CHAPTER 5

OPERATIONS

SECTION A - GENERAL INFORMATION

5-1. SYNOPSIS. Upon entering the operational phase of training, emphasis will shift from merely driving the helicopter to actually performing an intended mission with it. Assuming you understand and can fly the machine, your goal then becomes one of learning and applying operational procedures, techniques and theory. Even though an operational maneuver will be performed under visual conditions in the aircraft, procedures can be learned in the learning center and practiced in the simulator, thereby, better preparing you to perform them in-flight. Operational training is designed to give you a basis of judgment for use in the many varied conditions you will face in the future. We cannot teach you everything to do for every situation.. As well as teaching procedures, we are developing judgment.

SECTION B - ACADEMIC LESSONS

5-2. MODULE 0-1, Doppler Navigation. (2.0 Hour)

a. Objective (Standard - C). Understand:

(1) Doppler components and explain their operation.

(2) Preparation of a doppler navigation map.

(3) The preflight and in-flight procedures for doppler navigation and search.

b. Student Requirements and Tips. Assignment:

(1) Read Supplemental Information.

(2) Part II of this module is on TV tape.

(3) Exercise. After completing this module, you will be required to flight plan your doppler mission. The information and materials may be obtained from the H-3 Academics Section.

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

d. Required Materials/Equipment:

(1) TO 1H-3(C)E-1.

(2) Pilot's computer.

(3) Plotter.

e. Supplemental Information. Navigation training is intended to improve your navigation proficiency and to emphasize the importance of accurate pilotage navigation in conjunction with the use of the doppler navigation system during helicopter operations.

(1) Doppler Navigation Systems. The accuracy, validity, and reliability of the APN-175 Doppler Navigation System will largely depend upon the operator. Only through proper flight planning, accurate update, proper interpretation of component malfunction, and a thorough understanding of the system will the pilot realize the maximum benefit from the doppler navigation system.

(2) Constructing a Doppler Grid Map. The large scale map is the most desirable to use for a doppler grid; therefore, a 1:500,000 scale map will be used. Orient the grid to true North by selecting a meridian in the approximate center of the chart. Draw the North-South reference datum line on this meridian. Select a line of latitude at the center of the meridian for the East-West reference datum line. The intersection of the two lines will be the reference datum point (RDP). From the RDP, measure 20 miles and use the same 20 mile scale to measure the North/South, East/West lines. (Other methods may be used at the pilot's discretion.) The accuracy of the grid lines will add to the accuracy of the doppler system.

(3) Calculating Doppler Coordinates. In certain instances, it may be desirable to calculate doppler coordinates rather than construct a grid. For example, a change of destination, once airborne, would present considerable difficulty, should it be outside the grid you have already constructed. It is also much easier to calculate and more accurate than to construct a grid over long distances involving the use of several maps. Procedures for calculating doppler coordinates from latitude and longitude will be presented in Module 0-1.

(a) Determine the RDP, using the same procedure as above. For N-S coordinates, the difference in latitude between the RDP and the desired point is converted directly to nautical miles and set into the doppler when required.

(b) For the E-W coordinates, the difference in longitude at the latitude of the desired point is converted to nautical, using the Length of a Degree of Latitude and Longitude chart. (Table 5-3)

(4) Selecting Update Points. Geographical locations which are readily discernible and which pinpoint exact positions should be selected as update points. Intersections of rivers, roads, or railroads are considered best. A tower of depicted obstruction, if selected as a point, will locate exact position, but is not always easily identifiable. Plot the desired course and, along that route, select several update points and record their doppler coordinates on an in-flight log.

(5) Update Procedures. Update the present position shortly after takeoff and as often as possible thereafter to determine the reliability of the system. Geographic locations are normally used; however, under IFR conditions, over water or over ill-defined geographic areas, radio NAVAIDS, of necessity, must be used for update points. When using TACAN to plot a position, keep in mind that this is slant-range information and the further away from the station, the more accurate the update will be.

5-3. MODULE O-2, Remote Site Operations. (1.0 Hour)

a. Objective (Standard - D) Answer questions concerning various aspects of remote site operations to include:

(1) Turbulence, wind effects, high density altitude considerations.

(2) Site evaluation parameters and procedures.

(3) Approach, landing, and takeoff procedures.

b. Student Requirements and Tips:

Assignment:

(a) Read TO 1H-3(C)E-1, Section II, Remote Area Operations.

(b) There are two parts to this module.

(c) Read Supplemental Information.

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

d. Supplemental Information:

(1) Remote area training includes mountain flying, high altitude operations and confined area operations. Wind direction/velocity, gross weight limitations and effect of obstacles are but a few of the considerations that must be taken into account for each landing and takeoff. It is imperative that each crew member understand completely the maneuvers to be accomplished during all phases of remote operations.

(2) Operator Knowledge. Before an aircraft can be effectively used, its capabilities must be known. Charts are provided in the flight manual to aid in determining the aircraft's performance. Use of the charts is based on known or estimated conditions compared to a standard aircraft's ability to perform. The H-3 performance charts are exceptionally accurate, allowing quite precise preflight planning.

(3) Preflight Planning. As altitude and temperature increase, H-3 lifting capabilities decrease; therefore, it is essential that meteorological planning data be as close as possible to that expected to be encountered in the intended area of operation. If precise operating area information is not available, intelligent estimates must be made as to the expected pressure altitude and surface ambient air temperature. The available data will then be used to determine the necessary performance factors from the appendices. Another factor affecting helicopter performance is wind. Weight carrying capability increases rapidly with an increase in wind velocity relative to the rotor system. However, accurate wind information is more difficult to obtain and more variable than other planning data. It is, therefore, not advisable to include wind in the planning data except to note that any wind encountered in the operating area will affect helicopter performance. In a few cases, operational necessity will require you to operate at a density altitude above the hovering capability of the helicopter. In these cases, a running landing or takeoff from a prepared surface will be necessary to accomplish the mission.

(4) In-flight Procedures:

(a) Initial pass (optional).

(b) High reconnaissance (mandatory).

(c) Low reconnaissance (mandatory).

(d) Analysis. The effect of mountains and vegetation can greatly vary temperatures and wind conditions within a short distance. Most likely you will also be unfamiliar with the landing site and surrounding terrain. For these reasons, each landing area must be carefully evaluated at the time of intended operations. When evaluating a landing area or site, execute as many fly-bys as necessary to assure a safe approach and landing. During this phase of training, use a rectangular pattern when terrain and/or wind conditions permit.

(5) Initial Pass:

(a) Recommended:

1 Descent Checklist.

2 Gear Down - Before Landing Checklist.

(b) Analysis. Prior to the first pass over a site, the Descent and Before Landing Checklist should be accomplished. On the first pass over a strange landing area, the most important thing a pilot can do is identify the landing/hover site and note the conditions that can make your high reconnaissance more useful. Pick out prominent landmarks that will assist you in keeping the area in sight. Try to establish the direction you will make the high reconnaissance. You may also start gathering the data for computing the landing power required.

(6) High Reconnaissance:

(a) Required:

1 Speed selectors as required (103% N_r minimum).

2 Airspeed 70 KIAS minimum.

3 Altitude approximately 300 feet.

(b) Analysis. If terrain, weather and other factors permit, fly the high reconnaissance at approximately 300 feet above the landing site to permit observation of the intended landing area and all possible approach and takeoff routes. Use a minimum airspeed of 70 knots and accomplish the following:

1 Descent Checklist (if not already accomplished).

2 Before Landing Checklist (if not already accomplished).

3 Free Air Temperature, Pressure ALT, and fuel on board. Check for possible inversion. This information will be given to the flight mechanic as soon as possible to expedite TOLD computations.

4 Approach and Departure Routes. Observe possible routes for approach and departure. Consider the terrain features and select the most desirable area over which to maneuver.

5 Wind Evaluation. There are several methods of determining the wind direction and velocity in remote areas. The most reliable method is by the use of smoke generators. However, it must be noted that the hand held day-night distress signal and standard issue smoke grenade constitute a fire hazard when used in areas covered with combustible vegetation. Although the smoke grenade will not normally be used while you are in training, when it is used, it will be deployed from a low reconnaissance approach. Observation of foliage will indicate to some degree the direction of the wind, but is of limited value in estimating wind velocity. Helicopter drift determined by eyesight without the use of navigational aids is the first method generally used by experienced pilots. The accuracy with which wind direction may be determined through the "drift" method becomes a function of wind velocity. If practical, execute 90-degree course changes during the high reconnaissance to evaluate the wind direction. The greater the wind value, the more closely the direction may be defined.

6 Site Elevation. Estimate the elevation of the landing area. This can be determined by pilot judgment or by the radar altimeter.

7 Power Available/Required Check. This check will be performed at any time a remote landing is anticipated. Determine the maximum power available by increasing N_f to maximum and then topping the engines, noting the maximum torque (power) available at 103% N_r. This should be accomplished under conditions equal to or more severe than the anticipated landing area.

8 Maximum Power /Computed Power Comparison. Compare the maximum power available with computed maximum power available (if this has not been done previously during the flight). If engine operation is deemed satisfactory, the actual maximum power available will be compared with the computed required to hover at the selected wheel height, in the landing area. Remote computations will be based on zero wind. If power available does not provide a satisfactory margin over the power required, the low recon, approach and landing will not be attempted. Subsequent landings in the same general area will not require repetition of the power available/required check provided conditions (altitude, OAT, pressure altitude) remain essentially unchanged.

