TC 1-237

AIRCREW TRAINING MANUAL
UTILITY HELICOPTER
H-60 SERIES

October 2007

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HEADQUARTERS
DEPARTMENT OF THE ARMY

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SUMMARY of CHANGES

TC 1-237
Aircrew Training Manual Utility Helicopter H-60 Series
This revision, dated 1 September 2007

o Adds symbol for H-60A/L and H-60M and specific verbiage into tasks (par 1-2).

o Adds H-60M only tasks 1025,1167,1169,1260, and 4113, identified by (H-60M)

o Adds (A/L) as an identifier at the end of tasks only pertinent to H-60 A/L.

O Defines minimum Nonrated crewmember base task list (table 2-6)for other than (15T/68W).

o Consolidated and updated medic tasks: 2060, 2062, and 2120.

o Consolidates the number of maintenance 4000 series tasks.

o Defines aircraft and NVG currency in mission/series (par 2-6).

o Removes requirement for tasks 2012,2024,2026,2036 from NVG qualification/refresher training, and mandatory annual evaluation (table 2-7).

o Consolidates 1000 series Medic tasks and consolidates into task 2120 perform patient evacuation and treatment.

o Updates task 1010 prepare a performance planning card and moved manual instructions to Appendix E.

o Adds task 1011 determine aircraft performance using tabular data.

o Updates Appendix B qualification training for H60A/L/M rated and nonrated crewmembers.

o Paragraph 3-5 clarifies hands-on evaluation requirements for rated crew members.

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Training Circular
1-237

Headquarters
Department of the Army
Washington, DC, 12 October 2007

Aircrew Training Manual
Utility Helicopter
H-60 Series

Contents

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*This publication supersedes TC 1-237, 27 September 2005.

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Preface

This aircrew training manual (ATM) standardizes aircrew training programs and flight evaluation procedures. This manual provides specific guidelines for executing H-60 aircrew training. It is based on the battle-focused training principles outlined in Field Manual (FM) 7-1. It establishes crewmember qualification, refresher, mission, and continuation training and evaluation requirements. This manual applies to all H-60 series crewmembers and their commanders.

This is not a stand-alone document. All of the requirements of the Army regulations (ARs) and training circular (TC) 1-210 must be met. Implementing this manual conforms to AR 95-1 and TC 1-210.

This manual, in conjunction with the ARs and TC 1-210, will help aviation commanders—at all levels—develop a comprehensive aircrew training program. By using the ATM, commanders ensure that individual crewmember and aircrew proficiency is commensurate with their units' mission and that aircrews routinely employ standard techniques and procedures.

Crewmembers will use this manual as a "how to" source for performing crewmember duties. It provides performance standards and evaluation guidelines so that crewmembers know the level of performance expected. Each task has a description that describes how it should be done to meet the standard.

Standardization officers, evaluators, and unit trainers will use this manual and TC 1-210 as the primary tools to assist the commander in developing and implementing his aircrew training program.

This publication applies to the Active Army, the Army National Guard/Army National Guard of the United States, and the U.S. Army Reserve unless otherwise stated.

The proponent of this publication is the United States Army Training and Doctrine Command (TRADOC). Send comments and recommendations on Department of Army (DA) Form 2028 (*Recommended Changes to Publications and Blank Forms)* or automated link (http://www.usapa.army.mil/da2028/daform2028.asp) through the aviation unit commander to Commander, U.S. Army Aviation Center, ATTN: ATZQ-TD (Flight Training Branch), Building 4507, Andrews Avenue, Fort Rucker, AL 36362-5263. Recommended changes may also be e-mailed to RUCK.ATZQ-TD@conus.army.mil.

This publication implements portions of STANAG 3114.

This publication has been reviewed for operations security considerations.

Chapter 1
Introduction

This ATM describes training requirements for H-60 crewmembers. It will be used with AR 95-1, AR 600-105, AR 600-106, National Guard Regulation (NGR) 95-210, TC 1-210, and other applicable publications. The tasks in this ATM enhance training in both individual crewmember and aircrew proficiency. The training focuses on accomplishing tasks that support the unit's mission. The scope and level of training to be achieved individually by crewmembers and collectively by aircrews will be dictated by the mission essential task list (METL). Commanders must ensure that aircrews are proficient in mission essential tasks.

1-1. CREW STATION DESIGNATION. The commander designates a crew station(s) for each crewmember. The individual's DA Form 7120-R (*Commander's Task List*) must clearly indicate all crew station designations. Training and proficiency sustainment for rated crewmembers (RCMs) is required in each designated crew station with access to the flight controls. Instructor pilots (IPs), standardization instructor pilots (SPs), instrument examiners (IEs), and maintenance test pilot evaluators (MEs) must maintain proficiency in both seats. Nonrated crewmember (NCM) training and proficiency sustainment is required in each designated crew station. Except for flight activity category (FAC) 3, aviators designated to fly from both pilots' seats will be evaluated in each seat during each phase of readiness level (RL) progression and annual proficiency and readiness test (APART) evaluations. This does not mean that both standardization and instrument flight evaluation need to be completed in both seats. As long as both seats have been evaluated during some portion of the above evaluations, the requirements for "both seat evaluation" have been met. (Maintenance test pilot [MP]/ME RL progression and APART evaluations will be conducted according to chapter 5 of this ATM.)

1-2. SYMBOL USAGE AND WORD DISTINCTIONS.

a. **Symbol usage**. The diagonal (/) means one or the other or both. For example, IP/SP may mean IP or SP, or it may mean IP and SP.

(1) M Denotes applicable only to H-60M series aircraft.

(2) A/L Denotes applicable only to H-60A/L series aircraft

(3) ATM tasks listed in uppercase and bold denote performance tasks.

b. **Word distinctions**.

(1) Warnings, cautions, and notes. These words emphasize critical and important instructions.

(a) A warning indicates an operating procedure or a practice that, if not correctly followed, could result in personal injury or loss of life.

(b) A caution indicates an operating procedure or a practice that, if not strictly observed, could result in damage to, or destruction of, equipment.

(c) A note highlights essential information that is not of a threatening nature.

(2) Will, must, shall, should, and may.

(a) Will, must, or shall are used to indicate mandatory actions.

(b) Should is used to indicate a nonmandatory but preferred method of accomplishment.

(c) May is used to indicate an acceptable method of accomplishment.

c. **Night vision devices (NVDs)**.

(1) Night vision system (NVS) refers to the NVS that is attached to the aircraft.

(2) Night vision goggles (NVGs) refer to any NVG image intensifier system; for example, the AN/AVS-6 (aviator's night vision imaging system [ANVIS]).

Note. NVD refers to either NVS or NVG.

Chapter 2
Training

This chapter describes requirements for qualification, refresher, mission, and continuation training. Crewmember qualification requirements will be according to AR 95-1, TC 1-210, and this ATM.

2-1. QUALIFICATION TRAINING.

a. **Initial aircraft qualification.**

(1) Rated crewmember. Initial aircraft qualification training in the H-60 is conducted at the United States Army Aviation Warfighting Center (USAAWC) or at Department of the Army (DA) approved training sites according to a USAAWC-approved program of instruction (POI).

(2) Nonrated crewmember. Military occupational specialty (MOS) qualification is conducted at DA-approved training sites. Initial aircraft qualification training for NCMs is conducted at the unit according to this ATM, (appendix A, sections I and II), applicable regulations, and the commander's aircrew training program (ATP). NCMs must complete academic and flight training and pass the required written examinations within 90 consecutive days from the start of training (United States Army Reserve (USAR)—1 year, Army National Guard (ARNG)—refer to appropriate regulations). Qualification training requirements for nonrated crewmember standardization instructors (SIs) and nonrated crewmember instructors (FIs) are also outlined in appendix A, section III.

b. **NVG qualification.** Initial NVG qualification and aircraft NVG qualification will be according to TC 1-210, the USAAWC NVG training support package (TSP), and this ATM. The NVG TSP can be obtained by writing to the Commander, US Army Aviation Center ATTN: ATZQ-ATB-N, Fort Rucker, AL 36362-5000 or atzqatbns@conus.army.mil. The NVG TSP may be obtained through Army Knowledge Online (AKO) from the Night Vision Devices Branch Knowledge Center at https://www.us.army.mil/suite/kc/5826250. An additional download site is available from the Fort Rucker Homepage at http://www.rucker.army.mil. Under the "TENANT SITES" drop-down menu select Night Vision Devices and select the Training Support Packages link.

(1) Initial NVG qualification. Initial NVG qualification training will be conducted according to this ATM.

(a) Academic training. The crewmember will receive training and demonstrate a working knowledge of the topics outlined in the current USAAWC NVG TSP and appropriate topics outlined in paragraph 3-4b of this ATM. Academic training must be completed prior to commencement of flight training.

(b) Flight training.

- Rated crewmembers. RCMs will complete, as a minimum, 10 flight hours of training on the tasks outlined in table 2-1. The evaluation may be applied to the 10-hour training requirement.
- Nonrated crewmembers. NCMs will demonstrate proficiency in all tasks outlined for NCMs in table 2-1. There is no minimum flight hour requirement.
- NVG progression. For progression to NVG RL 2, a crewmember must complete an NVG evaluation given at night by an NVG IP, SP, FI, or SI, as appropriate.

(2) H-60 additional aircraft NVG qualification. Each crewmember must complete the requirements outlined in paragraph 2-1b(1) above with the following exceptions.

(a) Academic training. The crewmember will receive training and demonstrate a working knowledge of the appropriate topics outlined in paragraph 3-4b.

(b) Flight training. RCMs will demonstrate proficiency in the tasks outlined in table 2-1.

(c) NVG progression. For progression to NVG RL 2, a crewmember must complete an NVG evaluation given at night by an NVG IP, SP, FI, or SI, as appropriate.

c. **Aircraft series qualification**. Aircraft series qualifications will be accomplished according to the approved USAAWC POI/TSP and this ATM (appendix B), as applicable.

d. **ANVIS heads-up display (HUD) qualification training**. These qualification procedures are outlined in appendix C.

e. **Additional system qualifications**. These will be conducted according to appendix D—to include but not limited to external stores support system/extended range fuel system (ESSS/ERFS) and Volcano qualifications.

