CHAPTER 7

OPERATIONAL MISSIONS

SECTION A - GENERAL INFORMATION

7-1. SYNOPSIS. The worldwide mission of tactical helicopter crews is constantly changing and the exact specialized skills you will be required to master is dependent on the tactical unit to which you are assigned. In this course, you will receive instruction in those general skills which are important to every TAC helicopter pilot, such as sling work, flying at maximum gross weight, operational approaches and low level VFR navigation. Your combat training will take the form of tactical profile missions; the combat information presented in your academic modules is written to prepare you for these TAC profiles. Most of the combat material is derived from the experiences of those who served in the 21st SOS during the war in Southeast Asia. Thus, much of the terminology used comes directly from that conflict. Although much of this information may not apply directly to your present TAC assignment, the simulated combat experience you receive here will expose you to procedures and skills that could play an important part in future tactical helicopter combat missions.

SECTION B - ACADEMIC LESSONS

7-2. MODULE Z-1, Operational Mission Planning. (1.6 Hours)

a. Objective (Standard - 3). Obtain and apply intelligence information and apply mission planning techniques in planning an operational mission:

(1) Frag order information.

(2) Preliminary intelligence briefing.

(3) Customer intelligence briefing.

(4) Preliminary weather briefing.

(5) Obtain maps and/or photos.

(6) Five principles of mission planning.

(7) Interpolate geographic positions using a topographic map with TACAN radials and DME fixes plotted.

(8) Select an initial point.

(9) Determine load carrying capability.

(10) Compute performance data.

(11) Compute mission length in mileage and time, fuel requirements and total load that can be carried during mission duration.

(12) Consider emergency situations.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Modules 0-6 through 0-9.

(2) Assignment. Read the following Supplemental Information and the Supplemental Information for Aircraft Lesson Z-5, located in paragraph 7-6.

c. Source Reference. TAC Regulation 55-153.

d. Required Materials/Equipment:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) Pilot's computer.

(3) Pencil and paper.

e. Supplemental Information:

Lesson Z-1 is probably the single most important lesson you will take in the operational phase of your training. It completely outlines the procedures employed in gathering information for and planning a tactical combat mission. When you complete this slide tape module, you will be given all the materials and information needed to plan a mission. The mission you will plan is Aircraft Lesson Z-5. You will be given a simulated frag order, intelligence information (in the form of an intelligence map) and pictures of your target HLZs. There will also be blank Mission Planning Data Cards for your use. Your task will be to completely plan lesson Z-5 and prepare the appropriate maps and data cards. Once this is completed, you should take these materials to your academic instructor who will make

an initial evaluation of your work. You will then use these materials to actually brief and fly this lesson in the aircraft. The instructor pilots with you will make every effort to simulate real combat conditions during the lesson. This lesson will be flown as a two ship sortie, so you and another TAC student in your class (when applicable) should work together on your flight planning. A primary and an alternate route should be planned. Both of the student pilots involved in the lesson will have a change to fly the lead aircraft during the lesson.

The following is extracted from the 21st SOS Tactics Manual for your information.

"(1) Weather. All applicable weather should be checked during mission planning by the Mission Commander. Weather conditions should be VMC in the HLZ area for adequate escort operations. VMC hemispheric altitudes will be flown enroute dependent on weather and threat environment. Initial departure and recovery on tactical clearances may be under IMC as long as radar coverage can provide adequate separation until resuming VMC flight. If a mission is delayed for over one hour beyond the original takeoff time, the Mission Commander will recheck enroute weather.

(2) Frag. The frag order will contain all pertinent information concerning number of aircraft, escorts, radio frequencies, cargo and troop movement, recommended route, time on target, pickup point, drop off LZ, fuel available, and lead-in aircraft if necessary.

(3) Route of Flight. Routes are usually planned on a 1:250,000 scale chart. It is essential that the aircrew study the HLZ area on a 1:50,000 scale map as well. Photographs of the target area are desirable and usually helpful, but may sometimes be misleading. Intelligence data reflecting enemy troop concentrations, LOGs, AAA location and escape and evasion areas are integral parts of route selection and should be indicated on mission charts. Flight should be planned so as to avoid utilizing a stereotyped routing. In a known threat area, different routes of flight must be utilized to the maximum possible extent to avoid the establishment of an ambush point by the enemy.

(4) Radio Procedures. All frequency changes will be initiated by the lead aircraft. Prior to crossing the "fence", VHF will normally be the primary interplane radio. After crossing the fence, UHF will normally become the primary interplane unless otherwise directed by the Mission Commander. During the mission briefing, all radio frequencies will be discussed to include the naming of the primary, secondary and tertiary frequencies. In addition, the significance of each frequency and call signs of individuals to be contacted will also be named. Mission Commanders may dictate necessary changes to these procedures as required.

(5) Intelligence. It is the Mission Commander's responsibility to check all available intelligence sources, so that the mission will be flown with a minimum of hostile exposure. Intelligence information may be obtained from wing intelligence, customer briefing and other personnel who fly regularly in the area of operation.