(7) Low Reconnaissance:

(a) Required:

1 Speed selectors - maximum.

2 Airspeed 60 KIAS minimum.

3 Altitude 50 feet above the highest obstacle minimum.

(b) Analysis. The low reconnaissance should be flown in the direction considered the most desirable for an approach to the landing area as determined during the high reconnaissance, and flown as much like the intended approach as possible. The pass should be flown over the area to the site of the landing spot at approximately 50 feet above the highest obstacle at a minimum airspeed of 60 KIAS and the following accomplished:

1 Recheck the approach route.

2 Re-evaluate wind.

3 Check size, slope, condition and obstructions in the landing area.

NOTES.

1. A good rule of thumb is: The landing area should be twice the size of the rotor diameter.

2. The low recon will not be flown until the power available/required computations are complete.

3. Consideration must be given to the effect of topography on power required when hovering over sloping terrain; power required to hover will increase proportionally with the slope of the landing surface. In addition, OGE power is normally required for hovering over pinnacles due to the reduction/loss of ground effect.

after completing the pass over the site and returning to pattern altitude, the speed selectors should be returned to 103% N_r.

(8) Approach:

(a) Required. Recheck landing gear and speed selectors to MAX.

(b) Analysis. After the high and low passes have been performed, consider the approach to be used. The type of approach and approach techniques will vary with almost every situation. The approach and takeoff should be planned to avoid obstacles and effect the safest possible approach and departure under existing operating conditions. In some instances, a straight-in approach may be impossible or impractical, and a circling or side approach would be best. After turning final approach, recheck gear and beep speed selectors to max. Normally, a 30° - 40° apparent angle on final is recommended. Start the approach at 50 to 70 knots from approximately 300 feet above the landing site elevation. Ensure that the groundspeed, approach angle, and rate of descent are consistent with the existing conditions. (For student training, all remote area operations will not exceed 500 FPM throughout the approach or 300 FPM during the last 100 feet of the approach.) The transition period is the most difficult portion of any approach. As the helicopter performance decreases and/or the height of the obstacles increases, the transition period becomes more critical and a low rate of descent will be required. When the helicopter drops below an obstacle, a loss of wind generally occurs as a result of the airflow being disturbed by obstacles on the upwind side of the landing zone, which creates a virtual null area. This null area extends toward the downwind side of the clearing and will become larger as the height of the obstacle and wind velocity increase. It is therefore increasingly important in the landing phase that this null area be avoided if marginal performance capabilities are anticipated.

NOTE. The flight manual states the nose wheel should be locked prior to landing on slopes. If the nose wheel is locked, brakes must also be locked.

(9) Landing. The landing is the culmination of the area and site evaluation. Landing RPM should be maintained until the collective is placed smoothly in the full down position so that an immediate takeoff may be accomplished should the helicopter start tipping from a gear being placed in soft earth or hidden hole. Refer to the flight manual for slope landing limitations. Tactical operational missions frequently require one or two wheel landings to a slope, so if you are unable to go full down with the collective, decrease the collective until you reach a point where cyclic control approaches or reaches the limits.

CAUTION. Do not exceed limits as outlined in the flight manual.

Control of the aircraft will be quite demanding. The blade-tip-to-ground clearance is reduced and must be closely monitored. There are two control problems associated with hovering with only the nose gear on the ground. One, a tendency to roll up hill and two, a reduction of collective to stop movement, resulting in drop of the tail. These two are overcontrol problems common to slope landings. Hovering with only a main gear on the ground seems easier to control. The main problem associated with this type hover is blade-to-ground clearance.

NOTE. Upslope or cross slope landings are preferred over downslope landings because tail rotor clearance is greatly reduced downslope.

(10) Takeoff:

(a) Required:

1 Before Takeoff Checklist (if required).

2 N_r 100% minimum (speed selectors set at maximum).

3 Torque as needed.

(b) Analysis:

1 When practical, all takeoffs will be made into the wind and downslope. This ideal solution rarely exists, however, the selected takeoff route is usually a compromise between wind and terrain. It is possible that under certain combinations of limited area, high obstacles upwind, and limited power available, the best takeoff route would be either crosswind or downwind. Even though this is a departure from the cardinal rule of "take off into the wind," it may well be the proper solution when all factors are weighed in their true perspective.

2 Full power (or as necessary) should be used for all takeoffs from remote/confined areas until obstacles are cleared and a safe single engine/climb airspeed is attained. The use of full power applied early during the takeoff will give the maximum performance of the aircraft to clear obstacles. However, with a light aircraft and a large power reserve, it may be desirable to use less than full power for the takeoff. During upgrade training and evaluation flights, full power may be simulated by utilizing at least OGE power. It must be understood by all crew members that this is a simulated power restriction and any delay in applying maximum power (if the situation dictates) may jeopardize safe obstacle clearance. When operating at or near maximum power, it is imperative that the crew monitor the rotor RPM and engine performance instruments to prevent exceeding operating limits or drooping the rotor RPM. When obstacle clearance is of primary concern, the pilot's attention will be concentrated outside the aircraft. Under these conditions, the crew must assist the pilot in identifying unsafe or potentially hazardous conditions. The null, or downdraft area is of particular concern in making takeoff from a confined area. Under heavy load or limited power conditions it is desirable to achieve translational lift prior to transitioning to a climb. If the takeoff is not started from the most downwind portion of the area and translational velocity achieved prior to arrival in the null or downdraft area, a significant loss of lift may occur at the most critical portion of the takeoff.

CAUTION. Do not forget to release the parking brakes and unlock the nose gear after completing the After Takeoff Checklist if either were used during operations on rough or sloping terrain.

5-4. MODULE O-3, Formation. (0.4 Hour)

a. Objective (Standard - C). Given a situation requiring formation flight, answer questions IAW ARRSR 55-5 regarding:

(1) Joinup.

(2) Types of formation.

(3) Emergency and recovery procedures.

b. Student Requirements and Tips. Assignment: Read ARRSR 55-5, Chapter 8.

c. Source Reference. ARRSR 55-5, Helicopter Aircrew Operational Procedures.

5-5. MODULE O-4, Land Hoist. (0.7 Hour)

a. Objective (Standard - C). Answer questions concerning land hoist IAW ARRSR 55-5 to include:

(1) Crew briefing items

(2) TOLD planning considerations.

(3) Pattern, checklist, and approach procedures.

(4) Hover, pickup, and takeoff procedures.

(5) Hoist emergency procedures.

b. Student Requirements and Tips. Assignment:

(1) Read TO 1H-3(C)E-1, Section IV, Rescue Hoist.

(2) Supplemental Information.

c. Source Reference:

(1) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

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

d. Supplemental Information:

(1) Power Available/Required Check. This check will be performed at any time a hoist recovery is anticipated. Determine the maximum power available by increasing N_f to maximum and then topping the engines, noting the maximum torque (power) available at 103% N_r. This should be accomplished under conditions equal to or more severe than the anticipated area of operation. Compare the maximum power available with a computed maximum power available (if this has not been done previously during the flight). If engine operation is deemed satisfactory, the actual maximum power available will be compared with the computed power required to hover, at the selected wheel height, in the operational area. Remote area operations will be based on zero wind. If power available does not provide a satisfactory margin over the power required, the low recon, approach and landing will not be attempted. Subsequent hoist operations in the same general area will not require repetition of the power available/required check provided conditions (altitude, OAT, pressure altitude) remain essentially unchanged.

(2) Land Hoist Recovery. Perform Descent, Before Landing, Pilot Hoist Recovery, Hoist Operator, and Combat Penetration Checklists (when required). Additionally, a high and low reconnaissance, as outlined in paragraph 5-3, Remote, will be accomplished in so far as operational conditions permit.

(a) During confined area hoist operation, the survivor may never be seen either by the pilot, and in some cases, by the hoist operator until he emerges from the trees on the forest penetrator. In either case, guidance must be provided by the survivor with his emergency radio or other signaling device (i.e., smoke or pen gun flare). Mirrors are of little use underneath heavily foliated terrain.

(b) Under these circumstances, keeping the area in sight is absolutely necessary. Once you turn your back on an ill-defined, dense tree canopy, you may never find the survivor again. Therefore, it is the pilot's responsibility to keep the hoist operator informed as to aircraft location in relation to the survivor (downwind, base, final, etc.).

(c) Approach (angle) should be adjusted to the situation. After completing the landing site evaluation, the traffic pattern for training operations will be flown approximately the same as transition (terrain and winds permitting). To keep the hoist area in sight, right hand patterns will be flown, when possible. A steep approach will provide a better surveillance of the area, but keep in mind that it also creates a greater exposure to any hostile force.

(d) A steady hover technique during confined area hoist operation is particularly critical in that the forest penetrator must be lowered directly to the survivor through the trees. By the same token, once the survivor is on the penetrator, care should be taken to avoid an oscillating hoist cable and resulting injury to the survivor. In these conditions, the hoist operator should advise the pilot exactly where the penetrator is in relation to the trees.

(3) Voice Procedures:

(a) The following are types of advisories which will be given by the hoist operator to position the helicopter precisely over the spot for hoist insertion and extraction:

1 Forward.

2 Back.

3 Left or right.

4 Up or down.

5 Fast.

6 Slow.

7 Stop.

8 Hold.

(b) The hoist operator will indicate the amount and direction of movement desired. Movement in two directions simultaneously is possible and would be directed thusly: "Forward 10, right 5."