Table 2-1. Flight tasks for initial night vision goggles qualification

Task	Title
1000	Participate in a crew mission briefing
1024	Perform before-starting-engine through before-leaving-helicopter checks
1026	**MAINTAIN AIRSPACE SURVEILLANCE**
1028	Perform hover power check*
1034	**PERFORM GROUND TAXI***
1038	**PERFORM HOVERING FLIGHT**
1040	**PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF**
1046	Perform electronically aided navigation*
1048	Perform fuel management procedures
1052	**PERFORM VISUAL METEOROLOGICAL CONDITIONS FLIGHT MANEUVERS**
1058	**PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH**
1062	**PERFORM SLOPE OPERATIONS**
1064	**PERFORM A ROLL-ON LANDING***
1068	**PERFORM GO-AROUND***
1070	**RESPOND TO EMERGENCIES**
1082	**PERFORM AUTOROTATION***
1114	**PERFORM A ROLLING TAKEOFF***
1155	Negotiate wire obstacles
1162	Perform emergency egress
1184	Respond to inadvertent instrument meteorological conditions *
2081	**OPERATE NIGHT VISION GOGGLES**
2092	**RESPOND TO NIGHT VISION GOGGLES FAILURE**
* Applies to RCMs only.	

2-2. REFRESHER TRAINING. The refresher training program is designed for crewmembers that are initially integrated into the ATP as RL 3. It enables them to regain proficiency in all base tasks. This chapter lists refresher training requirements and provides guidelines for developing refresher training programs (tables 2-2 and 2-3). While undergoing refresher training, the crewmember will be designated RL 3.

Table 2-2. Refresher flight training guide for rated crewmembers

Flight Instruction	Hours
Day and night base task training	6.0
Flight evaluation	2.0
Instrument base task training (aircraft and/or simulator)	8.0
Instrument evaluation	2.0
Total hours	**18.0**

Table 2-3. Refresher flight training guide for nonrated crewmembers

Flight Instruction	Hours
Day and night base task training	6.0
Flight evaluation	2.0
Total hours	**8.0**

a. **Aircraft refresher training requirements.**

(1) Rated crewmember. The RCM completes RL 3 requirements when the criteria in TC 1-210 (chapter 2) are met.

(a) Academic training. The RCM will receive training and demonstrate a working knowledge of the applicable topics listed in paragraph 3-4b (items 1-7) and complete an operator's manual written examination.

(b) Flight training. The RCM will receive training and demonstrate proficiency from the designated crew station(s). Proficiency must be demonstrated in each performance and technical base task listed in table 2-4. An X under the mode of flight for performance tasks specifies the mode in which the task will be performed. Technical tasks may be trained and/or evaluated in any condition and/or mode (refer to paragraph 2-5d(2) for guidance on technical tasks). A task that may be performed from either crew station need not be evaluated from both. All tasks must be trained to proficiency. Table 2-2 is a guide for developing refresher flight training for RCMs. Actual hours will be based on individual proficiency.

(2) Nonrated crewmember. The NCM completes RL 3 requirements when the criteria in TC 1-210 (chapter 2) are met. Nonrated crewmembers have minimum flying-hour requirements as specified in AR 600-106.

(a) Academic training. Topics listed in appendix A, sections I and II will be used as a guide for developing a refresher academic training program for NCMs.

(b) Flight training. The NCM will receive training and demonstrate proficiency from his designated crew station(s). Proficiency must be demonstrated in each performance and technical base task listed in table 2-5 and table 2-6. An X under the mode of flight for performance tasks specifies the mode in which the task will be performed. Technical tasks may be trained and evaluated in any condition or mode (refer to paragraph 2-5d (2) for guidance on technical tasks). NCMs must demonstrate crew coordination and airspace surveillance proficiency in all other flight tasks listed in table 2-4. All standards of each flight task must be trained to proficiency. Table 2-3 is a guide for developing refresher flight training for NCMs. Actual hours will be based on individual proficiency.

b. **NVG refresher training**. The crewmember must complete the training outlined below. NVG considerations for each task, when applicable, are in chapter 4 of this ATM.

(1) Academic training. The crewmember will receive training and demonstrate a working knowledge of the appropriate topics listed in paragraph 3-4b prior to commencement of flight training.

(2) Flight training. Crewmembers will demonstrate proficiency in all tasks outlined for the appropriate crewmember in table 2-1. There is no minimum flying hour requirement.

(3) NVG progression. For progression to NVG RL 2, a crewmember must complete an NVG evaluation given at night by an NVG IP, SP, FI, or SI, as appropriate.

2-3. MISSION TRAINING. Mission training develops the crewmember's ability to perform specific mission/additional tasks selected by the commander to support the unit's METL. Mission training may be done during mission support or collective training.

a. **Training requirements**.

(1) Academic training. Academic training should focus on training a crewmember to operate as a proficient member of an aircrew and the doctrine for the current unit of assignment up to the battalion level. The crewmember must demonstrate a working knowledge of the topics listed in paragraph 3-4b with special emphasis placed on sections (8) and (9). If the unit presently does not conduct door gunnery, section (9) may be deleted.

(2) Flight training. The crewmember will receive flight training and demonstrate proficiency in the mission and additional tasks designated by the commander. Performance tasks will be conducted in each mode as specified on the individual’s DA Form 7120-1-R (*Crewmember Task Performance and Evaluation Requirements*) and DA Form 7120-2-R (*Crewmember Task Performance and Evaluation Requirements Continuation Sheet*) for the crewmember’s position. Mission training hour requirements are based on demonstrated proficiency. Technical tasks may be trained and evaluated in any condition or mode (refer to paragraph 2-5d (2) for guidance on technical tasks).

b. **NVG mission training**. NVG mission training will be according to the commander’s aircrew training program, TC 1-210, and this ATM. When commanders determine a requirement for using NVGs in mission profiles, they must develop a mission training program and specify mission/additional NVG tasks as required. Before undergoing NVG mission training, the RCM must complete qualification or refresher training and must be NVG current in the H-60. Additionally for RCMs, if not previously ANVIS HUD qualified, ANVIS HUD qualification should be done during NVG mission training as outlined below. See appendix C for ANVIS HUD qualification requirements.

(1) Academic training. The crewmember will receive training and demonstrate a working knowledge of the appropriate subject areas listed in paragraph 3-4b of this ATM. Special emphasis should be placed on NVG considerations pertaining to subject areas 3-4b (8) and (10). If conducting ANVIS HUD qualification, all RCMs will complete the academic portion of the ANVIS HUD qualification prior to beginning flight training with ANVIS HUD according to appendix C.

(2) Flight training. The crewmember will receive flight training and demonstrate proficiency in the mission/additional NVG tasks as specified by the commander on the individual’s DA Form 7120-1-R/DA Form 7120-2-R for the crewmember’s position. There is no minimum flight hour requirement.

(3) NVG progression. For progression to NVG RL 1, a crewmember must complete an NVG evaluation given at night by an NVG IP, SP, FI, or SI, as appropriate. For a RCM not previously ANVIS HUD qualified, he should complete ANVIS HUD qualification according to

appendix C before progressing to NVG RL 1. A RCM who has been previously ANVIS HUD qualified does not need to complete ANVIS HUD qualification again. That RCM only needs to demonstrate proficiency in task 2086 before progressing to NVG RL 1 if that task is specified on the RCMs individual DA Form 7120-1-R/DA Form 7120-2-R.

c. **MP and ME mission training**. Commanders are not authorized to delete any maintenance test pilot (MP) tasks.

(1) Academic training. The crewmember will receive training and demonstrate a working knowledge of the subject areas in paragraph 3-4b that apply.

(2) Flight training. The MP/ME will receive training and demonstrate proficiency in the tasks in table 2-8..

2-4. CONTINUATION TRAINING REQUIREMENTS. The RCM aircraft and simulation device flying-hour requirements apply only to RCMs whose primary aircraft is an H-60 series helicopter. Hours/task iterations flown in similar series aircraft may be credited toward semiannual flying-hour requirements unless directed otherwise by the commander. For RCMs whose additional/alternate aircraft is an H-60 series helicopter, commanders will establish continuation training requirements according to TC 1-210.

a. **Semiannual aircraft flying-hour requirements**. The minimum requirements are as follows:

(1) Rated crewmember.

(a) FAC 1–48 hours, from the pilot's or copilot's seat.

(b) FAC 2–30 hours, from the pilot's or copilot's seat.

Note. IPs, SPs, IEs, MEs, and unit trainers (UTs) may credit those hours they fly while performing assigned duties at any crew station designated on DA Form 7120-R, during the day and night unaided, toward their semiannual flying-hour requirement.

(c) FAC 3–no aircraft flying-hour requirements.

(d) NVG RL 1 RCMs and Department of the Army civilians (DACs)—9 hours of NVG flight, of which a minimum of 6 hours must be flown at night in the aircraft from a crew station with access to the flight controls while using NVGs. The other 3 hours may be flown in the UH-60FS.

(2) Nonrated crewmember. Has 24 hours (12 hours USAR and ARNG) in the aircraft while performing crew duties and complying with AR 600-106 and DOD 7000.15 or NVG RL 1 NCMs, 5 hours at night while performing crew duties and wearing NVG.

Note. FIs and SIs may credit those hours they fly while performing assigned duties in the cabin toward their semiannual flying-hour requirement.

b. **Annual simulation device flying-hour requirements**. All RCMs will complete simulator requirements listed below.

(1) All active and reserve RCMs within 200 statute miles (SMs) of a compatible synthetic flight training system (SFTS) device will complete the following number of hours in the SFTS:

(a) FAC 1 – 18 hours annually.

(b) FAC 2 – 12 hours annually.

(2) RCMs outside of 200 SM: Commanders should set up SFTS programs when it is cost effective and feasible.

(3) ARNG RCMs refer to NGR 95-1.

(4) FAC 3 – 10 hours semiannually regardless of distance from a SFTS device. This is authorized to be prorated per TC 1-210.

(5) RCMs may apply 12 hours of UH-60FS time in a compatible flight simulator (2B38 and 2B60) toward their semiannual aircraft flying-hour minimums.