(6) HLZ Selection. Approved HLZs will normally be indicated on the frag and should be studied by the Mission Commander to insure operational usefulness. HLZs may be reconnoitered by squadron personnel if deemed necessary. During mission planning, all possible means of HLZ target study should be used to determine surface condition, size of HLZ, approach angles, escape routes and power required. If sufficient HLZ information is available, a decision will be made as to the type of landing to be accomplished at the HLZ, e.g., running landing, touchdown landing, hover landing. Seasonal changes will be an important factor in such a decision. The local weather station can give an analysis of how much rain has fallen in the location of the HLZ. Information is available through customer briefings, HLZ photos, air facilities data books and squadron HLZ files. All aircraft commanders should review this information thoroughly to determine load capability based on their experience level and aircraft performance. If an HLZ has not been indicated on the frag order, the Mission Commander should use all resources at his disposal to select a suitable area based on mission requirements and aircraft capabilities.

(7) IP Holding Points. A prominent feature within a few miles of the HLZ should be selected as an Initial Point (IP) for rendezvous and/or initiation of lead-in. This point should be crosschecked by any available navigational aid. Holding points will be determined by the Mission Commander based on enemy threat, terrain, prominent landmarks, weather and proximity to HLZ."

7-3. MODULE Z-2, Operational Mission Briefing. (0.7 Hour)

a. Objective (Standard - 3). Deliver a comprehensive operational mission briefing using a mission briefing guide and intelligence and flight planning information.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module Z-1.

(2) Assignment. Read Supplemental Information.

c. Source Reference. TAC Regulation 55.153.

d. Supplemental Information. Using the briefing guide shown in figure 7-1.1 through 7-1.4 (extracted from the 21st Special Operations Squadron Tactics Manual), prepare a mission briefing of Aircraft Lesson Z-5. You will then deliver this briefing just prior to flying Z-5.

7-4. MODULE Z-3, Operational Heavy Weight Operations. (0.7 Hour)

a. Objective (Standard - D). Correctly respond to questions pertaining to the procedures and requirements for heavy weight operations:

(1) Running takeoff.

(2) Minimum roll takeoff.

(3) Marginal power takeoff from hover.

(4) Shallow approach to running landing.

(5) Special considerations involved when making normal and steep approaches at heavy gross weights.

(6) Power settling.

(7) Engine T_5 and torque limits.

(8) Requirements and procedures for jettison of internal cargo.

b. Student Requirements and Tips:

Prerequisite Training. Complete Academic Module Z-2.

c. Source Reference:

(1) Chapters 2 and 3 of this student guide.

(2) TO 1H-3(C)E-1, Flight Manual, Section V.

7-5. MODULE Z-4, Operational Enroute and Navigation Procedures. (0.5 Hour)

a. Objective (Standard - C). Correctly respond to questions pertaining to the procedures for flying enroute on operational missions and navigating in hostile territory.

(1) Procedures for coordination with escort aircraft.

(2) Procedures required for mission coordination.

(3) Procedures for high altitude operations.

MISSION COMMANDER'S BRIEFING GUIDE

A. Flight Data:

1. Frag Nr_____Random Reference Nr_____

2. Start Engines _____ Taxi _____T.O._____

3. Primary HLZ Coord _____Elev_____Pax _____

Wt_____Call Sn_____Smoke_____Panels_____

4. Secondary HLZ Coord_____Elev_____Pax_____

WT_____Call Sn_____Smoke_____Panels_____

5. Frequencies:

a. UHF P_____/S_____/T_____/_____

b. VHF P_____/S_____/T_____/_____

c. FM P_____/S_____/T_____/_____

6. E & E Codes_____/_____

CBU_____/_____

Bingo Fuel_____

7. Aircraft/Flight Lineup:

Call Sn	Pilot/SOB	AC	Call Sn	Pilot/SOB	AC

Figure 7-1.1. Mission Commander's Briefing Guide

B. Ground Operations:

1. AC's Sign Clearance.

2. Publications.

3. Sanitization.

4. IFF/SIF Procedures (ground check, flight procedures).

5. Ground abort.

6. Check CIF currency.

C. Takeoff:

1. Runway line up.

2. Takeoff interval.

3. Abort procedures.

4. Departure procedures.

5. Joinup.

D. Enroute:

1. Formation Positions.

2. Climb/Cruise power_____/_____

3. Route:

Chkpt	Head	Dist	Time	TACAN Fix	Other

Figure 7-1.2. Mission Commander's Briefing Guide

4. Air Abort/In Flight Emergency.

5. Aircraft Lighting.

6. Route Crossing:

   a. Tactics.

   b. Crossing Point.

7. Weather Penetration Procedures.

8. Comm Procedures:

   a. Frequency changes.

   b. Contact w/ABCCC.

   c. Interplane frequency.

9. Escort Procedures Enroute:

   a. Rendezvous. Location_____Time_____Alt____Freq_____

   b. Pattern.

   c. Ground fire reaction.

E. HLZ Procedures:

1. Power. Req_____Avail_____Single Engine_____

2. FAC/Lead In:

   a. Call sign.

   b. Rendezvous.

   c. Altitude.

   d. Airspeed.

3. HLZ Approach_____Departure_____

4. HLZ Loads.

Figure 7-1.3. Mission Commander's Briefing Guide

5. High helicopter procedures.

6. Escort procedures.

7. Ground fire reaction.

8. Wx minimums.

9. Refueling.

F. SAR Procedures:

1. Lead escort SAR commander.

2. High helicopter notify King, ABCCC.

3. Number of personnel to be rescued.

G. Escort Release.

H. Recovery/Type Approach.

I. Emergency Deviations:

1. Route.

2. Altitudes.

3. Landing.

4. Fuel requirements.

J. Special Briefing Items.

Figure 7-1.4. Mission Commander's Briefing Guide

(4) Fuel management procedures.