(c) Prior to entering an area for a hoist operation, the pilot will advise the hoist operator to "Prepare for a Hoist Pickup." At this time, the hoist operator will accomplish the Hoist Operator's Checklist and inform the pilot, "Hoist Operator's Checklist completed, ready for pickup, acknowledge." This statement will be transmitted on Hot Mike. The hoist operator will turn off Hot Mike as soon as the pilot and copilot acknowledge the transmission. When the survivor is located, the person making the sighting will notify the other crew members of clock position, and estimated distance from the aircraft. While on final, and prior to the pilot losing sight of the survivor, and assuring that the hoist operator has the survivor's position in sight, the pilot should direct the hoist operator to "Go Hot Mike." From this time, the hoist operator should provide continuous commentary to direct the aircraft over the survivor. It is extremely important that the hoist operator give clear, concise voice commands, keeping the pilot informed at all times with a continuous commentary. (Example: Penetrator going down - half way down - on the ground - he is clear of the trees - he is ten feet from the door - survivor in and secure - ready for takeoff.)

(d) After removing the survivor from the penetrator, the hoist operator will remove the penetrator from the hoist cable, rewind the cable and request hoist master switch off. At this time, the pilot will turn off the hoist master switch. The hoist operator will stow the penetrator and secure from hoist pickup.

(4) Night Hoist Operations:

(a) Rescue hoist operations can be safely accomplished at night as well as day. The hoist operations are basically the same in that normal voice procedures and crew coordination will be used. During a night hoist recovery, there is always the possibility of obstructions on the final approach; therefore, the steep approach to a hover out of ground effect will be emphasized. The types of lighting and approach techniques previously discussed in Chapter 3 will be used. If necessary, the hoist operator may use the rescue light which is attached to the rescue hoist. Keep in mind that the hoist operator may encounter the same problems as the pilot with depth perception. Consequently, the altitude and distance to the survivor given by the hoist operator may be somewhat less than accurate. The key to a successful night recovery is a power controlled approach so that any errors may be easily corrected.

(b) During the hover phase of the recovery, use of the landing light, in addition to the searchlight, may aid in keeping adequate ground references. If both lights are used, the pilot flying the helicopter should position the controllable searchlight out to the side at an approximately angle of 50 degrees. The landing light should be positioned at an angle that will illuminate the references needed directly ahead of the helicopter. These light settings will allow the pilot to have illuminate ground references for both fore and aft and lateral corrections to hover.

5-6. MODULE O-5, Cargo Sling. (0.6 Hour)

a. Objective (Standard - C). Answer questions IAW ARRSR 55-5 and TO 1H-3(C)E-1 concerning:

(1) Cargo sling limits.

(2) Briefing Items.

(3) Normal and emergency procedures.

b. Student Requirements and Tips. Assignment:

(1) Read TO 1H-3(C)E-1, Section IV, External Cargo Sling and Section VI, Flight with External Loads.

(2) Supplemental Information.

c. Source Reference:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

(3) TO 1H-3(C)E-1CL-2.

d. Supplemental Information:

(1) During sling operations, you will be using many of the maneuvers learned in the transition phase of your training. A significant difference from the transition phase will be the need to closely monitor power requirements and anticipate power changes earlier. The key to successful sling operations is developing smooth and positive aircraft control techniques. Although the maneuvers and procedures may seem a little mechanical and uncomfortable at first, your proficiency will increase with practice. Refer to TO 1H-3(C)E-1CL-2 for cargo sling procedures and briefing items.

(2) Flight Planning Procedures. Primary consideration will be given to the hovering capability of the helicopter during sling operations. Consult the performance data in the Appendix of the flight manual to ensure that the gross weight, including the object to be sling-loaded, is within the hovering capabilities of the helicopter. Compute TOLD data using hover altitude that will give a five-foot load clearance. Do not, in any case, exceed the weight limitations of the sling.

(3) Crew Coordination and Marshalling Signals. Crew coordination is a vital part of sling operations. Be sure that each crew member is aware of his specific duties. Standard international aircraft marshalling signals will be used. These are the signals used by all units worldwide. After bringing the helicopter to a hover, and while approaching the sling load, observe and follow the directions of the marshaller. After the hover is established, continue to observe the marshaller for indication of drift, positive hook-up and takeoff clearance. Flight mechanics may direct pilots via interphone for cargo hook-up without benefit of a ground marshaller.

__NOTE__. The pilot must be notified immediately by the flight mechanic when the load is hooked or released so that the pilot is aware of the aircraft configuration at all times.

(4) In-flight Procedures:

(a) Approach for Sling Pickup. The approach for the sling pickup will be the same as that used in normal remote work. The Before Landing Checklist will be accomplished on downwind and the speed selectors advanced to maximum on final. Fly a normal approach to a point just short of the sling weight (downwind).

(b) Hovering Pickup. Prior to commencing the pickup, complete the Before Takeoff Checklist and insure that the cargo sling master switch is in the SLING position. Hover the helicopter into the wind and position it over the load using the signals given by the marshaller Hold a constant hover while the hook-up is being made. After hook-up is completed and the hook-up man is clear, slowly increase collective pitch to take slack out of the sling cable. Center the helicopter over the load and lift the sling load to five feet. Sling load height can be determined by signals from ground personnel. Check the power required at this point to insure sufficient power exists to complete the takeoff.

(If you cannot maintain sling load clearance of five feet at 103% N_r, abort the exercise.) Note the height of the helicopter above the ground as a reference for subsequent approaches with the sling load attached. For training purposes power is computed for a 20 foot hover plus 5% Torque

(c) Takeoff with Sling Load. Once a positive hover has been established, use whatever power is necessary to slowly initiate takeoff and climb. Climb so that airspeed and altitude increase simultaneously. Remember, the aircraft will have a tendency to settle as it moves forward and additional power may be required to prevent the aircraft from settling and the load contacting the ground. Climb and accelerate to an airspeed conducive to load stability. At a safe altitude, complete the After Takeoff checklist. ARRSR 55-4 recommends placing the cargo master switch in the SAFE position upon reaching 500 feet AGL.

__NOTE.__ Flight over personnel, buildings or equipment will be avoided whenever possible.

(d) Approach and Landing with Sling Load. During sling approaches, normal transition maneuvers can be used. The major difference will be the need to closely monitor power requirements and anticipate power changes. Master switch will be placed in the SLING position prior to descending below 500 feet AGL. Actual release of the sling load may be effected by either pilot depressing the button switch located on the cyclic or manually by the right seat pilot depressing the manual release located beside his right heel. For automatic releases, the switch will be placed in the AUTO position during the final stages of the approach prior to the load contacting the ground. The radar altimeter may be used during the approach until the crew member in the cabin takes over. The key to successful sling operations is developing smooth and positive aircraft control techniques. During the approach to the release point, care should be taken to prevent dragging the load on the ground. The helicopter is normally hovered when the cargo is approximately five feet above the ground. A vertical descent is then made until the load is resting on the surface at which time a release is effected.

(5) Safety Procedures:

(a) Helmets, with goggles, will be used by the ground crew for eye protection.

(b) All cargo sling releases will be checked for proper operation prior to carrying a sling load.

(c) If a sling load is suspected of being frozen to the ground, do not attempt to free the load with the aircraft. This practice could exert a strain on the sling that would exceed the suspension unit limitations. Additionally, it could also result in an aircraft mishap. The pilot is responsible to ensure that the sling load is not frozen to the ground. During initial hook-up, closely monitor the power requirement. If the power has been increased to the point where the load should be off the ground but is not, terminate the attempt.

(6) Emergency Procedures. If during hovering sling operations, an emergency occurs necessitating an immediate landing, the pilot should make every effort to release the load and move slightly to the left so as to avoid injury to ground personnel and damage to the aircraft. To dampen oscillations, a coordinated turn should be made or the airspeed decreased.

5-7. MODULE 0-6, Preliminary Flight Planning. (0.4 Hour)

a. Objective (Standard - C). Answer questions pertaining to preliminary flight planning actions to include:

(1) Obtaining and using a flight order.

(2) Obtaining flight plan form and AF Form 70.

(3) Obtaining and using passenger and cargo manifest.

(4) Locating and reviewing applicable NOTAMS.

(5) Reviewing and initialing flight crew information file.

(6) Obtaining preliminary weather data.

b. Source Reference:

(1) AFR 60-16, General Flight Rules.

(2) AFR 60-1, Flight Management Policies.

5-8. MODULE 0-7, Perform Mission Planning. (0.6 Hour)

a. Objective (Standard - 3). Understand the use of TO 1H-3(C)E-1 and typical mission information to perform mission planning IAW AFR 60-16 and FLIP:

(1) Determine route.

(2) Determine type of flight plan (IFR or VFR).

(3) Determine cruise altitude.

(4) Determine true airspeed.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module 0-6.

(2) Assignment. Read Supplemental Information.

c. Source Reference:

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

(2) FLIP Planning.

(3) AFR 60-16, General Flight Rules.

(4) ARRSR 55-1, Rescue and Recovery Operations

d. Required Materials/Equipment. TO 1H-3(C)E-1.

e. Supplemental Information:

(1) Requirements for Helicopters to Operate VFR:

(a) Below 10,000 feet MSL:

1 Visibility greater than three miles.

2 Cloud clearance:

a 1,000 feet above clouds.

b 500 feet below clouds.

c 2,000 feet horizontal from clouds.

(b) At or below 1,200 feet AGL outside controlled airspace, visibility may be less than one mile provided:

1 Flight is conducted at or below the base of the controlled airspace.

2 Flight is conducted clear of clouds.

3 Forward speed permits adequate opportunity to see and avoid other traffic and obstructions.

(c) Helicopters may be operated according to VFR within Federal airways up to an altitude that provides a minimum of 500 feet below the minimum enroute altitude (MEA) or minimum obstruction clearance altitude (MOCA), whichever is lower.