(6) Only time flown in an H-60 series helicopter, 2B38, and 2B60 SFTS devices will be credited toward flying hour or simulation requirements.

(7) Commanders should consider increasing annual SFTS requirements when training other than instrument training is conducted in the SFTS (i.e., ASE training, ERFS, HUD).

c. **Annual task and iteration requirements**. The minimum task and iteration requirements are as follows:

(1) DA Form 7120-1-R/DA Form 7120-2-R in the crewmember's individual aircrew training folder (IATF) specifies the tasks and modes/conditions that the crewmember must perform. Task iteration requirements will be according to TC 1-210 except as stated below. The commander may require the crewmember to perform additional iterations of specific tasks based on crewmember proficiency. The commander should consider increasing task iteration requirements if the crewmember's proficiency is in question throughout the ATP year. The crewmember is responsible for maintaining proficiency in each task on his task list in the modes specified.

(2) The minimum iteration requirement for all performance tasks is one iteration in each mode or condition of flight listed in tables 2-4 through 2-6 and those tasks from table 2-7 designated by the commander on the crewmember's DA Form 7120-1-R/DA Form 7120-2-R. Additional iterations should be added based on individual crewmember proficiency.

(3) The minimum iteration requirement for all technical tasks is one iteration in any mode or condition. Additional iterations should be added based on individual crewmember proficiency.

(4) MPs/MEs will perform a minimum of four iterations of maintenance test pilot tasks (4000 series) annually. MEs will perform two iterations from each crew station with access to the flight controls annually.

d. **Hood/weather requirements.** All aviators will complete hood or weather requirements as determined by the commander. This requirement may be completed in the aircraft or simulator.

2-5. TASK LISTS. Tables 2-4 through 2-8 list base and mission tasks.

a. **Base tasks**. Tables 2-4 through 2-6 list the required performance and technical base tasks for RCMs and NCMs for RL progression. An "X" under the mode of flight for performance tasks specifies the mode for progression and annual task iteration requirements. Technical tasks may be performed in any mode of flight.

b. **Mission/Additional tasks**. Table 2-7 lists the performance and technical mission tasks for RCMs and NCMs. The commander will select mission and any additional tasks that support the unit's METL. Once a task is selected by the commander, an "X" under the mode of flight column denotes the task is mandatory for RL progression in that mode of flight.

c. **Maintenance test pilot tasks**. Table 2-8 lists the maintenance test pilot tasks. All tasks listed in this table will be evaluated during initial MP progression and initial ME evaluations.

d. **Task groups.**

(1) Performance tasks. These tasks measure the crewmember's ability to perform, manipulate the controls, and respond to tasks that are affected by the conditions and mode of flight. These tasks are significantly affected by the conditions and mode of flight; therefore, the condition and mode of flight under which the task must be performed must be specified. The base tasks listed as performance tasks in tables 2-4 through 2-6 already have the applicable conditions and modes of flight specified. The mission tasks listed as performance tasks in table 2-7 must have the conditions and modes or flight specified by the commander based on the unit METL. These specified conditions and modes of flight will be outlined in writing. Those tasks designated as performance tasks are listed in uppercase and bold type in tables 2-4 through 2-7.

(2) Technical tasks. These tasks measure the crewmembers ability to plan, preflight, brief, run-up, or operate specific onboard systems, sensors, or avionics in flight or on the ground. These tasks are not significantly affected by the condition and mode of flight, therefore, may be performed or evaluated in any condition and/or mode. The commander may mandate specific modes or conditions of flight based on unit mission. Tasks designated as technical tasks are listed in lowercase and plain type in tables 2-4 through 2-7.

e. **Evaluation guidelines**.

(1) Evaluations. APART evaluation tasks are those that are identified with an "S" or "I" in the evaluation column of tables 2-4 through 2-6. Annual NVG evaluation tasks are those tasks identified with an "NG" in the evaluation column of tables 2-4 through 2-6. Tasks evaluated at night or while using NVD will suffice for tasks required in day conditions.

(2) Night evaluation tasks must be evaluated in that mode if designated on DA Form 7120-1-R/DA Form 7120-2-R by the commander.

(3) A chemical, biological, radiological, nuclear (CBRN) task iteration (wearing mission-oriented protective posture [MOPP] IV) performed at night or while wearing NVG may be substituted for a day CBRN task iteration. An iteration completed in any mode (day, night or NVG) while wearing MOPP IV may also suffice for one of the iterations required in that mode of flight when not wearing MOPP IV.

Table 2-4. Rated crewmember base task list

Legend:

Day	Day mode of flight	Inst	Instrument mode of flight
Night	Night unaided mode of flight	NVG	NVG mode of flight
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation
S	Standardization flight evaluation	NG	NVG annual/NVG PFE

Task	Task Title	Day	Inst	Night	NVG	Eval
1000	Participate in a crew mission briefing	X				S, I
1004	Plan a visual flight rules flight	X				S
1006	Plan an instrument flight rules flight	X				I
1010	Prepare a performance planning card	X				S, I
1011	Determine aircraft performance using tabular data	X				S
1012	Verify aircraft weight and balance	X				S
1013	Operate mission planning system	X				S
1014	Operate aviation life support equipment	X				S

Table 2-4. Rated crewmember base task list

Legend:

Day	Day mode of flight	Inst	Instrument mode of flight
Night	Night unaided mode of flight	NVG	NVG mode of flight
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation
S	Standardization flight evaluation	NG	NVG annual/NVG PFE

<table>
<tr><th>Task</th><th>Task Title</th><th>Day</th><th>Inst</th><th>Night</th><th>NVG</th><th>Eval</th></tr>
<tr><td>1016</td><td>Perform internal load operations</td><td colspan="4">X</td><td>S</td></tr>
<tr><td>1020</td><td>Prepare aircraft for mission</td><td colspan="4">X</td><td>S</td></tr>
<tr><td>1022</td><td>Perform preflight inspection</td><td colspan="4">X</td><td>S</td></tr>
<tr><td>1024</td><td>Perform before-starting-engine through before-leaving-helicopter checks</td><td colspan="4">X</td><td>S, I, NG</td></tr>
<tr><td>1025</td><td>Operate integrated vehicle monitoring system (H-60M)</td><td colspan="4">X</td><td>S</td></tr>
<tr><td>1026</td><td>MAINTAIN AIRSPACE SURVEILLANCE</td><td>X</td><td>X</td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1028</td><td>Perform hover power check</td><td colspan="4">X</td><td>S, I, NG</td></tr>
<tr><td>1032</td><td>Perform radio communication procedures</td><td colspan="4">X</td><td>S, I</td></tr>
<tr><td>1034</td><td>PERFORM GROUND TAXI</td><td>X</td><td></td><td>X</td><td>X</td><td>S</td></tr>
<tr><td>1038</td><td>PERFORM HOVERING FLIGHT</td><td>X</td><td></td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1040</td><td>PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF</td><td>X</td><td></td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1044</td><td>NAVIGATE BY PILOTAGE AND DEAD RECKONING</td><td>X</td><td></td><td>X</td><td>X</td><td>S</td></tr>
<tr><td>1046</td><td>Perform electronically aided navigation</td><td colspan="4">X</td><td>S, NG</td></tr>
<tr><td>1048</td><td>Perform fuel management procedures</td><td colspan="4">X</td><td>S, I, NG</td></tr>
<tr><td>1052</td><td>PERFORM VISUAL METEOROLOGICAL CONDITIONS FLIGHT MANEUVERS</td><td>X</td><td></td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1054</td><td>Select landing zone/pickup zone/holding area</td><td colspan="4">X</td><td></td></tr>
<tr><td>1058</td><td>PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH</td><td>X</td><td></td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1062</td><td>PERFORM SLOPE OPERATIONS</td><td>X</td><td></td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1064</td><td>PERFORM A ROLL-ON LANDING</td><td>X</td><td></td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1068</td><td>PERFORM GO-AROUND</td><td>X</td><td></td><td>X</td><td>X</td><td>S</td></tr>
<tr><td>1070</td><td>RESPOND TO EMERGENCIES</td><td>X</td><td>X</td><td>X</td><td>X</td><td>S, NG</td></tr>
<tr><td>1082</td><td>PERFORM AUTOROTATION</td><td>X</td><td></td><td>X</td><td>X</td><td>S</td></tr>
<tr><td>1114</td><td>PERFORM A ROLLING TAKEOFF</td><td>X</td><td></td><td>X</td><td>X</td><td>S</td></tr>
<tr><td>1142*</td><td>Perform digital communications</td><td colspan="4">X</td><td></td></tr>
<tr><td>1155</td><td>Negotiate wire obstacles</td><td colspan="4">X</td><td></td></tr>
<tr><td>1162</td><td>Perform emergency egress</td><td colspan="4">X</td><td>S</td></tr>
<tr><td>1166</td><td>Perform instrument maneuvers</td><td colspan="4">X</td><td>I</td></tr>
<tr><td>1167</td><td>PERFORM FLIGHT MANEUVERS USING STANDBY FLIGHT INSTRUMENT SYSTEM (H-60M)</td><td>X</td><td></td><td>X</td><td>X</td><td>S or I</td></tr>
<tr><td>1168</td><td>Perform command instrument system procedures (A/L)</td><td colspan="4">X</td><td>S or I</td></tr>
<tr><td>1169</td><td>Perform flight director operations (H-60M)</td><td colspan="4"></td><td>S</td></tr>
<tr><td>1170</td><td>Perform instrument takeoff</td><td colspan="4">X</td><td>I</td></tr>
</table>

Table 2-4. Rated crewmember base task list

Legend:

Day	Day mode of flight	Inst	Instrument mode of flight
Night	Night unaided mode of flight	NVG	NVG mode of flight
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation
S	Standardization flight evaluation	NG	NVG annual/NVG PFE

Task	Task Title	Day	Inst	Night	NVG	Eval
1174	Perform holding procedures	X				I
1176	Perform nonprecision approach	X				I
1178	Perform precision approach	X				I
1180	Perform emergency global positioning system recovery procedure	X				
1182	**PERFORM UNUSUAL ATTITUDE RECOVERY**	X	X	X	X	S or I
1184	**RESPOND TO INADVERTENT INSTRUMENT METEOROLOGICAL CONDITIONS**	X		X	X	S, NG
1188	Operate aircraft survivability equipment	X				S
1190	Perform hand and arm signals	X				S
1194	Perform refueling operations	X				
1253*	Operate flight management system/central display unit	X				S
1254*	Operate multifunction display	X				S
1260*	Operate digital map (H-60M)	X				S
1262	Participate in a crew-level after action review	X				S

*Base tasks requiring specialized equipment do not apply to aircraft that do not have the equipment.