(5) Procedures for low level VFR navigation.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module Z-3.

(2) Assignment. Read Supplemental Information.

c. Source Reference. TAC Regulation 55-153.

d. Supplemental Information:

(1) Hostile Aircraft Tactics:

(a) The best formation to provide surveillance against hostile aircraft is a variation of "tactical" formations. Flying two aircraft elements, each wingman should fly a position no more than 10 to 15 degrees back of his leader with 2000 to 2500 feet lateral separation. The second element leader should fly on the side away from the flight leader's wingman with slightly greater separation and with his wingman on the side away from the flight leader. Succeeding elements should be flown in similar formation 500 feet lower/higher and 3000 feet behind the lead flight if sufficient escorts are not available to provide greater separation. The escort aircraft should fly a weave pattern above and behind the helicopters, being always in position to see any attacking aircraft. The attack is normally from the rear. The following hostile aircraft tactics can, however, be implemented from any formation.

(b) When hostile aircraft are definitely approaching the formation (20 miles by radio call or in sight), all helicopters should initiate a minimum collective, maximum airspeed descent toward treetop level. Consideration should be given to the ground tactical situation, terrain limitations and weather before initiating this evasive action. The Mission Commander will commence this maneuver as appropriate. When it is determined that an aircraft, element or flight is definitely being attacked, the endangered aircraft (element or flight), should start an immediate turn toward the attacker. A maximum rate of descent should be continued throughout the maneuver, but structural flight limits should not be exceeded. Door gunners should maintain continuous leading fire toward the attacker as long as the guns can be brought to bear. When the attacker overshoots the evading helicopter, the latter should turn to follow his attacker's line of flight remaining below and to the rear as long as possible. Rapid descent should be continued and guns fired whenever they can bear on the attacker. Terrain-following flight will make continued fixed-wing attack almost impossible. Pilots should consider the relative dangers of ground fire and mid-air collisions versus the hazard presented by the attacker.

(2) Surface-to-Air Missiles. In the event of a SAM launch, enter a maximum airspeed, maximum rate of descent while turning so as to place the attacking weapon on a wingtip. This forces the missile to make maximum tracking corrections. If a missile is suspected to have infrared guidance, and altitude permits, pilots should consider pulling the throttles to ground idle during this maneuver to reduce the infrared output of the aircraft.

7-6. MODULE Z-5, Operational Mission Procedures. (0.6 Hour)

a. Objective (Standard - C). Correctly respond to questions pertaining to the procedures for transporting passengers into hostile territory.

(1) Procedures for applications of operational approaches.

(2) Procedures for operating into and out of hostile HLZs, including high/low bird procedures.

(3) Procedures for personnel onload/offload via the ramp, via ladders and via hoist and the circumstances when each would be used.

b. Student Requirements and Tips:

Prerequisite Training. Complete Academic Module Z-4.

c. Source Reference. TAC Regulation 55-153.

7-7. MODULE Z-6, Operational Infiltration/Exfiltration. (0.4 Hour)

a. Objective (Standard - C). Correctly respond to questions pertaining to the procedures for infiltration/exfiltration.

(1) Role of the FAC.

(2) Enemy procedures to detect the insertion.

(3) False insertion tactics.

(4) Emergency extraction.

b. Student Requirements and Tips:

Prerequisite Training. Complete Academic Module Z-5.

c. Source Reference. TAC Regulation 55-153.

7-8. MODULE Z-7, Operational Refueling. (0.3 Hour)

a. Objective (Standard - B). Correctly respond to questions pertaining to the procedures for operational refueling:

(1) Refueling from barrels.

(2) Hot refueling.

(3) HI drink.

b. Student Requirements and Tips:

Prerequisite Training. Complete Academic Module Z-6.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) ARRSR 55-5.

7-9. MODULE Z-8, AN/ALE-20 Flare Ejector System. (0.7 Hour)

a. Objective (Standard - B). Answer questions pertaining to the AN/ALE-20 Flare Ejector System:

(1) Capability.

(2) Normal operation.

(3) Emergency operation.

b. Student Requirements and Tips. This module is an H-53 module and is intended to familiarize you with the AN/ALE-20 Flare Ejector system. Only a few H-3 aircraft have the system installed, but it could be installed in additional aircraft should the need arise. This module includes a TV presentation.

c. Source Reference. The information for this module was extracted from TO 1H-53(H)B-1, the H-53 Flight Manual.

d. Supplemental Information. If you have any questions about the content of this module, see an academic instructor.

7-10. MODULE Z-9, Helicopter Evasive Maneuvers. (Classified) (0.5 Hours)

a. Objective (Standard - A). The student will be familiar with helicopter evasive maneuvers.

b. Student Requirements and Tips. The information in this module will be discussed during the Operational Mission Seminar.

c. Source Reference. ARRSR 3-1, Combat SAR (Secret).

d. Supplemental Information. Since this TV videotape is classified secret, it will be viewed in a secure area, and any student questions or discussion will be conducted in a secure area during the Operational Mission Seminar.

7-11. Z-SEM, Operational Mission Seminar. (2.0 Hours)

a. Objective. The student will discuss and answer questions on the operational mission phase of training.

b. Student Requirements and Tips:

(1) Prerequisite Training. Academic Module Z-1 through Z-9 and Aircraft Lesson Z-4.