(2) Requirements for Special VFR:

(a) Conducted within airport control zone.

(b) ATC clearance must be obtained.

(c) Flight conducted clear of clouds.

(d) Pilot must be able to maintain visual contact with ground.

(3) Conditions Under Which Helicopters Must Operate IFR:

(a) When weather does not permit VFR operations.

(b) When performing instrument approaches.

(c) Between official sunset and official sunrise unless mission cannot be accomplished under IFR.

(d) When flying along a victor airway at any altitude higher than 500 feet below the lower limit of the airway.

(4) Requirements for Helicopters to Operate IFR:

(a) Destination must be served by an operational approach aid for which an instrument approach is published and you can fly this approach with the equipment aboard your aircraft.

(b) Forecast weather at destination for the period ETA plus or minus one hour must be at or above the lowest minimums published for an operational approach aid suitable for use by your aircraft. (Helicopter may use one-half the published visibility minimum for the approach providing final approach airspeed is 91 knots or less).

(5) A word of caution when planning instrument flights is that minimum enroute altitudes must be closely examined. Single engine flight altitude is limited by gross weight and density altitude. The inability to maintain terrain clearance, if the loss of an engine should occur, can result in a dangerous condition particularly when the ceiling does not permit transition to visual conditions before reaching single engine flight altitude.

5-9. MODULE O-8, NAV Forms. (1.3 Hour)

a. Objective (Standard - 3). Use TO 1H-3(C)E-1 and typical mission information to answer questions concerning NAV forms IAW AFR 60-16 to include:

(1) Navigational data for VFR and IFR flight (heading, distance, and time).

(2) Computing fuel consumption.

(3) Determining fuel requirements.

(4) Determing alternate airfield requirements.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module O-7.

(2) Assignment. Study Supplemental Information.

(3) At the completion of this module, contact the Academic Section for mission planning data. You should plan the mission and have it checked by your IP or an academic instructor prior to reporting for Aircraft Lesson 0-9.

c. Source Reference:

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

(2) AFR 60-16, General Flight Rules.

d. Required Materials/Equipment:

(1) TO 1H-3(C)E-1.

(2) Pilot's computer.

(3) Pilot's plotter.

e. Supplemental Information:

(1) Preflight Planning. Before beginning a flight, the pilot in command should familiarize himself with all available information appropriate to the intended operation. For flight under IFR or flights not in the vicinity of the airport, this information should include, but need not be limited to, available weather reports and forecasts, fuel requirements, alternates available if the flight cannot be completed as planned, and any known traffic delays. See FLIPs for the area of intended operation, and Section II of the flight manual (Preparation for Flight).

(2) AF Form 70. AF Form 70, "Pilot's Flight Plan and Flight Log," is a self-explanatory form designed as a pilot's preflight/in-flight worksheet. Required entries are indicated by column headings. All appropriate entries will be made before flight. USAF regulations require the use of the AF Form 70 on all flights except:

(a) Flight conducted within 200 NM of the point of departure when preflight planning of control parameters such as altitudes, headings, fuel consumption rates, etc., is impractical.

(b) When MAJCOMs authorize the use of a more detailed form.

(c) For VFR helicopter operations.

(d) When its use would delay the departure of a priority mission as defined by the Major Command concerned.

__NOTE.__ Pilots assigned to MAC units: MAC regulations require that an AF Form 70 be used for all helicopter flights outside the designated local flying area except on urgent rescue missions when completion of the form would unacceptably delay response, provided adequate route and fuel management planning is accomplished.

(3) Alternate Airfields:

(a) An alternate is required:

1 When filing IFR to a field with radar only.

2 When forecast weather at destination (ETA ± one hour) is below 700 feet ceiling and one mile VIS.

(b) To qualify as an alternate:

1 Fields without published approach must have weather compatible with VFR operations for ETA ± one hour to permit a VFR descent from the IFR minimum en route altitude and a VFR approach and landing.

2 Fields with a published approach procedure must have forecast a ceiling of at least 700 feet or 500 feet above the lowest compatible published landing minimum, whichever is higher, and a visibility of one mile or one-half mile above the lowest compatible published landing minimum, whichever is higher.

(c) When alternates are required, you must compute heading, distance, time and fuel to alternate. Fuel required to alternate must be added to total fuel requirements.

5-10. MODULE 0-9, DD Form 175. (1.2 Hour)

a. Objective (Standard - 3). Use typical mission information and FLIP publications to complete DD Form 175.

(1) Review a completed DD Form 175-1.

(2) Accomplish DD Form 175.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module 0-8.

(2) Assignment. Study Supplemental Information.

c. Source Reference:

(1) FLIP Planning Data.

(2) FLIP General Planning Section, Chapter 5, Pilot Procedures.

d. Supplemental Information. This program of instruction will take you block by block through the completion of a DD Form 175 for a typical mission. After you complete this module, you should possess a basic understanding of the flight clearance form and its uses. You must keep in mind, however, that in one program it is impossible to cover all the different types of missions you will encounter during your career and the differences in completing the DD Form 175 that result. Also, if you go for a long period of time without having to file a 175, you'll find that you have forgotten much of the specific information you once knew on how to fill it out. For these reasons, it is strongly recommended that whenever you find it necessary to file a DD Form 175 that you consult a FLIP General Planning Document. You will find a complete block by block explanation of the DD Form 175 at the beginning of the Pilot Procedures Chapter. Use it! Also, when turning your flight plan into base operations personnel, insure they check it completely. That is their job! It is better to find a filing error on the ground rather than in the air. It could save you a possible violation.

5-11. MODULE 0-10, VFR Navigation. (0.6 Hour)

a. Objective (Standard - C). Answer questions concerning VFR Navigation.

(1) Pilotage.

(2) Use of instrument navigation aids.

(3) Maintaining the AF Form 70.

(4) Communication Procedures.

(f) IFF procedures.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module 0-8.

(2) Assignment. Read Supplemental Information.

c. Source Reference:

(1) AFM 51-40, Air Navigation.

(2) AFR 60-16, General Flight Rules.

(3) FLIP.

d. Supplemental Information:

(1) Position your map so it is oriented toward North to make it easier to identify landmarks.

(2) Always work from your map to the ground.

(3) 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:

(a) 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 features. 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.

(b) 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.

(c) Determine the time to check your turning points.

(d) 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.

(e) 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 with dense foliage.

(f) 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.

(g) 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.

(4) Radar Altimeter Procedures. It is helpful during a navigational leg to have an accurate reading of your actual height above the ground. Your radar altimeter will provide this information.

5-12. MODULE O-11, Search. (0.8 Hour)

a. Objective (Standard - C). Answer questions concerning search missions to include:

(1) Planning the search.

(2) Aircrew briefings.

(3) Search patterns.

(4) Scanning procedures.

(5) HC-130 N/P - Helicopter Team concept.

(6) Debriefing.

b. Student Requirements and Tips. Assignment: Read Supplemental Information.

c. Source Reference. ARRSR 55-5, Helicopter Aircrew Operational Procedures.

d. Supplemental Information:

(1) Aircrew Briefings. The AC will brief and discuss with his crew the procedures and crew duties for the mission. The briefing will include

(a) Objective of the search.

(b) Weather.

(c) Plan of operation for the search.

(d) Other aircraft involved.

(e) Position reporting.

(2) Planning the Search. The AC will evaluate the situation for search, coverage required, appropriate method of search, type of pattern required, altitude, airspeed and track spacing.

(a) A checklist for planning the search is:

1 Review factors affecting the search.

2 Determine method of locating survivor or object (visual/electronic).

3 Determine intensity of coverage required (preliminary or concentrated).

4 Select search area (location/size) and search pattern.

5 Determine track spacing (greater for preliminary search coverage).

6 Determine search altitude (higher for preliminary search coverage).

7 Determine airspeed (higher for preliminary search).

8 Determine air refueling control time, if applicable.

9 Determine "Bingo" time for planned recovery location.

(b) The following factors should be considered when determining appropriate search procedures for a specific mission:

1 Weather conditions.

2 Terrain characteristics, if over land.

3 Sea conditions, if over water.

4 Time of day for the search.

5 Signal aids of survivors.

6 Object's size, shape, color contrast and amount of freeboard.

7 Status of objective: overdue, lost, crashed or ditched.

8 Estimated location of objective.

9 Endurance of the search aircraft.

(c) Track spacing must be carefully established and never greater than twice the detection range. Recommended search altitudes for visual searches range from 500 feet to 3000 feet depending on the object of the search, visual aids, weather, etc. During preliminary searches, the aircraft should be flown at a speed that will permit rapid coverage of the search area yet will allow scanners an opportunity to visually detect large objects, signals or wreckage. Optimum airspeed is recommended cruise during preliminary searches and 70 KIAS during concentrated searches.

(3) Search Procedures. The AC will supervise and coordinate activities of crew members. The Pre-Search Checklist will be completed prior to initiating the search. The copilot should plot the search pattern, record sighting information, monitor the altimeter and accomplish other duties as requested by the AC. It is easy to become distracted (looking outside the aircraft at possible sightings, etc.), so plan to have the pilot flying the aircraft monitor airspeed at all times.

NOTE. Under high temperatures, high density altitude and heavy gross weights, it is possible that the aircraft will not be able to maintain altitude below 50 KIAS.

(a) The route search will be employed when the only information available is a known dead reckoning position on the intended track of the search objective.

(b) A parallel search will be used to cover large rectangular areas where the objective is expected to be between two points and possibly off track due to navigation error.

(c) The creeping line search may be used to cover an area on both sides of the search objective's intended track spacing during and after route searches.