Note. Performance tasks are in uppercase and bold type. Technical tasks are in lowercase and plain type.

Table 2-5. Nonrated crewmember (15T/68W) base task list					
Legend:					
Day	Day mode of flight	Inst	Instrument mode of flight		
Night	Night unaided mode of flight	NVG	NVG mode of flight		
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation		
S	Standardization flight evaluation	NG	NVG annual/NVG PFE		
Task	**Task Title**	**Day**	**Night**	**NVG**	**Eval**
1000	Participate in a crew mission briefing		X		S, NG
1014	Operate aviation life support equipment		X		S
1016	Perform internal load operations		X		S, NG
1020	Prepare aircraft for mission		X		S, NG
1022	Perform preflight inspection		X		S
1024	Perform before-starting-engine through before-leaving-helicopter checks		X		S, NG
1026	**MAINTAIN AIRSPACE SURVEILLANCE**	X	X	X	S, NG
1032	Perform radio communication procedures		X		S
1038	**PERFORM HOVERING FLIGHT**	X	X	X	S, NG
1040	**PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF**	X	X	X	S, NG
1048	Perform fuel management procedures		X		S, NG
1052	**PERFORM VISUAL METEOROLOGICAL CONDITIONS FLIGHT MANEUVERS**	X	X	X	S, NG
1058	**PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH**	X	X	X	S, NG
1062	**PERFORM SLOPE OPERATIONS**	X	X	X	S, NG
1070	**RESPOND TO EMERGENCIES**	X	X	X	S, NG
1114	**PERFORM A ROLLING TAKEOFF**	X	X	X	S
1155	Negotiate wire obstacles		X		
1162	Perform emergency egress		X		S, NG
1188	Operate aircraft survivability equipment		X		S
1190	Perform hand and arm signals		X		S
1194	Perform refueling operations		X		
1262	Participate in a crew-level after action review		X		S

*Base tasks requiring specialized equipment do not apply to aircraft that do not have the equipment.

Note. Performance tasks are in uppercase and bold type. Technical tasks are in lowercase and plain type.

Table 2-6. Nonrated crewmember base task list (minimum for other than (15T/68W) –technical inspector, door gunner)

Legend:

Day	Day mode of flight	Inst	Instrument mode of flight
Night	Night unaided mode of flight	NVG	NVG mode of flight
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation
S	Standardization flight evaluation	NG	NVG annual/NVG PFE

<table>
<tr><th>Task</th><th>Task Title</th><th>Day</th><th>Night</th><th>NVG</th><th>Eval</th></tr>
<tr><td>1000</td><td>Participate in a crew mission briefing</td><td colspan="3">X</td><td></td></tr>
<tr><td>1014</td><td>Operate aviation life support equipment</td><td colspan="3">X</td><td></td></tr>
<tr><td>1016</td><td>Perform internal load operations</td><td colspan="3">X</td><td></td></tr>
<tr><td>1020</td><td>Prepare aircraft for mission</td><td colspan="3">X</td><td></td></tr>
<tr><td>1022</td><td>Perform preflight inspection</td><td colspan="3">X</td><td></td></tr>
<tr><td>1024</td><td>Perform before-starting-engine through before-leaving-helicopter checks</td><td colspan="3">X</td><td></td></tr>
<tr><td>1026</td><td>MAINTAIN AIRSPACE SURVEILLANCE</td><td>X</td><td>X</td><td>X</td><td></td></tr>
<tr><td>1032</td><td>Perform radio communication procedures</td><td colspan="3">X</td><td></td></tr>
<tr><td>1162</td><td>Perform emergency egress</td><td colspan="3">X</td><td></td></tr>
<tr><td>1190</td><td>Perform hand and arm signals</td><td colspan="3">X</td><td></td></tr>
<tr><td>1262</td><td>Participate in a crew-level after action review</td><td colspan="3">X</td><td></td></tr>
</table>

*Base tasks requiring specialized equipment do not apply to aircraft that do not have the equipment.

Note. Mandatory evaluation tasks may be designated by the commander.

Note. Performance tasks are in uppercase and bold type. Technical tasks are in lowercase and plain type.

Table 2-7. Crewmember (rated/nonrated) mission task list

Legend:

Day	Day mode of flight	Inst	Instrument mode of flight
Night	Night unaided mode of flight	NVG	NVG mode of flight
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation
S	Standardization flight evaluation	NG	NVG annual/NVG PFE

<table>
<tr><th>Task</th><th>Task Title</th><th>Day</th><th>Inst</th><th>Night</th><th>NVG</th><th>Eval</th></tr>
<tr><td>2010</td><td>PERFORM MULTIAIRCRAFT OPERATIONS</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2012</td><td>PERFORM TACTICAL FLIGHT MISSION PLANNING (RCM ONLY)</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2014</td><td>Perform electronic countermeasures/electronic counter-countermeasures procedures</td><td colspan="4"></td><td></td></tr>
<tr><td>2022</td><td>Transmit tactical reports</td><td colspan="4"></td><td></td></tr>
<tr><td>2024</td><td>PERFORM TERRAIN FLIGHT NAVIGATION</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2026</td><td>PERFORM TERRAIN FLIGHT</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2034</td><td>PERFORM MASKING AND UNMASKING</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2036</td><td>PERFORM TERRAIN FLIGHT DECELERATION</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Table 2-7. Crewmember (rated/nonrated) mission task list

Legend:

Day	Day mode of flight	Inst	Instrument mode of flight
Night	Night unaided mode of flight	NVG	NVG mode of flight
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation
S	Standardization flight evaluation	NG	NVG annual/NVG PFE

Task	Task Title	Day	Inst	Night	NVG	Eval
2042	Perform actions on contact					
2048	**PERFORM SLING LOAD OPERATIONS**					
2050	Develop an emergency global positioning system recovery procedure					
2052	**PERFORM WATER BUCKET OPERATIONS**					
2054	**PERFORM FAST-ROPE INSERTION AND EXTRACTION SYSTEM OPERATIONS**					
2056	**PERFORM RAPPELLING OPERATIONS**					
2058	**PERFORM SPECIAL PATROL INFILTRATION/EXFILTRATION SYSTEM OPERATIONS**					
2060	**PERFORM RESCUE HOIST OPERATIONS**					
2061	Operate forward looking infrared system					
2063	Operate storm scope weather mapping system					
2064	**PERFORM PARADROP OPERATIONS**					
2065	Operate personnel locater system					
2066	Perform extended range fuel system operation					
2068	**PERFORM SHIPBOARD OPERATIONS**					
2070	**PERFORM M-139 VOLCANO OPERATIONS**					
2075	Perform fat hawk operations					
2076	**PERFORM CAVING LADDER OPERATIONS**					
2078	**PERFORM HELOCAST OPERATIONS**					
2081	**OPERATE NIGHT VISION GOGGLES**					NG
2086	**OPERATE AVIATOR'S NIGHT VISION IMAGING SYSTEM HEADS-UP DISPLAY**					
2090	**PERFORM LANDING AREA RECONNAISSANCE FOR SIMULATED MAXIMUM GROSS WEIGHT**					
2092	**RESPOND TO NIGHT VISION GOGGLES FAILURE**					NG
2093	**PERFORM SIMULATED MAXIMUM GROSS WEIGHT APPROACH AND LANDING**					
2095	**PERFORM SIMULATED MAXIMUM GROSS WEIGHT TAKEOFF**					
2098	Perform aerial radio relay					
2108*	Perform auxiliary power unit operations (NCM only)					
2112*	**OPERATE ARMAMENT SUBSYSTEM**					
2116	Perform an aerial radiological survey					
2120*	Perform patient evacuation and treatment					

Table 2-7. Crewmember (rated/nonrated) mission task list

Legend:

Day	Day mode of flight	Inst	Instrument mode of flight
Night	Night unaided mode of flight	NVG	NVG mode of flight
Eval	Maneuver listed is required to be evaluated on the listed evaluation	I	Instrument flight evaluation
S	Standardization flight evaluation	NG	NVG annual/NVG PFE

Task	Task Title	Day	Inst	Night	NVG	Eval
2122*	Operate mission medical interior cabin systems					
2127	Perform combat maneuvering flight					
2169	Perform aerial observation					

* Applies to NCMs only.

Note. Performance tasks are in uppercase and bold type. Technical tasks are in lowercase and plain type.

Table 2-8. Maintenance test pilot task list

Task	Task Title
4000	Perform prior-to maintenance test flight checks
4081	Perform before-starting- engine checks
4088	Perform starting engine checks
4090	Perform engine run-up and systems checks
4113	Perform integrated vehicle health monitoring system operations (H-60M)
4156	Perform hover checks
4193	Perform in-flight checks
4200	Perform backup tail rotor servo check
4202	Perform generator underfrequency protection disable/low rotor revolutions per minute check
4204	Perform compasses, turn rate, and vertical gyros checks (A/L)
4220	Perform maximum power check
4228	Perform vibration absorber check and tuning (A/L)
4236	Perform autorotation revolutions per minute check
4254	Perform Vh check
4284	Perform engine shutdown checks
4288	Perform gust lock/rotor brake operations

2-6. CURRENCY REQUIREMENTS.

a. Aircraft currency will be according to AR 95-1. Those crewmembers whose currency has lapsed must complete an evaluation given in the aircraft by an IP, SP, FI, or SI, as appropriate. Commanders should consider selecting tasks from each mode of flight (day, night and instrument) and evaluating tasks from each selected mode during the currency evaluation. These requirements will be outlined in the unit standing operating procedure (SOP). Currency in any one mission/series aircraft for which the rated crewmember is qualified will satisfy the requirement for all aircraft within the same group. Nonrated crewmembers may maintain currency in any H60 helicopter in which qualified. Mission/series aircraft are grouped as follows:

(1) UH-60A/L, HH-60A/L, MH-60A/L, VH-60A

(2) UH-60M, HH-60M

b. To be considered night vision goggles (NVG) current, a crewmember must take part every 60 days in at least a 1-hour flight in the aircraft at night while wearing NVG. For those qualified and maintaining an additional aircraft, NVG currency may be accomplished within any H-60 series in which qualified and current. A RCM must be at a crew station with access to the flight controls. Using the UH-60FS to maintain currency is not authorized. A NCM must perform designated duties in a crew station authorized on the DA Form 7120-R. Those RCMs and NCMs whose currency has lapsed must complete as a minimum a 1-hour proficiency flight evaluation given at night in the aircraft by an NVG IP, SP, FI, or SI, as appropriate. The minimum tasks to be evaluated are listed in tables 2-4 through 2-7 and identified by an "NG" in the evaluation column.

c. If the crewmember fails to demonstrate proficiency, he will be regressed to the appropriate RL status.