(2) Assignment. Review Chapter 7 of this student guide.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) TAC Regulation 55-153.

SECTION C - SIMULATOR LESSONS

7-12. SIMULATOR LESSON SZ-1. (2.0 Hours)

a. Objectives:

(1) See figure 5-1.

(2) You should be prepared to combat any emergency.

b. Student Requirements and Tips:

(1) Prerequisite Training. Academic Modules Z-1 through Z-7 and Simulator Missions SP-2 and SO-2.

(2) Assignment. Review:

(a) TO 1H-3(C)E-1 for abnormals listed above.

(b) TO 1H-3(C)E-1, Section V, for maximum gross weight/CG limits.

c. Source Reference. TO 1H-3(C)E-1, Flight Manual.

SECTION D - AIRCRAFT LESSONS

7-13. AIRCRAFT LESSON Z-1. (1.5 Hours)

a. Objective. See figure 7-2.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SZ-1 and Aircraft Lesson O-2.

(2) Assignment. Study Supplemental Information.

c. Source Reference. TO 1H-3(C)E-1, Flight Manual.

d. Supplemental Information:

(1) This phase of training is designed to teach you to adapt and adjust your flying procedures to operational flying and to expose you to all types of operational approaches. The operational flying phase may require that you reorient your thinking. Generally speaking, up to this point in training you have been limited pretty much to a basic rectangular pattern. For ease of training, the maneuvers will be classified as operational approaches. Operational approaches may be flown at any airspeed (not necessarily maximum performance), but the patterns must be adjusted due to terrain or environment. Keeping the landing/hovering spot in sight at all times is important. The large rectangular pattern cannot normally be flown. All turns should be made to the right so the flight mechanic can help keep the landing/hovering spot in sight. Operational approaches are designed to build your confidence in the aircraft and in your ability to make the aircraft perform. They allow you to fly the helicopter to a landing or approach to a hover in a minimum amount of time with minimum exposure to hostile fire. Should you overshoot a straight-in approach, you may need an operational approach to complete the landing. Aircraft limitations and restrictions will be observed during all approaches.

(2) Maneuvers:

(a) 180/360/270 degree operational approaches:

1 Required:

a Descent and Before Landing Checklist completed.

b Combat Checklist (if required) completed.

c Final Approach Check - completed prior to beginning approach.

d RPM - maximum N_r during Final Approach.

2 Analysis. These approaches are simply 180/360/270 degree approach from any altitude to the site of intended landing. Keep the spot in sight and begin the approach anytime you are in a position to intercept the approach angle for the type approach being flown. For example, the 180 degree approach may be started on downwind and is a descending 180 degree turn to arrive on a final approach at the desired angle. Prior to starting the approach, complete all checklists and post scanners. Since you may begin the approach from the downwind position, complete the Final Approach Check prior to beginning the descent so full attention can be devoted to the approach. The final part of the approach is the same as the approaches to a hover or a touchdown as outlined in the transition maneuvers. The 270 degree approach requires a 270 degree arc being flown around the site while decreasing airspeed in the last third of the turn so as to roll out into the wind on a short final approach to the spot. The 360 degree approach is much the same except that a 360 degree arc is flown around the site, keeping the landing spot in sight. It requires power adjustment to maintain the arc with the last half of the approach being the same as the 180/270 degree approach.

NOTE. Remember when you are required to perform an operational approach, you are usually in a hostile environment and you are not afforded the luxury of a landing site evaluation which involves a high and low reconnaissance. You may be able to do some preplanning but most likely you have to evaluate the spot while you are making your approach. This requires you to recognize and evaluate the same items that were accomplished in the high and low reconnaissance in a much shorter time.

(b) 360 operational spiral approach:

1 Required:

a All checklists completed prior to beginning the approach.

b RPM - maximum N_r during Final Approach. Check.

c Entry - over the spot at minimum of 2,000 feet.

2 Analysis. Approach at least 2,000 feet AGL or higher above the spot at maximum/briefed airspeed. When over the spot, lower the collective to unload the rotor system and roll in a steep turn (to the right when possible). The angle of bank and power is varied as you spiral down and roll out on a short final into the wind. During this approach, power flight as well as autorotative flight may be required. The challenge is to recognize the rate-of-descent necessary to complete the 360/540/720 degree or whatever degree of turn necessary and roll out on a short final into the wind.

(c) Straight-in operational approach (high airspeed and high rate of descent):

1 Required:

a All checklists completed prior to beginning the approach.

b RPM - maximum and matched during Final Approach Checklist.

c Entry - straight-in to spot from a minimum of 2,000 feet AGL.

2 Analysis. Start the approach from 2,000 feet or higher and far enough away to establish a normal to steep approach angle. The landing/hovering spot must be in sight prior to beginning the approach. The approach angle is flown at maximum/briefed airspeed to arrive at the spot on final approach into the wind. This type approach gives a high rate of descent. Use power as necessary to maintain airspeed until you start the flare for final approach. Powered flight as well as autorotative flight may be required. S-turns may be used to adjust the angle-of-approach. You may be required to jink the aircraft on final to avoid simulated ground fire. The challenge on this approach is not to overshoot the spot or "balloon" on the approach.

NOTE. Jinking the aircraft is altering the heading frequently to make the aircraft a difficult target. Nothing is standard but 20-30 degrees for 20-30 seconds is a good rule of thumb.