(d) An expanding square search will be used for a concentrated search of a small area where a sighting or search objective has been reported.

(e) The sector search will be used when the position of distress is known within close limits and the area to be searched is not extensive.

(f) The contour search is used to search mountains or hilly terrain.

(4) Scanning Techniques. Precise scanning is one of the most important aspects of a search. The helicopter crew members in the cargo compartment will be the primary scanners. Sighting characteristics and detection possibilities of the objective must be included in the briefing.

(a) When over water, the most probable objects of the search will be lifeboats, rafts, debris, oil slicks and personnel.

(b) Over land, scanners should look for anything ususual or unnatural for the terrain over which you are searching. It may be smoke, broken or scarred trees, shiny metal, fresh looking burned out areas, parachutes or some sort of signal.

(c) With three available crew members to scan, positions should be rotated every 30 minutes (left side, right side, rest).

(d) A routine scanning pattern should be used when searching. The eyes should move and pause for each three or four degrees of lateral/vertical distances at a rate which will cover ten degrees per second. The scanner's eye movement should be away from the aircraft to the effective visibility and then back toward the aircraft to a point as near under the aircraft as can be comfortably seen. Scanners must avoid turning away from the scanning pattern, closing their eyes, looking around the aircraft or focusing short of the surface being scanned.

(5) Sighting Procedures. When a sighting is made, the crew member will notify the rest of the crew over interphone and indicate the position of the sighting by using the clock system and distance. Immediately upon making a sighting, a smoke signal or sea marker will be dropped to mark the approximate location of the sighting. Use caution when dropping a smoke device over a wooded area to prevent a forest fire. The pilot should immediately turn in the direction of the target. The observer will continue to call out the target position and distance to orient the pilot. If the sighting is confirmed, the following procedures apply:

(a) Keep the target in sight at all times. Mark with dye/smoke marker.

(b) Turn on IFF IAW ARRSR 55-5, paragraph 2-6e(2), page 2-8.

(c) Report the sighting to the rescue center, on-scene commander, air/ground station or operating agency, as appropriate.

(d) A pararescue specialist will be deployed to assist the survivors when the AC deems assistance is required to effect recovery.

(6) HC-130/H-3 Team Concept. The HC-130 will be the central coordinating point for all activities.

(a) The helicopter AC will advise the HC-130 AC of fuel on-board, ETA to search area, ARCT and ARCP as soon as possible after takeoff.

(b) The helicopter will maintain radio contact with the HC-130 at all times.

(c) If a night recovery is conducted, the HC-130 will deploy flares to assist the helicopter crew to locate and recover the survivors.

5-13. MODULE O-12, Normal Water Operations. (0.5 Hour)

a. Objective (Standard - C). Answer questions concerning normal water operations procedures, conditions, and limits to include:

(1) The N_gT_5 relationship check and limits.

(2) Water limitations and sea state.

(3) Special post flight requirements.

b. Student Requirements and Tips:

Assignment. Read:

(a) TO 1H-3(C)E-1, Section II, Water Operations through Salt Water Operations.

(b) Supplemental Information.

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

d. Supplemental Information:

(1) Wind Determination. Over water, as over land, the most effective way to determine wind is with smoke. There are many types of smoke generators suitable for over water use. Wind can also be determined by other means. By observing general aircraft drift in cruise and specific aircraft drift on reconnaissance passes, wind direction may be determined within 30°. Other means of wind evaluation include wind forecasts and pilot knowledge of general wind patterns and local disturbances.

(2) Water Surfaces Produced by Wind. Two water surface features produced by wind are wind streaks and white caps. Wind streaks are parallel lines or streaks formed on water in light to moderate winds. These lines parallel wind direction but have a 180° ambiguity possibility. White caps are the foam formed on top of the wave crests. When the wave continues downwind the foam remains stationary producing an illusion that the white cap is "falling" into the wind. White caps are formed in moderate winds and are directly related to sea state.

(3) Hoist Capability. Amphibious helicopters retain their hoist capability. Use of the hoist in preference to water landing capability is predicated on sea state, salt water operations, availability of recovery equipment, number of crewmen, crew proficiency, and time available for pick up (landing and securing a survivor is more rapid than hoisting the survivor aboard). Another factor to be considered is location and condition of survivor and effect of rotor downwash on him. Will the rotor wash overturn his raft? Will the blast of water complicate his survival conditions, balloon a deployed parachute or aggravate his injuries? Water taxiing maneuverability of the H-3 will allow the pilot to position the cargo door close enough to the survivor for rapid extraction. Caution is necessary to avoid overshooting the survivor resulting in injury by sponson contact or entanglement of equipment such as parachutes with the airframe. Generally speaking, with favorable conditions, the water landing is the preferred method for over water recovery. It has proved to be faster, safer, and easier than a hoist pick up. Water landings with the air refueling probe installed are not considered normal due to the possibility of water entering the fuel supply. Hoist recoveries may be more desirable in some cases with an HH-3E.

(4) Flight Planning Procedures. Flight planning will be accomplished in the same manner as described in the remote lesson. Power required to hover at 15 feet will be computed. During preflight inspection, insure that all the drain plugs are installed and that all necessary water survival gear is on board the aircraft.

(5) In-flight Procedures:

(a) Required:

1 Descent Checklist.

2 Before Landing Checklist (landing gear - UP, forward anti-collision light - OFF) and insure both the landing and searchlight control switches are in the STOW position.

3 Normal traffic pattern.

4 Recheck gear UP and beep speed selectors to MAX.

5 Approach to 15-foot hover (first approach).

(b) Analysis:

1 Over water flight should be accomplished by utilizing a combination of visual and instrument flight techniques. Frequently, especially at night, an adequate horizon reference is not available. Therefore, the pilot must concentrate on smooth control inputs to effectively and safely maneuver under these conditions.

2 Prior to initiating a water landing, the pilot in command will evaluate the water landing area for suitability and drop a smoke device to be used as a reference. (Exception: When wind direction can be determined by other means; that is, flags, ponds, fires, or other wind indications and an adequate shore line is available for reference, a smoke device need not be dropped for reference.) Establish a rectangular pattern into the wind. Use a minimum of 300 feet and 70 KIAS on the downwind. When performing the Before Landing Checklist, insure that the landing gear is UP, the forward anti-collision light is OFF and the searchlight and landing lights are stowed. Maintain 300 feet and 70 KIAS on base leg.

3 After turning final, Recheck gear up and speed selectors to MAX. Approach procedures are generally the same as those used on land except depth perception may be difficult due to lack of references. The first approach should be planned to place the aircraft at the desired hovering altitude (15 feet) with zero ground speed over a predetermined spot.

4 Hovering landings will be accomplished by descending vertically into the water. Some forward movement will add to the smoothness of the landing. Rotor wash will create the illusion that the aircraft is moving while in a hover. Constantly observe clearance of the main rotors, lower collective to minimum and move cyclic to neutral.

5-14. MODULE O-13, Abnormal Water Operation. (0.3 Hour)

a. Objective (Standard - C) Answer questions concerning water operation procedures:

(1) Running landings.

(2) Engine and rotor shutdown.

(3) Anchoring.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module O-12.

(2) Assignment. Read:

(a) TO 1H-3(C)E-1, Flight Manual, Section III, Single Engine T/O from Water, Single Engine Water Landings, and Emergency Water Landings Procedures; Section IV, Bilge Pump.

(b) Supplemental Information.

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

d. Supplemental Information:

(1) Running Landings. Running landings may also be accomplished. Water contact speed must not exceed 20 knots. The pilot must exercise judicious aircraft control, contacting the water in a level to near level attitude in order to preclude nose or tail tuck. (Taxiing, hovering, and takeoff will be accomplished IAW the flight manual.) A 15-foot hover altitude is used for training.

(2) After Landing Procedures. Prior to rotor shutdown, direct the flight mechanic to visually check the bilges. If the aircraft is taking on water abnormally, rotor shutdown will not be accomplished. When necessary, operation of the bilge pump will provide adequate emptying of aircraft bilges, under most circumstances. If an emergency were to dictate an immediate evacuation of the helicopter while on the water, it is the pilot's responsibility to insure the safety of his crew and aircraft, in so far as is possible Conditions permitting, all bilges, doors, and windows should be secured, the helicopter anchored and the anchor lights turned on.

(3) Rotor Shutdown:

(a) Required. Rotor Shutdown and Engagement (Engines Running) Checklist.

(b) Analysis. To shut down the rotors on the water, accomplish the After Landing and Rotor Shutdown portion of the Rotor Shutdown and Engagement (Engines Running) Checklist. After the rotor brake is applied, the helicopter will rotate (to the left) as much as 360 degrees. Once the rotors have stopped, the helicopter will normally align itself to the wind and waves.

__NOTE.__ Rotor shutdown will not be accomplished if wave height exceeds two feet or the wind exceeds 20 knots. Additionally, engines will not be shut down when conducting this training.

__CAUTION.__ Insure that the droop stops are in prior to applying the rotor brake. If the droop stops will not come in, do not attempt to stop the rotors. Slowly advance one of the speed selectors from __ground idle__ to obtain 102% N_r and complete a normal rotor engagement.

(4) Rotor Engagement:

(a) Required. Rotor Shutdown and Engagement (Engines Running)Checklist.