2-7. ANNUAL CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR (CBRN) REQUIREMENTS.

a. Crewmembers will receive CBRN training in the tasks listed below. The commander may select other tasks based on the unit's mission. Crewmembers will perform at least one iteration of the tasks listed below annually while wearing MOPP IV CBRN gear. Task 1028 applies to RCMs only.

(1) Task 1022 – Perform preflight inspection.

(2) Task 1024 – Perform before-starting-engine through before-leaving-helicopter checks.

(3) Task 1026 – Maintain airspace surveillance.

(4) Task 1028 – Perform hover power check.

(5) Task 1038 – Perform hovering flight.

(6) Task 1040 – Perform visual meteorological conditions takeoff.

(7) Task 1058 – Perform visual meteorological conditions approach.

b. While conducting CBRN training, the commander will ensure that aircrews exercise caution when performing flight duties when the wet bulb globe temperature is above 75 degrees Fahrenheit.

c. Commander's may allow both pilots to fly while wearing MOPP IV.

Chapter 3
Evaluation

This chapter describes evaluation principles and grading considerations. It also contains guidelines for conducting academic and hands-on testing. Evaluations are a primary means of assessing flight standardization and crewmember proficiency. Evaluations will be conducted according to AR 95-1, TC 1-210, and this ATM.

3-1. EVALUATION PRINCIPLES.

a. The value of any evaluation depends on adherence to fundamental evaluation principles. These principles are described below.

(1) The evaluators must be selected not only for their technical qualifications but also for their demonstrated performance, objectivity, and ability to observe and to provide constructive comments. These evaluators are the SPs, IPs, IEs, MEs, SIs, and FIs who assist the commander in administering the ATP.

(2) The evaluation method must be based on uniform and standard objectives. In addition, it must be consistent with the unit's mission and must strictly adhere to the appropriate SOPs and regulations. The evaluator must ensure a complete evaluation is given in all areas and refrain from making a personal "area of expertise" a dominant topic during the evaluation.

(3) All participants must completely understand the purpose of the evaluation.

(4) Cooperation by all participants is necessary to accomplish the evaluation objectives. The emphasis is on all participants—not just on the examinee.

(5) The evaluation must produce specific findings to identify training needs. Any crewmember affected by the evaluation needs to know what is being performed correctly and incorrectly and how improvements can be made.

b. The evaluation will determine the examinee's ability to perform essential tasks to prescribed standards. Flight evaluations will also determine the examinee's ability to exercise crew coordination in completing these tasks.

c. The guidelines for evaluating crew coordination are based on an analysis of how effectively a crew performs together to accomplish a series of tasks. The evaluator must determine how effectively the examinee employs aircrew coordination as outlined in chapter 6 of this ATM.

d. In all phases of the evaluation, the evaluator is expected to perform as an effective crewmember. However, at some point during the evaluation, circumstances may prevent the evaluator from performing as an effective crewmember. In such cases, a realistic, meaningful, and planned method should be developed to pass this task back to the examinee effectively. In all other situations, the evaluator must perform as outlined in the task description or as directed by the examinee. The examinee must know that he is being supported by a fully functioning crewmember.

3-2. GRADING CONSIDERATIONS.

a. **Academic evaluation**. The examinee must demonstrate a working knowledge and understanding of the appropriate subject areas in paragraph 3-4b.

b. **Flight evaluation**.

(1) Academic. Some tasks are identified in TRAINING AND EVALUATION REQUIREMENTS as tasks that may be evaluated academically. For these tasks, the examinee must

demonstrate a working knowledge of the task. Evaluators may use computer based instruction, mock-ups, or other approved devices (to include the aircraft or simulator) to determine the examinee's knowledge of the task.

(2) In the aircraft or in the simulator. Tasks which require evaluation under these conditions must be performed in the aircraft or the UH-60FS. Task standards are based on an ideal situation. Grading is based on meeting the minimum standards. The evaluator must consider deviations (high wind, turbulence, or poor visibility) from the ideal during the evaluation. If other than ideal conditions exist, the evaluator must make appropriate adjustments to the standards.

3-3. CREWMEMBER EVALUATION. Evaluations determine the crewmember's ability to perform the tasks on his DA Form 7120-1-R and DA Form 7120-2-R and check understanding of required academic subjects listed in the ATM. The evaluator will determine the amount of time devoted to each phase. When the examinee is an evaluator/trainer or a unit trainer, the recommended procedure is for the evaluator to reverse roles with the examinee. When the evaluator uses this technique, the examinee must understand how the role reversal will be conducted and when it will be in effect.

Note. Initial validation of a crewmember's qualifications following a MOS-producing course of instruction/school—UH-60 Instructor Pilot Course, Maintenance Test Pilot Course, Instrument Flight Examiners Course, and Nonrated Instructor Course—will be conducted in the aircraft upon return from that course and in the aircraft at each new duty station.

a. **Performance criteria**.

(1) PI. The pilot (PI) must demonstrate a working knowledge of the appropriate subjects in paragraph 3-4b. In addition, the PI must be familiar with his individual aircrew training folder (IATF), and understand the requirements listed on his commander's task list.

(2) PC/MP. The pilot in command/maintenance test pilot (PC/MP) must meet the requirements in paragraph 3-3a (1). In addition, the PC/MP must demonstrate sound judgment and maturity in managing the mission, crew, and assets.

(3) UT. The unit trainer (UT) must meet the requirements in paragraph 3-3a (2). In addition, the UT must be able to instruct in the appropriate tasks and subjects, recognize errors in performance or understanding, make recommendations for improvement, train to standards, and document training.

(4) IP or IE. The instructor pilot (IP) or instrument examiner (IE) must meet the requirements in paragraph 3-3a (2). In addition, the IP or IE must be able to objectively instruct, evaluate, and document performance of the crew chief (CE), medical officer (MO), observer (OR), SI, FI, PI, PC, UT, and IE using role reversal for IP, IE, UT, PC, SI, and FI, as appropriate. The IP or IE must be able to develop and implement an individual training plan and have a thorough understanding of the requirements and administration of the ATP.

(5) SP. The SP must meet the requirements in paragraph 3-3a (2) and (4). The SP must be able to instruct and evaluate SPs, IPs, UTs, PCs, PIs, SIs, and FIs as appropriate, using role reversal. The SP must also be able to develop and implement a unit training plan and administer the commander's ATP.

(6) ME. The maintenance test pilot evaluator (ME) must meet the requirements in paragraph 3-3a (1) and (2). The ME must be able to instruct and evaluate other MEs and MPs using role reversal when required.

(7) CE/MO/OR. The CE/MO/OR must perform selected tasks to ATM standards, applying aircrew coordination principles. The CE/MO/OR must also demonstrate a basic understanding of the appropriate academic subjects listed in paragraph 3-4b. In addition, the CE/MO/OR must be familiar with and understand the requirements listed in the individual aircrew training folder (IATF).

(8) FI. The nonrated crewmember flight instructor (FI) must meet the requirements in paragraph 3-3a (7). In addition, the FI must be able to objectively train, evaluate, and document performance of the CE, MO, and OR as appropriate. The FI must be able to develop and implement an individual training plan, and have a thorough understanding of the requirements and administration of the aircrew training program.

(9) SI. The nonrated crewmember standardization instructor (SI) must meet the requirements in paragraph 3-3a (7) and (8). In addition, the SI must be able to train and evaluate the SI, FI, CE, MO, and OR using role reversal, as appropriate. The SI also must be able to develop and implement a unit training plan and administer the commander's ATP.

Note. SP/IP/IE/ME/UT/SI/FI will be evaluated on their ability to apply the learning and teaching process outlined in paragraph 3-4b (12).

b. **Academic evaluation criteria**.

(1) Proficiency flight evaluations. The commander or his representative will select appropriate topics to be evaluated from paragraph 3-4b that apply.

(2) APART standardization/NVG annual evaluations. The SP/IP/SI/FI will evaluate a minimum of two topics from each subject area in paragraph 3-4b that apply.

(3) APART instrument evaluation. The IE will evaluate a minimum of two topics from the subject areas in paragraphs 3-4b (1) through (5) relative to instrument meteorological condition (IMC) flight and flight planning. If the evaluated crewmember is an IP/SP/IE, the IE will evaluate the ability of the IP/SP/IE to instruct instrument-related tasks.

(4) APART MP/ME evaluation. The ME will evaluate a minimum of two topics from the subject areas in paragraphs 3-4b (1) through (4) and (11), with specific emphasis on how they apply to maintenance test flights. Additionally, evaluate topics in paragraph 3-4b (12) when the examinee is an ME.

(5) Other ATP evaluations. The SP/IP/SI/FI will evaluate a minimum of two topics from each subject area in paragraph 3-4b that apply.

3-4. EVALUATION SEQUENCE. The evaluation sequence consists of four phases. The evaluator will determine the amount of time devoted to each phase.

a. **Phase 1–Introduction**. In this phase, the evaluator—

(1) Will review the examinee's individual flight records folder (IFRF) and IATF records, if required, to verify that the examinee meets all prerequisites for designation and has a current DA Form 4186 (*Medical Recommendation for Flying Duty*).