(d) Operational Hoist. Operational hoist is an operational approach to a hover with a hoist pickup. The operational approach and the hoist procedures are accomplished as previously outlined. All checklists must be completed prior to beginning the approach, including the Hoist Operator's Checklist. Scanners are posted and briefed. Upon turning short final, the pilot notifies the hoist operator to go "Hot Mike." The scanners and hoist operator clear the aircraft and talk the pilot over the spot. Once the hoist pickup is complete, the pilot may perform a rapid egress maneuver. This is accomplished by accelerating to maximum airspeed at treetop level (a minimum of 50 feet for training) craft is in a relatively safe area and then executing a "pop-up" maneuver.

(e) Pop-up Maneuver. The "pop-up" is accomplished with a smooth application of aft cyclic (15-20 degrees) coupled with maximum power. Since you have accelerated to maximum airspeed, the bleed off of airspeed in the climb will be very slow if maximum power is applied. This attitude and power is held until you reach a safe or briefed attitude or reach an engine limitation. If you experience ground fire during the "pop-up," you may also combine jinking maneuvers.

NOTE. The aft cyclic movement must be smooth and steady to properly execute this maneuver. Do not rapidly jerk back on the cyclic.

7-14. AIRCRAFT LESSONS Z-2 AND Z-3. (1.5 Hours Each)

a. Objective. See figure 7-2.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SZ-1 and Aircraft Lesson O-5.

(2) Assignment:

(a) Study Supplemental Information.

(b) Review Academic Modules O-5 and Z-3.

c. Source Reference. TO 1H-3(C)E-1, Flight Manual.

d. Supplemental Information:

(1) Aircraft Lessons Z-2 and Z-3 will include carrying a heavyweight bulky object using sling procedures. The procedures utilized will be the same as those employed in the sling work accomplished during the operation phase of your training. The objects you will be carrying, however, will weigh more and will be more bulky than those you have lifted before. When working with loads of this nature, the computation of accurate TOLD data is a prime consideration. When lifting the load from the ground, you must be sure to come up straight over the load and check the power required to hover very closely. While in-flight, insure the load is monitored closely since bulky items with large surface area may tend to swing more than the less bulky loads you have been carrying.

(2) Aircraft Lesson Z-2 and Z-3 will also include running takeoffs, minimum roll takeoffs, marginal power takeoffs and shallow approaches to running landings as practiced in the transition phase of your training. All will be flown with special emphasis on the consideration involved when performing these maneuvers at heavy aircraft gross weights as discussed in Academic Module Z-3.

7-15. AIRCRAFT LESSON Z-4. (3.0 Hours)

a. Objective. See figure 7-2.

NOTE. The primary objective of Aircraft Lesson Z-4 is to expand your low level VFR navigation skills; however, your instructor will introduce tactical combat and communication techniques as the mission progresses to help prepare you for the TAC profile missions which follow.

b. Student Requirements and Tips:

(1) Prerequisite Training. Aircraft Lessons OC-1 and Z-1.

(2) Assignment. Study Supplemental Information.

(3) Tips. Your academic instructor will provide you with the simulated frag order to fly Lesson Z-4. The information will include the coordinates of the points to be flown to and a brief description of terrain and geographic features found at each point. You should plan the mission at least two days prior to its scheduled execution and present your flight planning materials to your academic instructor for initial evaluation prior to the day of your flight.

c. Required Materials/Equipment. Arrive at your preflight briefing with a map, AF Form 70 and TAC Mission Data Card, all completed with data applicable to Lesson Z-4. You should have your pilot's plotter and computer for possible diversions or replanning.

d. Source Reference. TO 1H-3(C)E-1, Flight Manual.

e. Supplemental Information:

(1) Navigation training during this course is intended to improve your navigation proficiency and to emphasize the importance of accurate pilotage navigation during helicopter operations. The ability to accurately locate targets and LZs with the use of maps is necessary for successful mission accomplishment. The pilot who cannot locate his LZ or target due to lack of knowledge of his maps, or proficiency in using them, is not only ineffective but dangerous. Poor map reading techniques may result in supplies or personnel being delivered to other than the proper target area. Such an event would not only be embarrassing but could be disasterous and result in loss of life. The ability to accurately and continuously pinpoint your position is a vital factor in being rescued in the event you are forced down. The time devoted to navigational training in this course is limited, so use this time to your best advantage. Your life and the lives of your crew may rest solely on your navigational proficiency.

(2) Mission planning, selecting the correct map, reading map coordinates and map reading techniques are important parts of each TAC mission. Each of these areas is covered in detail in this paragraph.

(a) Mission Planning. Tactical missions are often flown in a hazardous environment in which either part or all of the mission is flown at low altitude, in an unfamiliar area and without the assistance of radio aids. Your destination is not going to be a 10,000 by 150 foot lighted runway with a control tower, TACAN, and approach control to assist you in your approach to a landing. Your destination may be a small remote clearing and the only aids available will be your prepared map and previous training. Since a navigator is not included as part of the helicopter crew, this duty rests on the shoulders of the pilots.

(b) Map Selection. Select the map(s) that will be the most useful for your particular mission. Normally a 1:250,000 scale is used for medium to high altitude (2,000 to 10,000 feet AGL) enroute navigation. A 1:50,000 scale map is most useful for the target area and for mission planning. The maps used in the Air Force depict the UTM grid and contour information. The contour information can assist immeasurably in the selection of the enroute course and approach course to the LZ or target area. The map should cover enough area to allow for course deviations and to give you the "big picture" as to where you are in relation to points of interest.