(b) Analysis. To engage the rotors on the water, accomplish the Rotor Engagement and Before Takeoff portion of the Rotor Shutdown and Engagement (Engines Running) Checklist. Procedures are the same as on land except that the rotor brake is released prior to advancing either speed selector from ground idle and the speed selector is advanced slowly to minimize rotation. As the rotor begins to accelerate, the helicopter will begin to turn to the right. To counter this rotation, full left tail rotor pedal must be applied prior to releasing the rotor brake. At approximately 30% rotor speed, the tail rotor pedal control is sufficient to stop the turn. After tail control is obtained and the aircraft is realigned into the wind, neutralize the pedals and maintain directional control as needed.

(5) Running Takeoff from Water, Simulated Heavyweight:

(a) Required:

1 Before Takeoff Checklist.

2 Water taxi speed - 15 knots MAX.

3 Airspeed 50 KIAS.

4 N_r 100% minimum (speed selectors set at maximum).

(b) Analysis:

1 To simulate maximum operating conditions, available power will be restricted to hover power, computed for 15 feet, minus 10% torque. For an actual running takeoff from the water, maximum available power would be used. If the situation warrants, do not hesitate to either pull additional torque or abort the takeoff.

2 A running takeoff from the water is begun by aligning the aircraft into the wind. (If waves are higher than two feet, align the helicopter 30 degrees to the right of the waves.) Apply sufficient forward cyclic to obtain a forward taxi speed, while simultaneously increasing collective pitch to maximum/simulated maximum power available. When a forward taxi speed of approximately 10-15 knots (15 knots MAX) is achieved, take out the forward cyclic used initially.

NOTE. Aircraft attitude must be monitored continuously, so that any tendency of the nose to dig in may be countered by judicious control movements.

Once the helicopter breaks water, parallel the surface at approximately five feet altitude and accelerate to 50 KIAS. The simulated maneuver will be terminated upon reaching 50 KIAS and a normal climbout will be accomplished.

NOTES.

1. Frequently, while flying overwater, it is very difficult to determine helicopter height above the water. Therefore, once the helicopter is paralleling the water surface, caution must be exercised to avoid flying the helicopter back into the water.

2. When operating at high gross weight, the helicopter may skim over the water for a few seconds before climbing speed is attained. It may be necessary to accelerate to best climb speed prior to initiating a climb.

3. If the nose of the aircraft should inadvertently be allowed to "tuck" or dig into the water, or if the bow wave builds up to the bottom of the windscreen do not attempt to force the helicopter into the air by increasing collective, as this could possibly cause the helicopter to pitch over and allow the blades to strike the water. Proper corrective action is to slowly lower the collective pitch and hold the cyclic neutral or slightly aft.

(6) Emergency Ditching. There are many factors to consider when making an emergency ditching in an H-3. The primary consideration is the safety of the crew and passengers. Once safely on the water, you must consider actions which will aid in maintaining the aircraft effort and preparing it for recovery. These emergency procedures are covered quite thoroughly in the H-3 flight manual.

Should you be assigned to a coastal base, long overwater flights will not be uncommon. Careful planning will be required to prevent an incident due to fuel exhaustion. Sea winds are finicky; a tailwind could turn into a headwind at any time. In order to have alternate landing areas available, become familiar with the Coast Guard and Navy facilities in your area. Most large Navy ships have flight decks, and all Coast Guard HEC (High Endurance Cutters) are equipped with at least a small helipad. Either Navy or Coast Guard ships can possibly refuel you in a hover using the single point refueling adapter. Coast Guard Manual 419 and ARRSR 55-5 covers shipboard helicopter operations; they contain procedures for hovering over or landing on a ship. As a last resort, you can have a cargo aircraft or ship drop containers of fuel in the water near you. You can land next to them and either take them on board or transfer fuel directly into the fuel tanks from the containers in the water. Portable pumps, either manual or engine powered, will allow transfer of the fuel from the containers into the fuel tanks.

The idea behind this discussion of contingencies for long overwater flights is to "be prepared for the worst." Plan ahead, know the capabilities of your sister services and be familiar with the operating procedures required to work with them.

5-15. MODULE 0-14, Flare Drop Procedures. (0.5 Hour)

a. Objective (Standard - C). Answer questions concerning flare drop requirements, patterns and emergencies.

b. Student Requirements and Tips. Assignment: Read ARRSR 55-5, Chapter 3, Flare Drop Procedures.

c. Source Reference:

(1) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

(2) ARRSR 55-1, Rescue and Recovery Operations.

5-16. MODULE O-15, F-111 CAPSULE SLING. (0.5 Hour)

a. Objective (Standard - C). Correctly respond to questions pertaining to recovery of an F-111 capsule to include:

(1) Securing ejection system.

(2) Rigging procedures.

(3) In-flight procedures.

(4) Safety precautions.

5-17. MODULE O-16, M-60 Weapon. (1.0 Hour)

a. Objective (Standard - C). Correctly respond to questions pertaining to nomenclature and use of the M-60 weapon.

b. Student Requirements and Tips. Assignment: Read Weapon System portion of Section IV, TO 1H-3(C)E-1.

c. Source Reference: TO 1H-3(C)E-1

5-18. O-SEM, FCF Procedures and Operations Seminar. (3.0 Hour)

a. Objective (Standard - B):

(1) Answer questions concerning FCF procedures:

(a) Flight test publications

(b) H-3 flight test procedures.

(c) In-flight troubleshooting

(2) Operations seminar.

b. Student Requirements and Tips:

(1) Prerequisite Training. All operational academic modules, and Aircraft Lessons 0-2, 0-4, 0-5, and 0-7.

(2) Assignment. Review the operational phase and be prepared to discuss any operational procedures/maneuvers.

c. Source Reference:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

SECTION C - SIMULATOR LESSONS

5-19. Simulator Lesson SO-1. (2.0 Hours)

a. Objectives:

(1) See figure 5-1.

(2) You will be required to combat the following abnormal situations:

(a) APU prime pump failure.

(b) APU overspeed.

(c) High APU EGT.

(d) Battery start.

(e) Hot start.

(f) Cold hangup, start.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Modules 0-1, 0-2, 0-3, 0-4, 0-6, 0-7, 0-8, 0-9, 0-11, and Simulator Lesson SI-2.

(2) Updating of your doppler position will be accomplished using instrument NAV aids.

c. Source References:

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

(2) Marconi Doppler Handbook.

(3) ARRSR 55-5.

d. Required Materials/Equipment:

(1) Doppler Flight Plan.

(2) Doppler Navigation Map.

(3) Pilot's Computer.

(4) Pilot's Plotter.

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

(6) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

5-20. Simulator Lesson SO-2. (2.0 Hours)

a. Objectives:

(1) See figure 5-1.

(2) You will be required to combat the following abnormal situations:

(a) Main rotor malfunctions.

(b) Main gear box oil system failure.

(c) Chip lights for intermediate and tail rotor gearboxes.

(d) Engine compressor stall.

(e) Fuel system failure.

(f) Engine oil system malfunction.

(g) Tail rotor control system failure.

(h) Tail rotor drive system failure.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Modules 0-5, 0-10, 0-14, and Simulator Lesson SO-1.

(2) Updating of your doppler position will be accomplished using instrument nav aids.

c. Source References:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

d. Supplemental Information:

COURSE NUMBER	H3P1/2/3	DESIGNATION H-3(OPS/ARRS/MSN OPS)(SIMULATOR)			TRAIN
FLIGHT TIME	HOURS	2	2	2	2
	TENTHS	0	0	0	0
LESSON	PHASE/SUBJECT	SO	SO	SR	SZ
	NUMBER	1	2	1	1
FLIGHT PREPARATION		3	3	3	3
COCKING/SCRAMBLE PROCEDURE			2	3	3
DOPPLER: Flight Planning		2	3		
Equipment Set-Up		2	3		
Operation		2	3		
In Flight Diversion		2	3		
DOPPLER SEARCH: Planning		2			
Navigation		2			
Pattern		2			
FORMATION: Lost Visual		3			
REMOTE PROCEDURES		2			
High/Low Recon		2			
Hoist		2			
Sling			2		3
Flare Drop				2	2
AIR REFUELING PROCEDURES				3	
Fuel Transfer				3	
WATER HOIST PROCEDURES				2	
Smoke Drop				3	
IFR NAVIGATION: Flight Planning			3		
Navigation			3		
IFR Recovery			3		
MAXIMUM GROSS WEIGHT				3	3
EXTREME CG				2	2
MISSION COORDINATION			2	3	3
ENGINE TOPPING			2	3	3
Ng/T5 RELATIONSHIP CHECK			2	3	3
CREW COORDINATION		2	2	3	3
USE OF CHECKLIST		3	3	3	3
ABNORMAL/EMERGENCY PROCEDURES		2	2	3	3
AIRMANSHIP		S	S	S	S

Figure 5-1. H-3 (Ops/ARRS/Msn Ops) (Simulator) - CPTS

(1) You will be required to plan an IFR flight to include preparation of AF Form 70, DD Form 175, and Doppler coordinates.

(2) Your simulator instructor will provide NOTAM, weather and navigational data for your mission. Check with him at least one day prior to this mission. Plan on spending at least one hour planning the mission. Complete instructions are available from H-3 academics.

e. Required Materials/Equipment:

(1) Pilot's computer.

(2) DD Form 175.

(3) AF Form 70.

SECTION D - AIRCRAFT LESSONS

5-21. AIRCRAFT LESSONS 0-1 AND 0-2. (1.5 Hours Each)

a. Objective:

(1) See figure 5-2.

(2) Be prepared to discuss the following APU malfunctions for Aircraft Lesson 0-1:

(a) No tach indication.

(b) Low oil pressure.

(c) High EGT.

(d) Overspeed.

(e) Prime pump failure.

(f) Clutch late engagement.