(2) Will confirm the purpose of the evaluation, explain the evaluation procedure, and discuss the evaluation standards and criteria to be used.

b. **Phase 2–Academic evaluation topics**. The tasks identified with an asterisk (*) apply to RCMs only.

(1) Regulations and publications AR 95-1; DA Pam 738-751; Department of Defense flight information publication (DOD FLIP); TC 1-210; FM 3-04.240; appropriate aircraft operator's manual; appropriate –23 series manuals; chapters 2, 4, and 6 of this ATM; and local and unit SOPs. Topics in this subject area are—

- ATP Requirements
- Crew coordination
- Airspace regulations and usage*
- Unit SOP and local requirements
- Aviation life support equipment (ALSE)
- Visual flight rules/instrument flight rules (VFR/IFR) minimums and procedures*

- Flight plan preparation and filing*
- Inadvertent IMC procedures*
- Forms, records, and publications required in the aircraft
- Weight and balance requirements
- DOD flight information publications and maps*

(2) Aircraft systems, avionics, and mission equipment description and operation (appropriate aircraft operator's manuals and chapter 4 of this ATM). Topics in this subject area are—

- Engines and related systems
- Flight control and automatic flight control system (AFCS) system
- Powertrain system
- Utility system
- Flight instruments*
- Heating, ventilation, cooling, and environmental control unit
- Lighting
- Servicing, parking, and mooring
- Mission equipment
- Avionics
- Emergency equipment
- Fuel system
- MARK XII IFF
- Hydraulic and pneumatic system
- Main and tail rotor groups
- Auxiliary power unit
- Electrical power supply and distribution systems
- Aircraft survivability equipment (ASE)
- Cargo handling systems
- Armament

(3) Operating limitations and restrictions (appropriate aircraft operator's manual). Topics in this subject area are—

- Wind limitations*
- Power limitations*
- Aircraft system limitations*
- Temperature limitations*
- Performance planning*
- Weather/environmental limitations/restrictions*
- Rotor limitations*
- Engine limitations*
- Airspeed limitations
- Loading limitations
- Maneuvering limits*
- Weapon system limitations

(4) Aircraft emergency procedures and malfunction analysis (appropriate aircraft operator's manual). Topics in this subject area are—

- Emergency terms and their definitions
- Engine malfunctions*
- Fires
- Hydraulic system malfunctions*
- Landing and ditching procedures
- Stabilator malfunctions*
- Rotor, transmission, and drive system malfunctions*
- Emergency exits and equipment
- Chip detectors*
- Fuel system malfunctions*
- Electrical system malfunctions*
- Flight control malfunctions*
- AFCS malfunctions*
- Mission equipment

(5) Aeromedical factors (AR 40-8, FM 3-04.301). Topics in this subject area are—

- Flight restrictions due to exogenous factors
- Stress and fatigue
- Spatial disorientation
- Hypoxia
- Middle ear discomfort
- Principles and problems of vision

(6) Aerodynamics (FM 3-04.203 and appropriate aircraft operator's manual). Topics in this subject area are—

- Relative wind*
- Airflow during a hover*
- Total aerodynamic force*
- Dynamic roll over*
- Translating tendency*
- Dissymmetry of lift*
- Retreating blade stall*
- Compressibility*
- Settling with power*
- Transverse flow*
- Autorotation*
- Effective translational lift*

(7) Night mission operations (FM 3-04.203 and FM 3-04.301). Topics in this subject area are—

- Unaided night flight
- Visual illusions
- Distance estimation and depth perception
- Dark adaptation, night vision protection, and central night blind spot
- Night vision limitations and techniques
- Types of vision
- Use of internal and external lights
- Night terrain interpretation, map preparation, and navigation

(8) Tactical and mission operations (FM 1-113, FM 1-400, FM 3-04.126, FM 4-20.197, FM 55-450-2, FM 2-0, FM 3-52, FM 3-100.2, and FM 90-4; TC 1-210; appropriate aircraft operator's manual; chapter 4 of this ATM, and unit SOP). Topics in this subject area are—

- ASE employment
- Downed aircraft procedures
- Communication security (COMSEC)
- Mission equipment
- Volcano operations
- High intensity radio transmission area (HIRTA)
- Tactical formation
- Fratricide prevention
- Terrain flight planning and safety
- Actions on contact
- Internal load operations
- CBRN operations
- Fire support

(9) Weapon system operation and employment (FM 3-04.126 and FM 3-04.140, M60D/M240H operator's manual, appropriate aircraft operator's manual, and unit SOP). Topics in this subject area are—

- Weapons initialization, arming, and safety
- Operation and function of the M60D/M240H
- Visual search and target detection
- Weapons employment during night and NVD operations
- Range estimation
- Duties of the door gunner
- Fire control/fire commands
- Techniques of fire and employment

(10) Night vision goggle operations (FM 3-04.301, TC 1-204, appropriate aircraft operator's manual, NVG operator's manual, and unit SOP). Topics in this subject area are—

- NVG nomenclature, characteristics, limitations, and operations
- NVG aircraft modifications
- NVG effects on distance estimation and depth perception
- ANVIS HUD operations*
- Hemispherical illumination
- NVG ground and air safety
- Use of internal and external lights
- NVG tactical operations, to include lighting*
- NVG terrain interpretation, map preparation, and navigation

(11) ME and MP topics (DA Pam 738-751, applicable –23 series manuals, applicable maintenance test flight manuals, chapter 5 of this ATM, and applicable aircraft operator's manual). Topics in this subject area are for MEs and MPs only.

- Engine start
- Electrical system
- Power plant
- Power train
- Flight controls
- Fuel system
- Instrument indications
- Auxiliary power unit (APU) system
- Engine performance check
- Hydraulic system and leak detection isolation
- Vibrations
- AFCS system

- Communication and navigation equipment
- Maintenance operational check/maintenance test flight (MOC/MTF) requirements
- Warning systems indications
- MTF weather requirements

(12) Evaluator/trainer topics (Instructor Pilot Handbook/Instructing Fundamentals For the Instructor Pilot). Topics in this subject area are—

- The learning process
- Effective communication
- Teaching methods
- Types of evaluations
- Planning instructional activity
- Flight instructor characteristics and responsibilities
- Human behavior
- The teaching process
- The instructor as a critic
- Instructional aids
- Techniques of flight instruction

c. **Phase 3–Flight evaluation**. If this phase is required, the following procedures apply.

(1) Briefing. The evaluator will explain the flight evaluation procedure and brief the examinee on which tasks will be evaluated. When evaluating an evaluator/trainer, the evaluator **must** advise the examinee that, during role reversal, the evaluator may deliberately perform some tasks outside standards to check the examinee's diagnostic and corrective action skills. The evaluator will conduct or have the examinee conduct a crew briefing according to task 1000.

(2) Preflight inspection, engine start, and run-up procedures. The evaluator will evaluate the examinee's use of the appropriate technical manuals (TMs)/checklists (CLs)/MTFs and the integrated electronic technical manual as appropriate. The evaluator will have the examinee identify and discuss the function of at least two aircraft systems.

(3) Flight tasks. As a minimum, the evaluator will evaluate those tasks listed on the commander's task list as mandatory for the designated crew station(s) for the type of evaluation the evaluator is conducting and those mission or additional tasks selected by the commander. The evaluator, in addition to the commander-selected tasks, may randomly select for evaluation any tasks listed on the mission or additional task list. An IP, SP, ME, IE, UT, FI and SI must demonstrate an ability to instruct and evaluate appropriate flight tasks.

Note. During any instrument flight evaluation, the aviator's vision will be restricted to the aircraft instruments. If the aircraft is not under actual IMC conditions, then the vision will be restricted by wearing a vision limiting device and the appropriate flight symbol will be logged on DA Form 2408-12 (*Army Aviator's Flight Record).*

(4) Engine shutdown and after-landing tasks. The evaluator will evaluate the examinee's use of the appropriate TMs/CLs/MTFs and the integrated electronic technical manual as appropriate.

d. **Phase 4–Debriefing**. Upon completing the evaluation, the evaluator will—

(1) Discuss the examinee's strengths and weaknesses.

(2) Offer recommendations for improvement.

(3) Tell the examinee whether he/she passed or failed the evaluation and discuss any tasks not performed to standards.

(4) Complete the applicable forms and ensure that the examinee reviews and initials the appropriate forms.

Note. The evaluator will inform the examinee of any restrictions, limitations, or revocations the evaluator will recommend to the commander following an unsatisfactory evaluation.

3-5. HANDS-ON PERFORMANCE EVALUATIONS.

a. **Standardization Flight Evaluation.** This evaluation is an examination of flight tasks and procedures conducted in each mission/series aircraft (par 2-6 a. 1) in which a rated crewmember is required to perform duties. Nonrated crewmembers may complete annual standardization requirements in any H60 series helicopter in which qualified. The flight evaluation will consist of the tasks marked with an "S" in the Eval column of tables 2-4 through 2-6 and those tasks designated by the Commander in table 2-7.

Note: Rated crew members in which either the H-60A/L or H-60M is designated as their additional aircraft on the DA Form 7120-R, at a minimum, will complete the task(s) designated as (A/L) or (H-60M – to include tasks 1253,1254) in table 2-4.

b. **Instrument Flight Evaluation**. This evaluation is an examination of flight tasks and procedures conducted in each aircraft category in which a RCM is required to perform duties. The evaluation consists of the tasks marked with an "I" in the Eval column of table 2-4.

c. **MP/ME Flight Evaluation**. This evaluation is an examination consisting of maintenance tasks conducted in each mission/series aircraft (par 2-6 a. 1) in which a crewmember is required to perform duties. The flight evaluation will consist of the tasks in table 2-8.

Note: MP/MEs in which either the H-60A/L or H-60M is designated as their additional aircraft on the DA Form 7120-R, at a minimum, will complete the task(s) designated as (A/L) or (H-60M) in table 2-8.

Chapter 4

Crewmember Tasks

This chapter implements portions of STANAG 3114/Air Standard 60/16.