(c) UTM Grid System. The Universal Transverse Mercator (UTM) grid system is simple in theory, but may become very confusing when airborne while pressed for time and trying to quickly locate a set of coordinates. Do not rush. Take your time and locate the coordinates correctly the first time.

1 Relationship of Military Grids to Map Projections. Because military grids are designed to permit accurate identification of ground locations and the computation of distance and direction from one point to another and because all map projections have inherent distortion of scale and angles, it is essential that military grids be superimposed upon projections having the least distortion. Conformal projections selected by the Department of Defense as having the least distortion of scale and angles for large and medium scale mapping are the Transverse Mercator and the Polar Stereographic. The military grid systems are applied to aeronautical charts primarily for use in Air Force support of ground operations. The Air Force uses the Universal Transverse Mercator (UTM) from latitude 80°S to 84°N and the Universal Polar Stereographic (UPS) from latitudes 84°N and 80°S to the respective poles. The standard unit of measure used with UTM and UPS grids is the meter.

2 Military Grid Reference System. The military grid reference system is designed for use with the UTM and UPS grids. The world is divided into large, regularly shaped geographic areas, each of which is given a unique identification, called the Grid Zone Designation. These areas are subdivided into 100,000 meter squares, based on the grid covering the area. Each square is identified by two letters called the 100,000 meter square identification.

3 Locating a Military Grid Reference. A Military Grid Reference consists of a group of letters and numbers which indicate the grid coordinates - the numerical reference - of the point expressed to the desired accuracy. A reference is written as a continuous number without space, parentheses, dashes or decimal points. Example: NL743385 - locating a point within 100 meters. To satisfy special needs, a reference can be given to the nearest 10 meters and the nearest 1 meter. Examples: NL74343856 - locating a point within 10 meters; NL7434238565 - locating a point within 1 meter. Normally all elements of a grid reference are not used. Those to be omitted depend upon the size of the area of activities

and the scale of the map to which the reference is keyed (interval of grid lines). On some maps, the grid will have lettered squares with less than ten divisions. This presents no problem in the use of the map as the area is covered by the next square. When coordinates are given to you, they will appear as two letters followed by four or six numbers. The two letters identify the 100,000 meter square (see figure 7-3). Move to the lower left corner of the lettered square. The numbers are divided into groups of two or three (up to five in some cases). The first number identifies the 10,000 meter square reading to the right. The next number identifies a 1000 meter square and the third, if given, identifies a 100 meter square. Using the first number of the second group of numbers, read up to find the major square then find the 1000 or 100 meter square with the next numbers of the group. A plastic grid overlay as shown in figure 7-3 is handy to find the exact spot in the 100 meter square. The procedure is simple once you are familiar with it. Start at the lower left corner of the lettered square. Read right with the first group of numbers and up with the second group of numbers.

(d) Map Reading Techniques. After much experience in working with 1:50,000 and 1:250,000 charts, it has been found that there are several points that will help you with your map reading. The more important ones follow:

1 When proceeding from point-to-point, always try to get there in the easiest way (this is not necessarily the most direct route). Follow roads, rivers, railroad tracks and any other prominent terrain or man-made feature. It is sometimes better to follow a curved or crooked road to a point rather than a straight line over miles of dense jungle and then spend time trying to locate yourself. However, do not overfly hostile areas just because that is the easiest route to follow!

2 When using a map, do not limit yourself to checking the terrain features immediately on either side of track. Try to get the "big" picture. Constantly keep a check for any large or definite features that may be off in the distance on either side of track which will help to keep you located.

3 Determine the time to check your turning points.

4 Use contour lines to your advantage. They give excellent information as to the presence of streams, hills, gullies, etc. Contours give excellent navigation information when in mountainous terrain.

5 Remember that man-made features such as unimproved roads, settlements, small bridges and structures may be destroyed or changed. Depend on natural or more permanent man-made features for pilotage. At the same time, remember that very small natural features like ponds or small creeks may dry up at certain times and not be visible, or may be covered by dense foliage.

6 Altitude is always a big help when map reading. If at all possible, get to an altitude that will enable you to see as much of the surrounding terrain as possible. The lower you fly, the harder it is to keep oriented.

7 Be absolutely sure you are in the area specified. Here is where good map reading is important.

8 Tick your course lines every five or ten miles to aid in navigating. Write the time crossing major check points right on the map. Then you will have an updated reference point in case you lose track of your position.

9 Analyze the Area. Pick out obvious features that might be used to an enemy's advantage such as trails, clearings, boat landings, structures or defensive positions. Also be suspicious of any departure from normal color, density, motion or position of the surrounding foliage. Keep these areas in mind and give them special attention.

7-16. AIRCRAFT LESSON Z-5. (3.0 Hours)

a. Objective:

(1) See figure 7-2.

2) Prepare to discuss any emergency procedures previously covered in your training.

b. Student Requirements and Tips:

(1) Prerequisite Training. Academic Modules Z-8 and Z-9, Operational Mission Seminar, and Aircraft Lesson Z-4.

(2) Assignment. Study Supplemental Information.

(3) Tips. Aircraft Lesson Z-5 will be flown as a formation flight with another helicopter. The TAC profile mission you have planned will be flown. You and another TAC student pilot, who will fly the lesson with you, should work together on your flight planning. Maps and all other flight planning materials required will be supplied by academics. You should bring your own computer, plotter, colored pens and pencils, etc., as needed.

c. Required Materials/Equipment:

(1) Map.

