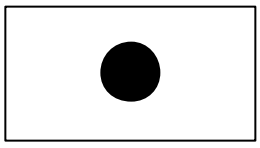


Squad
Section
Platoon
Company / Battery
Battalion
Regiment
Brigade
Division
Corps / MEF

IV. Role Indicator. The type or function symbols are placed inside the basic symbol (**Field A**). Symbols can be combined with one another to show an exact function or capability of the depicted unit. When no functional symbol I provided, an accepted abbreviation may be written inside the basic symbol.

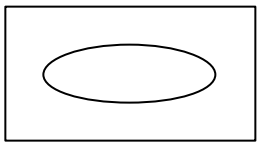


Infantry

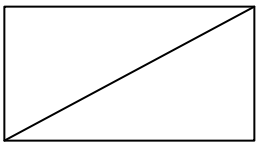


Artillery

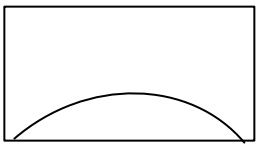
Electronic Warfare



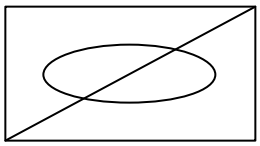
Armor



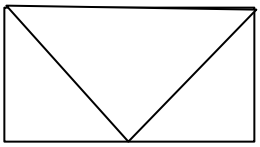
Reconnaissance



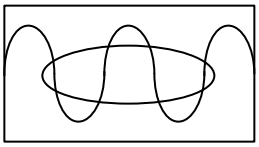
Air Defense



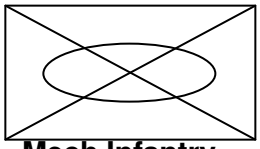
Light Armor



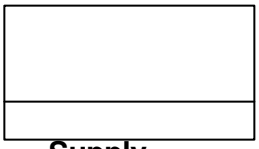
Anti Armor



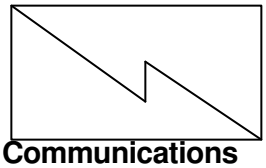
Assault Amphibious



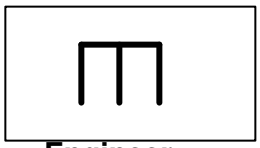
Mech Infantry



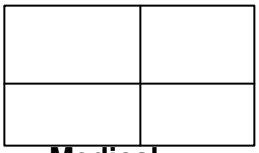
Supply



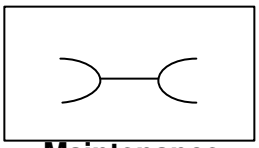
Communications



Engineer



Medical



Maintenance

V. Reinforcements and Detachments. If a unit is reinforced or has a detached element, this is indicated to the right of the basic symbol in **Field F**.

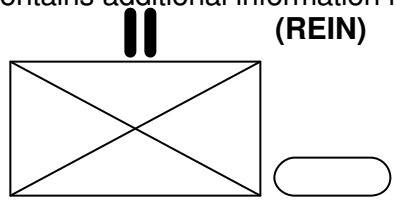
Reinforced	**(+) or (REIN)**
Detached	**(-)**
With Detachments and Reinforcements	**(-)(+) or (-)(REIN)**

VI. Unique Designations and Higher Formations. The identity of the unit is located to the left of the basic symbol in **Field T**. The unique designation must be consistent with the size indicator. The identity of the higher headquarters is located to the right of the basic symbol in **Field M**.

VII. Special Size Indicators. A cap drawn in **Field D** over the size indicator designates a temporary grouping or task force.

VIII. Free Text. **Field H** contains additional information not indicated elsewhere. For example:

Infantry Battalion Reinforced with Tanks



IX. Mobility Indicator. The type of mobility is shown beneath the basic unit or equipment symbol in **Field R**.

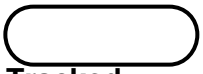
Amphibious

Wheeled

Wheeled Cross-Country

Trailer or Towed Vehicle

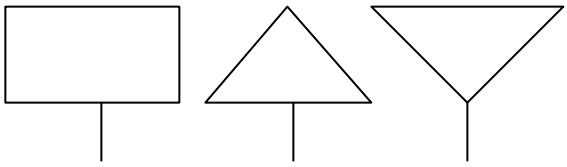
Oversnow



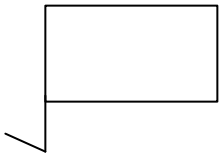
Tracked

Wheeled/Track Combination

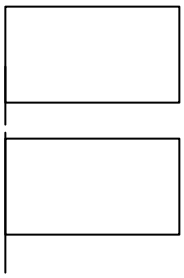
X. <u>Precise Locations</u>. The following methods are used to indicate precise locations:



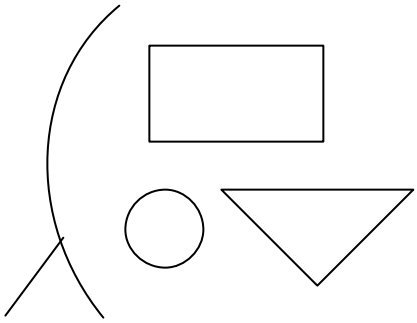
Basic symbols, other than Headquarters, may be placed on a staff which is extended or bent as required. The end of the staff indicates the precise location of the unit depicted.



Since the Headquarters symbol already has a staff, the staff is then extended or bent. The end of the staff indicates the precise location of the Headquarters.