This chapter describes the tasks that are essential for maintaining crewmember skills. It defines the task title, number, conditions, and standards by which performance is measured. A description of crew actions, along with training and evaluation requirements, is also provided. It does not contain all the maneuvers that can be performed in the aircraft.

4-1. TASK CONTENTS.

a. **Task number**. Each ATM task is identified by a 10-digit systems approach to training (SAT) number. The first three digits of each task in this ATM are 011 (U.S. Army Aviation School); the second three digits are 237 (UH-60). For convenience, only the last four digits are listed in this training circular (TC). The last four digits are as follows:

- Individual/base tasks are assigned 1000-series numbers.
- Crew/mission tasks are assigned 2000-series numbers.
- Maintenance tasks are assigned 4000-series numbers.

Note. Additional tasks designated by the commander as mission essential are not included in this ATM. The commander will develop conditions, standards, and descriptions for those additional tasks. These tasks will be assigned 3000-series numbers.

Note. When developing 3000 series tasks the commander may only expand but not substitute or change the standards for 2000-series tasks published in this manual.

b. **Task title**. The task title identifies a clearly defined and measurable activity. Titles may be the same in several ATMs, but tasks may be written differently for the specific airframe.

c. **Conditions**. The conditions specify the common conditions under which the task will be performed. Reference will be made to a particular helicopter within a design series when necessary. References to the UH-60FS in the conditions do not apply to NCM. All conditions must be met before task iterations can be credited. Normally, conditions are specified for wartime missions of the aircraft.

(1) Common conditions are—

(a) In a mission aircraft with mission equipment and crew, items required by AR 95-1 and publications.

(b) Under visual meteorological conditions (VMC) or instrument meteorological conditions (IMC).

(c) Day, night, and NVD employment.

(d) In any terrain or climate.

(e) CBRN including MOPP equipment employment.

(f) Electromagnetic environmental effects.

(2) Common training/evaluation conditions are—

(a) When a UT, IP, SP, IE, or ME is required for the training of the task, then that individual will be at one set of the flight controls while the training is performed. Evaluators/trainers who are evaluating/training NCMs must be at a crew station without access to the flight controls, except when evaluating crew coordination, conducting a local orientation flight, or conducting a no-notice evaluation.

(b) The following tasks require an IP, SP, or IE—as appropriate—to perform these tasks in the aircraft:

- Task 1070 – Respond to emergencies.
- Task 1082 – Perform autorotation.
- Task 1182 – Perform unusual attitude recovery.

(3) Unless specified in the task considerations, a task may be performed in any mode of flight without modifying the standards or descriptions. When personal equipment (NVG, MOPP, HUD, and so forth) or mission equipment (water bucket, ERFS, and so forth) is required to perform the task, the availability of that equipment becomes part of the conditions.

(4) Simulated IMC denotes flight solely by reference to flight instruments while wearing a vision-limiting device.

(5) Base tasks requiring specialized equipment do not apply to aircraft that do not have the equipment.

(6) NVG use may be a condition for any flight task. When NVGs are listed as a condition, task standards will be the same as those described for performance of the task without using NVGs.

(7) The aircrew will not attempt the tasks listed below when performance planning and the hover power check indicates that out of ground effect (OGE) power is not available.

- Task 2048 – Perform sling load operations.
- Task 2052 – Perform water bucket operations.
- Task 2054 – Perform fast-rope insertion and extraction system operations.
- Task 2056 – Perform rappelling operations.
- Task 2058 – Perform special patrol infiltration/exfiltration system operations.
- Task 2060 – Perform rescue hoist operations.
- Task 2076 – Perform caving ladder operations.

d. **Standards**. The standards describe the minimum degree of proficiency to which the task must be done. The terms, “without error,” “properly,” and “correctly” apply to all standards. The standards are based on ideal conditions. Crew actions (specified in the description) include satisfactorily performing crew coordination. Many standards are common to several tasks. Unless otherwise specified in the individual task, the common standards below apply.

(1) All tasks.

(a) Do not exceed aircraft limitations.

(b) Perform crew coordination actions per chapter 6 of this ATM.

(2) Hover.

(a) Maintain heading ±10 degrees.

(b) Maintain altitude, ±3 feet (±5 feet for OGE). *

(c) Do not allow drift to exceed 3 feet (10 feet for OGE hover). *

(d) Maintain ground track within 3 feet.

(e) Maintain a constant rate of movement appropriate for existing conditions.

Note. These standards (*) require that the other crewmembers announce drift and altitude changes before exceeding the standard.

(3) In-flight.

(a) Maintain heading ±10 degrees.

(b) Maintain altitude ±100 feet.

(c) Maintain airspeed ±10 knots indicated airspeed (KIAS).

(d) Maintain ground track with minimum drift.

(e) Maintain rate of climb or descent ±200 feet per minute (FPM).
(f) Maintain the aircraft in trim ±½ ball width.

(4) All tasks with the APU/engines operating (RCMs and NCMs).
(a) Maintain airspace surveillance (task 1026).
(b) Apply appropriate environmental considerations.

e. **Description**. The description explains the preferred method for doing the task to meet the standards. This manual cannot address all situations and alternate procedures that may be required. Tasks may be accomplished using other methods, as long as the task is done safely, and the standards are met. When specific crew actions are required, the task will be broken down into crew actions and procedures as follows.

(1) Crew actions. These define the portions of a task performed by each crewmember to ensure safe, efficient, and effective task execution. The designations P* (pilot on the controls), and P (pilot not on the controls) do not refer to PC duties. When required, PC responsibilities are specified. For all tasks, the following responsibilities apply.

(a) All crewmembers. Perform crew coordination actions, and announce malfunctions or emergency conditions. Monitor engine and systems operations, and avionics (navigation and communication) as necessary. During VMC, focus attention primarily outside the aircraft, maintain airspace surveillance, and clear the aircraft. Provide timely warning of traffic and obstacles by announcing the type of hazard, direction, distance, and altitude. Crewmembers also announce when attention is focused inside the aircraft—except for momentary scans—and announce when attention is focused back outside.

(b) PC. The PC is responsible for conducting the mission and for operating, securing, and servicing the aircraft he commands. The PC will ensure that a crew briefing is done and that the mission is performed according to the mission briefing, ATC instructions, regulations, and SOP requirements.

(c) PI/CE/MO/OR. Their responsibility is completing tasks assigned by the PC.

(d) P*. The P* is responsible for aircraft control, obstacle avoidance, and the proper execution of emergency procedures. The P*will announce any deviation, and the reason, from instructions issued. The P* will announce changes in altitude, attitude, airspeed, or direction.

(e) P. The P is responsible for navigation, in-flight computations, assisting the P* (as requested), and properly executing emergency procedures. When duties permit, the P assists the P* with obstacle clearance.

(f) CE/MO/OR. The CE, MO, and OR are responsible for maintaining airspace surveillance, traffic and obstacle avoidance, safety, security of passengers, and equipment. They provide assistance to the P* and P as required. They are also responsible for maintaining the aircraft or mission equipment according to their MOS.

(g) Trainer/evaluator. When acting as PI during training and evaluations, the trainer/evaluator will act as a functioning crewmember and perform as required, unless he is training or evaluating crewmember response to an ineffective crewmember. In the aircraft, the trainer/evaluator will ensure safe landing areas are available for engine failure training and that aircraft limits are not exceeded.

(2) Procedures. This section explains the portions of a task that an individual or crew accomplishes.

f. **Considerations**. This section defines consideration for accomplishing the task under various flight modes—for example, night, NVG, environmental conditions, snow/sand/dust and mountain/pinnacle/ridgeline operations. Crewmembers must consider additional aspects to a task when performing in different environmental conditions. Including environmental considerations in a task does not relieve the commander of the requirement for developing an environmental training program per TC 1-210. Specific requirements for different aircraft or mission equipment (HH-60L, ERFS, Volcano, and so forth) may also be addressed as a consideration. Training considerations establish specific actions and standards used in the training environment.

(1) Night and NVD. Wires and other hazards are much more difficult to detect and must be accurately marked and plotted on maps. Crewmembers use proper scanning techniques to detect traffic and obstacles and to avoid spatial disorientation. The P should make all internal checks (for example, computations and frequency changes). Visual barriers (areas so dimly viewable that a determination cannot be made if they contain barriers or obstacles) will be treated as physical obstacles. Altitude and ground speed are difficult to detect and using artificial illumination may sometimes be necessary. Crewmembers determine the need for artificial lighting prior to descending below barriers and adjust search/landing light for best illumination angle without causing excessive reflection into the cockpit. Entering IMC with artificial illumination may induce spatial disorientation. Cockpit controls will be more difficult to locate and identify. Crewmembers take special precautions to identify and confirm the correct switches and levers.

(2) Night unaided. The P* should not view white lights, weapons flash, or ordnance explosions directly as they will impair night vision.. The P* allows time for dark adaptation or, if necessary, adjusts altitude and airspeed until adapted. The P* will exercise added caution when performing flight tasks before reaching full dark adaptation. Dimly visible objects may be easier to detect using peripheral vision but may tend to disappear when viewed directly. Off-center viewing techniques are used to locate and orient on objects.

(3) NVD. Using NVDs degrades distance estimation and depth perception. Aircraft in flight may appear closer than they actually are —due to the amplification of navigation lights and the lack of background objects to assist in distance estimation and depth perception. Weapons flash may temporarily impair or shut down NVGs.

g. **Training and evaluation requirements**. Training and evaluation requirements define whether the task will be trained/evaluated in the aircraft, simulator, or academic environment. Listing aircraft/simulator under the evaluation requirements does not preclude the evaluator from evaluating elements of the task academically to determine depth of understanding or planning processes. Some task procedures allow multiple ways to achieve the standards. Chapter 2 (tables 2-4 through 2-7) lists the modes and conditions of flight in which the task must be evaluated. The commander may also select mission and additional tasks for evaluation.

h. **References**. The references listed are sources of information relating to that particular task. Certain references apply to many tasks. In addition to the references listed with each task, the following common references apply as indicated.

(1) All flight tasks (tasks with APU/engines operating).
- (a) AR 95-1.
- (b) FM 3-04.203.
- (c) FM 1-230.
- (d) Appropriate aircraft operator's manual/CL/MTFs.
- (e) DOD FLIP.
- (f) Federal Aviation regulations (FARs)/host-nation regulations.
- (g) Unit/local SOPs.
- (h) Aircraft logbook (DA Form 2408 series).
- (i) FM 3-04.301.