(2) AF Form 70.

(3) TAC Mission Data Card.

(4) Pilot's plotter.

(5) Pilot's computer.

d. Source Reference:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) TAC Regulation 55-153.

e. Supplemental Information:

(1) Aircraft Lesson Z-5 will be flown as a simulated two ship tactical infil as per the frag order found in the TAC mission planning room. Your instructor pilot will do everything possible to simulate combat conditions throughout the mission. Your abilities to perform tactical navigation, as well as your skills in coordinating and executing a TAC mission in a combat environment, will be put to the test. It is your responsibility to arrive at the flight line the day of the mission, with a completed flight plan for the mission. Once your instructor has given the standard briefing, you will be expected to delivery a comprehensive mission briefing utilizing the TAC mission briefing guide. During the mission, you will be confronted with many situations.

You will be expected to coordinate with your wingman, simulated escort fighters, simulated control agencies (ABCCC-Hillsboro, Command Post-Teepee), and your simulated teams. You will be required to react to simulated hostile ground fire, simulated enemy fighters and simulated threats to your teams on the ground. Academic Lessons Z-2, Z-4, Z-5 and Z-6 contain the information you need to know to successfully execute this mission.

(2) Normally, a course is selected before the checkpoints are determined; however, in some situations the reverse will be true. The course you select should be the most direct route possible consistent with the enemy position, terrain and other mission requirements. Do not compromise security to facilitate navigation. Possible factors that influence course selection are:

(a) Known enemy defenses. The current intelligence situation should be studied and penetration of enemy defenses should be carefully planned so as to offer minimum risks.

(b) Populated areas. Helicopters often receive ground fire from villages or small settlements even when such areas are not designated hostile. In addition to exposing yourself and crew to defenses near the village, you may tip off a communications net and alert other defenses further along your intended course.

(c) Terrain features. You may want to take advantage of terrain cover during low altitude flying to minimize your exposure to threat areas and assist in concealing your position when security is a factor. Often a course is selected to utilize prominent terrain features as checkpoints.

(d) Roads and rivers. These and other lines of communication should be avoided when they are located in hostile territory. If utilizing these features is absolutely necessary, select an altitude which offers the best security against enemy defenses reported to be positioned there. Remember, when using unprepared roads or trails for navigation, they are subject to change in direction and appearance, this is especially true in jungle terrain. Large rivers are by far the better of these terrain features to use for navigation. Even though the size will change with seasons, they are still easily identifiable.

(e) "Hot" areas. Areas of extensive combat operations in which you are not involved, i.e., close air support strikes, bomb strikes, and artillery areas. Because of the diversionary effect, flight near these areas could be advantageous but are often denied by command directives.

(f) Selected area for evasion (SAFE) areas. Always one of the better areas to overfly.

(g) Checkpoints. Checkpoints should be easily identifiable on your planned course. In remote areas, a natural terrain feature is more reliable than man-made features. Use major terrain features for checkpoints whenever possible to avoid mistakes.

(h) Turning points. Select turning points on the same basis as checkpoints. For clandestine missions, short course legs of 20-40 NM in length may be desirable.

(3) Formation training may be flown any time prior to this mission. The student will receive a minimum of 1.0 hour, with 0.5 hour as lead and 0.5 as a wingman. This tactical formation may be flown with any other H-3 or H-53 as long as the formation is prebriefed.

(4) Transition maneuvers may be practiced on any lesson, but must be completed prior to the completion of this mission. Only straight ahead and 90^{o} autorotations need be practiced.

7-17. AIRCRAFT LESSON ZC-1. (3.0 Hours)

a. Objectives:

(1) See figure 7-2.

(2) You will be evaluated on all the flying skills you have practiced in the operational phase of your training.

(3) Prepare to answer questions on all H-3 emergency procedures.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SP-3 and Aircraft Lesson Z-5.

(2) Assignment:

(a) Study supplemental information. Although not required, a review of the "Z" academic modules in areas where you feel you are weak is recommended.

(b) Complete mission planning for Aircraft Lesson ZC-1.

(3) You and your flying partner should begin flight planning for Aircraft Lesson ZC-1 as soon as possible after flying Aircraft Lesson Z-5. Prepare maps and data cards and a mission briefing.

c. Required Materials/Equipment:

(1) Map.

(2) AF Form 70.

(3) TAC Mission Data Card.

(4) Pilot's plotter.

(5) Pilot's computer.

d. Source Reference:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) TAC Regulation 55-153.

e. Supplemental Information. You will be evaluated on your abilities to plan, brief, and execute a simulated TAC combat mission similiar to Aircraft Lesson Z-5. Your ability to fly operational approaches, work with heavy internal gross weight conditions and to sling heavy bulky loads, will also be evaluated.