(3) Be prepared to discuss the following engine start abnormal situations for Aircraft Lesson 0-2.:

(a) Abnormal N_g indications.

(b) Abnormal fuel flow indication.

(c) Abnormal N_r indications.

(d) Abnormal N_f indications.

(e) Low oil pressure.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SO-1 and Aircraft Lesson T-6.

(2) Assignment:
(a) Read Supplemental Information.

(b) Review Supplemental Information, paragraph 5-3.

c. Source Reference:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

d. Supplemental Information. Many operational missions are performed away from a fixed base of operation. The aircraft is built to operate from many types of unimproved areas. A helicopter pilot must be able to recognize acceptable operating areas and note hazardous or limiting conditions for the aircraft. Before attempting a mission into any area, the pilot must consider several factors. Some of these factors are fixed and only require an awareness of their relevance, e.g., crew experience, mission priority, time available, mission requirements, and crew fatigue. Once the pilot considers these factors, the aircraft performance must be considered. Meterological data and height of obstacles versus size of the area must be considered to find an optimum approach angle and approach route for the aircraft. Sound preflight planning normally provides the operational pilot with accurate information concerning aircraft performance. The use of reconnaissance passes over an area of intended landing provides the information required to make a sound decision on how to operate into and out of the area. Reconnaissance passes also give the pilot time to prepare his aircraft and crew for the task at hand and to determine if an alternate area or type of operation is more suitable. The procedures for performing these reconnaissances passes are discussed in paragraph 5-3.

In addition to determining the power available at the operating area, the reconnaissances are used to observe the operating area itself. The most critical decision factor is determining whether or not the aircraft can be put in the area chosen. With a requirement to land in a highly restricted area, be aware that the rotor blade tips are furthest from the helicopter fuselage directly opposite the transmission. Pilots tend to accept the 45° position, which is more apparent from the pilot's seat, as being maximum rotor tip extension. This tendency can cause rotor tip contact with obstacles in a tight area. The minimum size area recommended for operational landings is twice the main rotor diameter. To give a basis of judgment for determining the size of an area, fly reconnaissances at the same altitude when possible.

An extremely important and constantly changing factor in remote area operations is the wind. In earlier operational courses, various techniques to determine wind direction and velocity were discussed. Full utilization of wind forecasts and these techniques will assure proper wind evaluation. Because the H-3 achieves translational lift at significantly higher airspeeds than many other helicopters (15 KIAS), wind is more critical in the takeoff phase than the landing phase of flight. Constant awareness of the direction and velocity of the wind is required to give a basis for making decisions as to landing and takeoff directions. Although the wind is an important factor, all other factors concerning the operating area must be considered to reach the proper decision.

Major cause of helicopter accidents is loss of rotor RPM. When flying at low gross weight, RPM control is relatively simple. However, at heavy gross weights, N_r becomes critical, and under high gross weight conditions, the N_r tachometer is sometimes neglected, resulting in excessively low N_r being unnoticed. By continuously monitoring N_r during an approach, a dangerous situation can be avoided while there is still time to abort the approach or take corrective action.

All limiting factors are magnified during high gross weight operations. Special attention must be given to smooth control application at all times. Anticipating high power requirements and using smooth airspeed transition lowers torque requirements. The "smooth" approach always provides more positive aircraft control.

Blade stall is not as common a problem as in some other single rotor aircraft. As mentioned in previous courses, blade stall is caused by a number of factors including high altitude, high gross weights, high airspeed, excessive "g" loads and low rotor RPM. Blade stall becomes a factor in high altitude cruise at high gross weights where it forces the pilot to limit his cruise airspeed. The pilot should realize the various flight conditions he will experience and check his blade stall speed during his preflight planning.

5-22. AIRCRAFT LESSONS O-3 AND O-4. (1.5 Hours Each)

a. Objectives:

(1) See figure 5-2.

(2) Be prepared to discuss the following in-flight emergencies for Aircraft Lesson O-3:

(a) Fuselage fires.

(b) Electrical fire.

(c) Smoke, fume and odor elimination.

(d) Bailout.

b. Student Requirements and Tips:

(1) Prerequisite Training:

(a) Aircraft Lesson O-3: Aircraft Lesson O-1.

(b) Aircraft Lesson O-4: Aircraft Lesson O-3.

5-23. AIRCRAFT LESSON 0-5, Cargo Sling. (1.5 Hours)

a. Objectives:

(1) See figure 5-2.

(2) Be prepared to discuss:

(a) Tail rotor control failure.

(b) Tail rotor drive failure.

(3) Your instructor may elect to accomplish a review of transition maneuvers, to include autorotations, simulated single engine approaches and landings, and AFCS/Servo OFF approaches and landings on this lesson and on Aircraft Lesson 0-6. A review of these maneuvers can be accomplished on any aircraft lesson in this phase of training, but will be completed by Aircraft Lesson 0-6.

b. Student Requirements and Tips:

(1) Prerequisite Training:

(a) Academic Modules 0-15 and 0-16.

(b) Simulator Lesson SO-2.

(c) Aircraft Lesson 0-1.

(2) Assignment:

(a) Review supplemental information, paragraph 5-6.

(b) Read supplemental information.

c. Source References:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

(3) ARRSP 55-5.

d. Supplemental Information:

(1) When planning the hover altitude for sling loads, remember you must include:

(a) The length of the cargo sling.

(b) The height of the sling load.

(c) At least five feet load clearance over the ground.

(2) Refer to ARRSP 55-5 for the specific items which must be briefed prior to commencing cargo sling operations.

(3) Fuel consumption, airspeed, and altitude restrictions must be considered during Preflight Planning.

5-24. AIRCRAFT LESSON O-6, Formation. (1.5 Hours)

a. Objectives:

(1) See figure 5-2.

(2) Be prepared to discuss:

(a) Main gear box malfunctions.

(b) Main gear box oil system failure.

(c) Chips lights for intermediate/tail rotor gearboxes.

(d) Formation procedures.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SO-2 and Aircraft Lesson T-6.

(2) Assignment. Read Supplemental information.

c. Source References:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures, Chapter 8.

(3) AFM 60-15, Aircraft Cockpit and Formation Flight Signals.

d. Supplemental Information:

(1) Study the "Formation Flight Briefing" in ARRSP 55-5 and brief the applicable items. If this briefing cannot be given prior to departure (for example, one or more of the aircraft in the flight have an earlier or later takeoff time), this briefing must be completed in the air prior to beginning formation flight.

(2) This mission is intended to familiarize you with the standard procedures for maintaining flight integrity, radio discipline, and air discipline. You will also learn the standard references used to maintain proper spacing and position off the lead aircraft for the different types of formation. This familiarization will help those students who will receive the rescue phase of training to transition to flying formation on the tanker during air refueling training.

(3) Good formation flying is hard work. Anticipate power and airspeed changes early. Make smooth, positive control inputs and do not fix your attention on only one or two references of the lead aircraft; a good cross-check of several references will allow you to recognize deviations early and will prevent you from getting behind the aircraft and falling out of position.

5-25. AIRCRAFT LESSON O-7, VFR Navigation, Low Level Navigation, and Water Operations. (3.0 Hours)

a. Objectives:

(1) See figure 5-2.

(2) Be prepared to discuss:

(a) Primary hydraulic system malfunctions/failure.

(b) Auxiliary hydraulic system malfunctions/failure.

(c) Utility hydraulic system malfunctions/failure.

(d) AFCS malfunctions.

(e) Bailout.

b. Student Requirements and Tips:

(1) Prerequisite Training:

(a) Academic modules O-12 and O-13.

(b) Simulator Lesson SO-1.

(c) Aircraft Lesson T-6.

(2) Assignment:

(a) Review supplemental information, paragraphs 5-8, 5-9, 5-10, 5-13, and 5-14.

(b) Read supplemental information.

c. Source References:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

d. Supplemental Information:

(1) This mission will be a combination of VFR Navigation, VFR Low Level Navigation, and Water Operations. Since your water operations training will be conducted at Elephant Butte, plan your VFR navigation route to and from the lake. Plan a portion of your route for low level navigation. One student will navigate to the lake and one student will navigate back to Kirtland AFB. The navigation portion of this mission will be flown from the left seat. You will be required to accomplish at least one left seat takeoff or landing. Before refueling at Elephant Butte, cock the aircraft using the "Cocking Checklist." Use the "Scramble Checklist" after refueling.

(2) Your water operations will be flown in the right seat.

(3) Low level navigation is essentially the same as normal VFR navigation. However, pilotage is far more difficult at 100 feet AGL than it is at 1000 feet or even 500 feet AGL. At 100 feet AGL, you may not fly a straight line direct course. In an unfriendly environment, use terrain masking whenever possible. Plan to cross roads and large open areas at right angles for minimum time exposure. If possible, plan your route around towns and other open areas. With all the heading, airspeed, and altitude changes required to fly at 100 feet AGL, pilotage is much more complex and much more difficult than it is at 1000 feet. For this reason, one pilot must devote his entire attention to flying the aircraft; the other pilot must concentrate on precise navigation. Select prominent turn/check points when they are available. Keep your Form 70 current. Turn to your new course on your ETA if you cannot positively identify your turn point. Do not over fly your ETA unless you know your aircraft position.

(4) Thorough, accurate preflight planning is absolutely essential for low level navigation in a hostile environment. Use all available crew members to assist you. Brief specific responsibilities so that each crew member knows what is expected of him for the entire crew to work together as a team. You may consider providing each crew member with a map. Be sure to brief proper intercom procedures to insure correct and concise use of the intercom system.