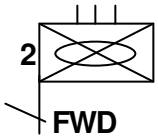


If a several headquarters are at one location, more than one symbol may be placed on a single staff.

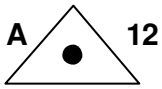


If a group of units or installations other than headquarters is at one location, the grouping of symbols may be enclosed in a bracket and the exact location indicated by a line.

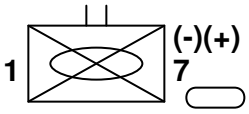
XI. Examples.



2d Marines, Forward CP, on AAVs



Alfa Battery, 12th Marines, Observation Post



1st Battalion, 7th Marines (minus) (reinforced) with Tanks, Mechanized

APPENDIX L

EAF WEB SITES

Assault zone survey

https://www.amc.scott.af.mil/do/dosub.cfm?page=division%2Ehtm

Airfield Suitability and Restrictions Report

https://www.amc.af.mil/do/doa/dovs.htm

Terra Server (Imagery)

http://www.terraserver.com

Naval Facilities (P-80)

http://www.efdlant.navfac.navy.mil/www_20/P-80/ccn100.htm

DOT/FAA (Airport Markings, Signs, and Selected Surface Lighting)

http://www.asy.faa.gov/safety_products/smgcs.htm

Planning and Design of Roads, Airfields, and Heliports in the Theater of Operation
FM 5-430-00-1 Volume One – Road Design
FM 5-430-00-2 Volume Two – Airfield and Heliport Design

http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/5-430-00-1/toc.htm

http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/5-430-00-2/toc.htm

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APPENDIX M

AIRCRAFT DIMENSIONS

FIXED WING AIRCRAFT DIMENSIONS

AIRCRAFT TYPE:	HEIGHT:	LENGTH:	WIDTH: A. WINGSPAN B. WIDTH OVER MISSLES C. WIDTH WINGS-STOWED
AV-8B HARRIER	11'6" (D) 13'2" (N)	46'3" (D) 47'10" (R) 50'3" (N)	A. 30'3" B. NA C. NA
F/A-18A/B/C/D HORNET	15'3"	56.0'	A. 37'6" B. 40'5" C. 27'6"
F/A-18E/F SUPER HORNET		60.1'	A. 41.8' B. 44.7' C. 30.6'
EA-6B PROWLER	16'8"	59'10"	A. 53' B. NA C. 25'10"
F-14A/D TOMCAT	16'	62'9"	A. 64'2" B. NA C. 38'3" (SWEPT)
KC-130 HERCULES	38'3"	99'6"	A. 135'7" B. NA C. NA
C-17	55'1"	173'11"	A. 169'9" B. NA C. NA
C-141B	14'7"	168'4"	A. 160'0" B. NA C. NA
C-5	65'1"	247'10"	A. 222'9" B. NA C. NA

APPENDIX M

AIRCRAFT DIMENSIONS

ROTARY WING AIRCRAFT DIMENSIONS

AIRCRAFT TYPE:	HEIGHT:	LENGTH WITH ROTORS: A. TURNING B. STOWED	WIDTH WITH ROTORS: A. OPERATING B. STOWED C. & TAIL STOWED
AH-1W SUPER COBRA	13'9"	A. 58' B. 58'	A. 48' B. 10'9" C. NA
UH-1N HUEY	13'1"	A. 57'4" B. 57'4"	A. 48' B. 9'5" C. NA
CH-46 SEA KNIGHT	16'8"	A. 84'4" B. 45'8"	A. 51' B. 14'9" C. NA
CH-53A/D SEA STALLION	24'11"	A. 88'3" B. 56'9"	A. 72'3" B. 12'3" C. 23'11" w/aux tanks
CH-53E SUPPER STALLION	28'6"	A. 99'1" B. 60'6"	A. 79' B. 23'11" C. 28'5" w/aux tanks
MV-22 OSPREY	22'1"	A. 57.3 B. 63.0 (BLADES FOLDED)	A. 84.5 B. 18.2 (WING & BLADES FOLDED) C. NA

APPENDIX N

REFERENCE LIST

FAA 7110.65	Air Traffic Control Handbook
AFI 13-217	Assault Zone Procedures
MCO 3500.19	Aviation Training and Readiness Manual, Vol. 5
OPNAVINST 3722.16C	United States Standard for Terminal Instrument Procedures
NAVAIR 00-80T-114	Air Traffic Control Facilities Manual (NATOPS)
NAVAIR 00-80T-115	Expeditionary Air Field (EAF) (NATOPS)
NAVAIR 01-75GAA-1T	KC-130 Tactical Manual
NAVAIR 01-1ASH-1T	Assault Support Helicopter Tactical Manual
DB 1-83	AN/TPN-30A
MCWP 5-1	Marine Corps Planning Process
MCO 3500.27	Operational Risk Management
MCRP 3-25B	Multi-service Brevity Codes
FM 5-430-00-1 Volume One	Planning and Design of Roads, Airfields, and Heliports in the Theater of Operation
FM 5-430-00-2 Volume Two	(Vol. 1 Road Design; Vol. 2 Airfield and Heliport Design)
MCWP 3-25.8	Marine Air traffic Control Detachment Handbook
MCRP 3-25A	Multiservice Procedures for Joint Air Traffic Control
JSC-HDBK-98-091	Joint Spectrum Center Field Antenna Handbook

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