TEST COURSE

COURSE NUMBER H3P3		DESIGNATION H-3 (OPS MISSION) (AIRCRAFT)						TRAINING
FLIGHT TIME	HOURS	1	1	1	3	3	3	
	TENTHS	5	5	5	0	0	0	
LESSON	PHASE/SUBJECT	Z	Z	Z	Z	Z	ZC	
	NUMBER	1	2	3	4	5	1	
FLIGHT PREPARATION		2	3	3	3	3	3	
MISSION PREPARATION: Briefing					2	3	3	
Determine Load Capability					2	3	3	
OPERATIONAL MISSION:Operational Approaches		2			3	3	3	
Operational Approach To TD		2			3	3	3	
HEAVY GROSS WEIGHT OPS: TOLD			2	3			3	
Takeoff			2	3			3	
Approach			2	3			3	
Landing			2	3			3	
HEAVY WEIGHT SLING: Briefing			2	3			3	
TOLD			2	3			3	
Pickup			2	3			3	
Load Positioning			2	3			3	
Release			2	3			3	
OPERATIONAL PROFILE: Map Preparation					2	3	3	
Low Level VFR Navigation					2	3	3	
Infil Procedures		2			3	3	3	
Exfil Procedures		2			3	3	3	
Mission Coordination					2	3	3	
Communications					2	3	3	
Evade Hostile Weapons					2	3	3	
Egress		2			3	3	3	
Diversion					2	3		
DOPPLER NAVIGATION: Flight Planning								
Inflight Procedures								
FORMATION						3		
REVIEW MANEUVERS: Transition								
Autorotations								
Single Engine Approach/Landing								
AFCS/Servo Off Approach/Landing								
USE OF CHECKLISTS		3	3	3	3	3	3	
CREW COORDINATION		1	2	3	3	3	3	
ABNORMAL/EMERGENCY PROCEDURES		3	3	3	3	3	3	
AIRMANSHIP		S	S	S	S	S	S	

Figure 7-2. OPS/MISSION - Aircraft

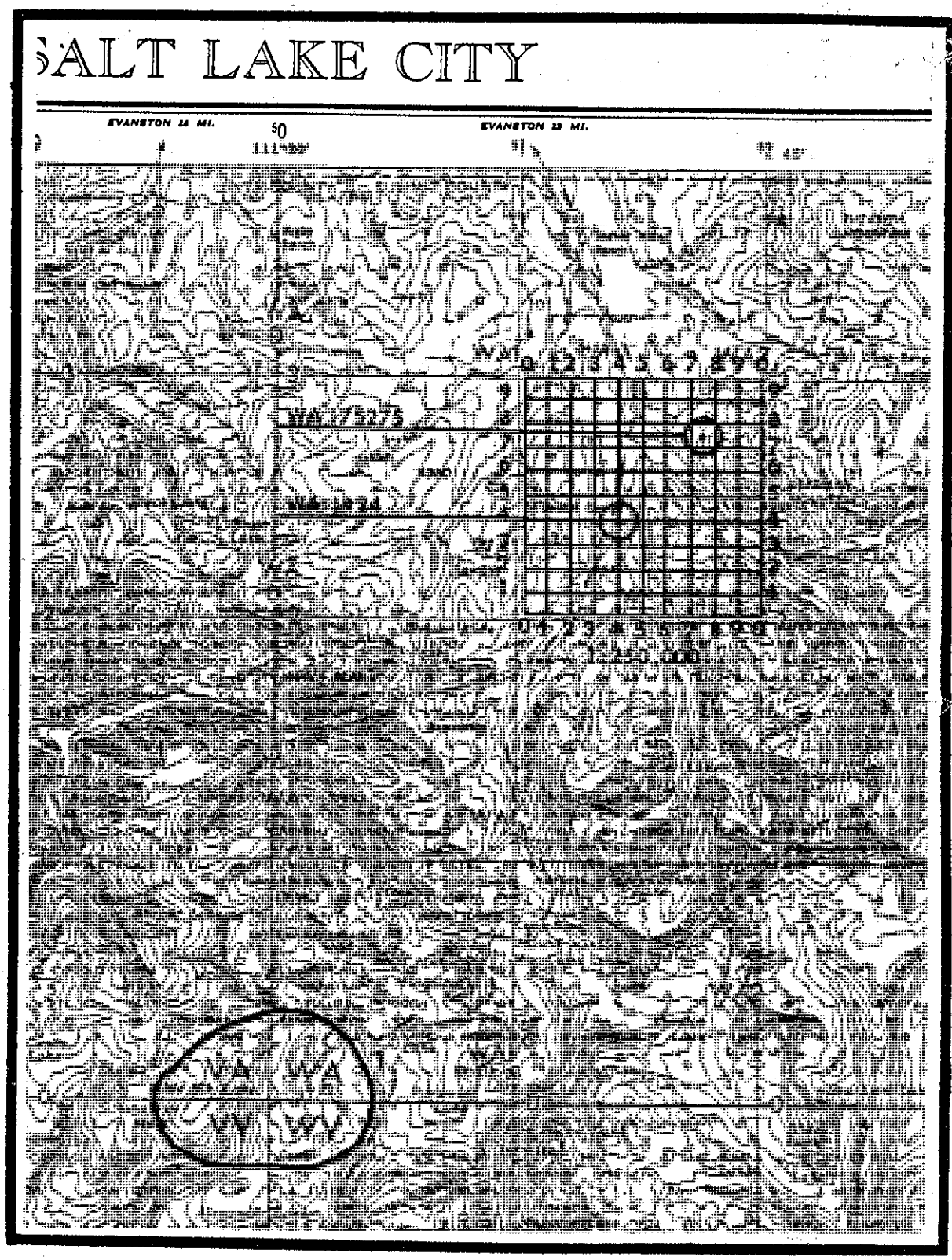

Figure 7-3. UTM Grid Map w/Overlay