5-26. AIRCRAFT LESSON NO-8, Night Land Hoist. (1.5 Hours)

a. Objectives:

(1) See figure 5-2.

(2) Be prepared to discuss:

(a) The H-3 electrical system.

(b) Generator failure.

(c) Transformer/rectifier failure.

(d) Communications system malfunctions.

(e) The H-3 fuel system.

b. Student Requirements and Tips:

(1) Prerequisite Training. Aircraft Lesson O-3 and NT-5.

(2) Assignment:

(a) Review supplemental information, paragraphs 5-3 and 5-5 (particularly 5-5d(4)).

(b) Read supplemental information.

c. Source References:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

d. Supplemental Information:

(1) If flares are to be used to increase visibility in the pick-up area, night flare hoist operations will be conducted in the same manner as night hoist, except that, under combat conditions, the use of aircraft lighting will be held to a minimum. Flares will be dropped by other aircraft in the vicinity of the pickup area. The same type approach, e.g., a combination instrument/visual, will be used. Shadows may appear during the latter part of the approach, particularly over rough or uneven terrain, which may produce undesirable effects such as apparent motion, or spatial disorientation. In the event that the flare burn time is exceeded and another flare drop has not been accomplished, immediately execute a missed approach. Subsequent approaches to the hoist area should not be initiated until the flare pattern is again established.

(2) Particular attention should be given to having scanners on board the recovery helicopter observe the flares during the hoist operation. This will preclude flying directly under or through the flare pattern. During training flare operations, the flare drop aircraft will expend one flare each pattern. In the event the flare is a dud, another flare will be deployed immediately.

(3) The flare helicopter will establish a pattern which will keep the recovery helicopter clear of descending flares. The flare pattern will be flown at a minimum of 3000' AGL, 70 KIAS, with an absolute maximum of three minutes between drops (four minutes for LUU-2/B). The drop heading and timing from target to drop will be determined by the use of the chart provided in ARRSP 55-5. After the first flare is released, corrections to heading and timing can be made to adjust the flares so as to give the best illumination to the recovery aircraft. (There should be a minimum of 500 feet between the recovery aircraft and the descending flare.) The pilot will establish the flare pattern and advise the FM of the drop timing. Timing will be initiated when over the target and the pilot notified when the flare(s) are deployed and their condition (dud, streamer, etc.).

(4) If flares are used, the recovery helicopter will normally fly a left hand pattern in order to remain clear of the descending flares.

(5) The low reconnaissance will not be flown at night.

5-27. AIRCRAFT LESSON OC-1. (1.5 Hours)

a. Objectives:

(1) See figure 5-2.

(2) Be prepared to discuss any emergency procedures covered so far.

b. Student Requirements and Tips:

(1) Prerequisite Training. Operations Seminar and Aircraft Lessons 0-2, 0-4, 0-5 and 0-7.

(2) As a minimum, your evaluation will include the following items:

(a) Search procedures.

(b) Landing site evaluations.

(c) Land hoist.

(d) Cargo sling operations.

(e) Water operations (normally evaluated verbally).

(f) VFR navigation.

(3) Assignment. Study all supplemental information. Although not required, a review of the "0" academic modules on the areas where you feel you are weak is recommended.

c. Source References:

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

(2) ARRSR 55-5, Helicopter Aircrew Operational Procedures.

(3) ARRSP 55-5.

TEST COURSE

COURSE NUMBER H3P1 | DESIGNATION H-3 (OPS) (AIRCRAFT) | TRAIN

FLIGHT TIME: HOURS	1	1	1	1	1	1	3	1		1							
FLIGHT TIME: TENTHS	5	5	5	5	5	5	0	5		5							
LESSON: PHASE/SUBJECT	0	0	0	0	0	0	0	NO		OC							
LESSON: NUMBER	1	2	3	4	5	6	7	8		1							
FLIGHT PREPARATION	3	3	3	3	3	3	3	3		3							
REMOTE: Site Evaluation	1	2	3	3	3			3		3							
Patterns	1	2	3	3	3					3							
Turning Approaches		1	2	3						3							
Approach to Hover	1	2	3	3						3							
Approach to Touchdown		1	2	3						3							
Landing	1	2	3	3						3							
Slope Landing		2	2	3						3							
Takeoff	1	2	3	3						3							
SEARCH PATTERNS		2	3	3						3							
HOIST: Confined			2	3						3							
OGE/Open Area			2	3				3		3							
CARGO SLING: Load Pickup					3					3							
Takeoff					3					3							
Flight/Approach					3					3							
Load Release					3					3							
FORMATION: Joinup						3											
Turning Joinup						3*											
Echelon/Fingertip						3											
Tactical						3											
Crossover						3											
Pitchout/Rejoin						3											
Lost Visual						3											
WATER OPS: N_g/T_5 Rel Check							3			3							
Takeoff							3			3v							
Landing							3			3v							
Taxi							3			3v							
Running Takeoff							3			3v							
Running Landing							3			3v							
Shutdown/Start							3			3v							
VFR NAVIGATION: Flight Planning							3			3							
Normal							3			3							
Low Level																	
DOPPLER NAVIGATION: Flight Planning																	
Inflight Procedures																	
REVIEW MANEUVERS: Transition																	
Autorotations						3											
Single Engine Approach/Landing						3											
AFCS/Servo OFF Approach/Landing						3											
CHECKLISTS	3	3	3	3	3	3	3	3		3							
CREW COORDINATION	1	2	2	3	3	3	3	3		3							
ABNORMAL/EMERGENCY PROCEDURES	3	3	3	3	3	3	3	3		3							
AIRMANSHIP	S	S	S	S	S	S	S	S		S							

Figure 5-2. H-3 (Ops)(Aircraft) - CPTS

LENGTH OF A DEGREE OF LATITUDE AND LONGITUDE

Lat.	LATITUDE		LONGITUDE		Lat.	LATITUDE		LONGITUDE	
	Nautical miles	Meters	Nautical miles	Meters		Nautical miles	Meters	Nautical miles	Meters
°									
0	59.701	110 567	60.109	111 321	45	60.006	111 131	42.575	78 849
1	.702	568	60.099	111 304	46	.017	151	41.828	77 466
2	.702	569	60.072	111 253	47	.027	170	41.068	76 058
3	.703	570	60.026	111 169	48	.038	190	40.296	74 628
4	.705	573	59.963	111 051	49	.049	210	39.511	73 174
5	59.706	110 576	59.881	110 900	50	60.059	111 229	38.714	71 698
6	.708	580	59.781	110 715	51	.070	249	37.905	70 200
7	.711	584	59.664	110 497	52	.080	268	37.084	68 680
8	.713	589	59.528	110 245	53	.090	287	36.253	67 140
9	.717	595	59.373	109 959	54	.100	306	35.409	65 578
10	59.720	110 601	59.201	109 641	55	60.111	111 325	34.555	63 996
11	.724	608	59.011	109 289	56	.120	343	33.691	62 395
12	.728	616	58.803	108 904	57	.130	361	32.815	60.774
13	.732	624	58.578	108 486	58	.140	379	31.930	59 135
14	.737	633	58.335	108 036	59	.150	397	31.036	57 478
15	59.742	110 643	58.074	107 553	60	60.159	111 414	30.131	55 802
16	.748	653	57.795	107 036	61	.168	432	29.217	54 110
17	.753	663	57.498	106 487	62	.177	448	28.294	52 400
18	.760	675	57.185	105 906	63	.186	464	27.362	50 675
19	.766	686	56.854	105 294	64	.194	480	26.422	48 934
20	59.773	110 699	56.506	104 649	65	60.203	111 496	25.474	47 177
21	.780	712	56.140	103 972	66	.211	511	24.518	45 407
22	.787	725	55.758	103 264	67	.219	525	23.554	43 622
23	.794	739	55.359	102 524	68	.226	539	22.583	41 823
24	.802	753	54.943	101 754	69	.234	553	21.605	40 012
25	59.810	110 768	54.510	100 952	70	60.241	111 566	20.620	38 188
26	.818	783	54.060	100 119	71	.247	578	19.629	36 353
27	.827	799	53.594	99 257	72	.254	590	18.632	34 506
28	.835	815	53.112	98 364	73	.260	602	17.629	32 648
29	.844	832	52.614	97 441	74	.266	613	16.620	30 781
30	59.853	110 848	52.099	96 488	75	60.272	111 623	15.606	28 903
31	.863	866	51.569	95 506	76	.276	632	14.588	27 017
32	.872	883	51.023	94 495	77	.282	642	13.565	25 123
33	.882	901	50.462	93 455	78	.286	650	12.538	23 220
34	.891	919	49.885	92 387	79	.290	658	11.507	21 311
35	59.902	110 938	49 293	91 290	80	60.294	111 665	10.472	19 394
36	.911	956	48.686	90 166	81	.298	671	9.434	17 472
37	.922	975	48.064	89 014	82	.301	677	8.394	15 545
38	.932	994	47.427	87 835	83	.303	682	7.350	13 612
39	.942	111 013	46.776	86 629	84	.306	687	6.304	11 675
40	59.953	111 033	46.110	85 396	85	60.308	111 691	5.256	9 735
41	.963	052	45.430	84 137	86	.310	694	4.207	7 792
42	.974	072	44.737	82 853	87	.311	696	3.157	5 846
43	.984	091	44.030	81 543	88	.312	698	2.105	3 898
44	.995	111	43.309	80 208	89	.313	699	1.052	1 949
45	60.006	111 131	42.575	78 849	90	60.313	111 699	0.000	0

Figure 5-3. Latitude/Longitude Reference Chart