(2) All instrument tasks.
- (a) AR 95-1.
- (b) FM 3-04.240.

(c) FAA Instrument Flying Handbook (FAA-H-8083-15).
(d) FAA Instrument Procedures Handbook (FAA-H-8261-1).
(e) DOD FLIP.
(f) Aeronautical Information Manual.

(3) All tasks with environmental considerations. FM 3-04.203.

(4) All tasks used in a tactical situation.
(a) TC 21-24.
(b) FM 1-113.
(c) FM 3-04.140.
(d) FM 3-04.111.
(e) FM 90-4.

(5) All medical tasks.
(a) FM 4-02.2.
(b) TC 8-800 (MEDIC).
(c) Appropriate aircraft operator's manual.
(d) Unit SOP and treatment protocol.

4-2. TASK LIST. The following numbered tasks are H-60 tasks.

TASK 1000

Participate in a crew mission briefing

CONDITIONS: Before flight in an H-60 helicopter, given a DA Form 5484 (*Mission Schedule/Brief)* information, and a unit-approved crew briefing checklist.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. The pilot in command (PC) will acknowledge an understanding of DA Form 5484 and will actively participate in a crew mission briefing.
2. A rated crewmember (RCM) will conduct the aircrew mission briefing using table 4-1 or a more detailed unit-approved crew briefing checklist.
3. Crewmembers will verbally acknowledge a complete understanding of the aircrew mission briefing.

DESCRIPTION:

1. Crew actions.

   a. A designated briefing officer will evaluate and then brief essential areas of the mission to the PC according to AR 95-1. The PC will acknowledge a complete understanding of the mission briefing and will initial DA Form 5484.

   b. The PC has overall responsibility for the crew mission briefing. The PC may direct other crewmembers to perform all or portions of the briefing.

   c. Crewmembers will direct their attention to the crewmember conducting the briefing. They will address any questions to the briefer and acknowledge that they understand the assigned actions, duties, and responsibilities. Lessons learned from previous debriefings should be addressed as applicable during the crew briefing.

   Note. An inherent element of the mission briefing is establishing the time and location for the crew-level after action review. (See task 1262.)

2. Procedures. Brief the mission using a unit-approved crew mission briefing checklist. See the following suggested format (table 4-1) for the minimum mandatory crew-briefing checklist. Identify mission and flight requirements that will demand effective communication and proper sequencing and timing of actions by the crewmembers.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references plus the following:

FM 3.04.300
DA Form 5484

Table 4-1. Suggested format of a crew mission briefing checklist

Crew Mission Briefing Checklist

1. Mission overview.
2. Currency verification.
3. Flight route.
4. Weather—departure, en route, destination, and void time.
5. Required items, mission equipment, and personnel.
6. Airspace surveillance procedures (task 1026), assign scan sectors.
7. Analysis of the aircraft.
   - a. Logbook and preflight deficiencies.
   - b. Performance planning.
     - (1) Comparison of computed ETF/ATF with logbook.
     - (2) Recomputation of PPC, if necessary.
     - (3) Max torque available and GO/NO GO data.
     - (4) Single engine capability - MIN/MAX – IAS.
     - (5) Emergency SE IAS – Airspeed to maintain between SE MIN/MAX IAS based on the mission and briefed for purposes of crew coordination.
   - c. Mission deviations required based on aircraft analysis.
8. Crew actions, duties, and responsibilities.
   - a. Aircrew coordination – two challenge rule, terminology.
   - b. Transfer of flight controls (P*).
   - c. Brief emergency actions.
     - (1) Mission considerations.
     - (2) Inadvertent IMC.
     - (3) Egress procedures and rendezvous point
     - (4) Actions to be performed by P*, P, and NCM.
     - (5) NVG failure.
9. General crew duties: Announce when focused inside (time limit appropriate for conditions, when VMC).
   - a. Pilot on the controls (P*).
     - (1) Fly the aircraft - primary focus outside when VMC, inside when IMC.
     - (2) Cross-check systems and instruments.
     - (3) Monitor/transmit on radios as directed by the PC.
   - b. Pilot not on the controls (P).
     - (1) Tune radios and set transponder.
     - (2) Navigate.
     - (3) Copy clearances, ATIS, and other information.
     - (4) Cross-check systems and instruments.
     - (5) Monitor/transmit on radios as directed by the PC.
     - (6) Read and complete checklist items as required.
     - (7) Set/adjust switches and systems as required.
   - c. Crew chief, medic, and other assigned crewmembers.
     - (1) Secure passengers and cargo.
     - (2) Perform other duties assigned by the PC.
10. Risk assessment considerations.
11. Time and place for crew-level after action review.
12. Crewmembers' questions, comments, and acknowledgment of mission briefing.

TASK 1004

Plan a visual flight rules flight

CONDITIONS: Before visual flight rules flight in an H-60 helicopter, given access to weather information, notices to airmen (NOTAMs), flight planning aids, necessary charts, forms, and publications.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Determine whether the aircrew and aircraft are capable of completing the assigned mission.
2. Determine whether the flight can be performed under visual flight rules (VFR) per AR 95-1, applicable Federal Aviation Regulations (FARs)/host-nation regulations, local regulations, and standing operating procedures (SOPs).
3. Determine the departure, en route, and destination procedures.
4. Select route(s) and altitudes that avoid hazardous weather conditions; do not exceed aircraft or equipment limitations, and conform to VFR cruising altitudes per Department of Defense flight information publication (DOD FLIP).
5. For cross-country flights, determine the distance ±1 nautical mile, true airspeed ±5 knots, ground speed ±5 knots, and estimated time en route (ETE) ±1 minute for each leg of the flight. Compute magnetic heading(s) ±5 degrees.
6. Determine the fuel required per AR 95-1, ±100 pounds.
7. Complete and file the flight plan per AR 95-1 and DOD FLIP.
8. Perform mission risk assessment per unit SOP.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) may direct the other crewmembers to complete some elements of the VFR flight planning.
   b. The other crewmembers will complete the assigned elements and report the results to the PC.
2. Procedures. Using appropriate military, Federal Aviation Administration (FAA), or host-nation weather facilities, obtain information about the weather. After ensuring that the flight can be completed under VFR per AR 95-1, check NOTAMs, chart updating manuals (CHUMs) and other appropriate sources for any restrictions that apply to the flight. Obtain navigational charts that cover the entire flight area, and allow for changes in routing that may be required because of the weather or terrain. Select the course(s) and altitude(s) that will best accomplish the mission. Determine the magnetic heading, ground speed, and ETE for each leg. Compute total distance and flight time. Calculate the required fuel using a CPU-26A/P computer/Weems plotter (or equivalent) or approved mission planning software. Complete the appropriate flight plan and file it with the appropriate agency.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: More detailed planning is necessary at night because of visibility restrictions. Checkpoints used during the day may not be suitable for night or night vision goggle (NVG) use.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references.

TASK 1006

Plan an instrument flight rules flight

CONDITIONS: Before instrument flight rules flight in an H-60 helicopter, given access to weather information, notices to airmen (NOTAMs), flight planning aids, necessary charts, forms, and publications.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Determine whether the aircrew and aircraft are capable of completing the assigned mission.
2. Determine whether the flight can be performed under instrument flight rules (IFR) per AR 95-1 and applicable Federal Aviation Regulations (FARs)/host-nation regulations, local regulations, and standing operating procedures (SOPs).
3. Determine the departure, en route, and destination procedures.
4. Select route(s) and altitudes that avoid hazardous weather conditions, do not exceed aircraft or equipment limitations, and conform to IFR cruising altitudes per Department of Defense flight information publication (DOD FLIP).
5. If off airway, determine the course(s) ±5 degrees.
6. Select an approach that is compatible with the weather, approach facilities, and aircraft equipment; determine if an alternate airfield is required.
7. Determine distance ±1 nautical mile, true airspeed ±5 knots, ground speed ±5 knots, and estimated time en route (ETE) ±1 minutes for each leg of the flight.
8. Determine the fuel required per AR 95-1 and FM 3-04.240, ±100 pounds.
9. Complete and file the flight plan per AR 95-1 and the DOD FLIP.
10. Perform mission risk assessment per unit SOP.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) may direct the other rated crewmember (RCM) to complete some elements of the IFR flight planning.
   b. The other RCM will complete the assigned elements and report the results to the PC.
2. Procedures. Using appropriate military, Federal Aviation Administration (FAA), or host-nation weather facilities, obtain information about the weather. Compare destination forecast and approach minimums, and determine whether an alternate airfield is required. Ensure that the flight can be completed per AR 95-1. Check the NOTAMs and other appropriate sources for any restrictions that apply to the flight. Obtain navigation charts that cover the entire flight area, and allow for changes in routing or destination that may be required because of the weather. Select the route(s) or course(s) and altitude(s) that will best accomplish the mission. When possible, select preferred routing. Determine the magnetic heading, ground speed, and ETE for each leg, to include flight to the alternate airfield if required. Compute the total distance and flight time. Calculate the required fuel using a CPU-26A/P computer/Weems plotter (or equivalent) or approved mission planning software. Complete the appropriate flight plan and file it with the appropriate agency.

Note. FAA-approved IFR GPS possess specific noncorruptible terminal instrument procedure data that cannot be altered by the aircrew.

Note. Crewmembers must be proficient in using all IFR navigation equipment installed in the aircraft they are operating (such as distance measuring equipment [DME], tactical air navigation [TACAN]). The proper use may include operating capabilities and restrictions that must be considered during the flight planning process.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references.

TASK 1010

Prepare a performance planning card

CONDITIONS: Given the aviation and missile command (AMCOM)–approved performance planning software and computer, or a blank DA Form 5701-60-R, the appropriate aircraft operator's manual, mission conditions, engine torque factors, and aircraft basic weight.

> ***Note.*** Performance planning will be completed prior to every mission. The approved performance planning software is the preferred method for calculating performance data.
>
> ***Note.*** The AMCOM user's manual for the Performance Planning Card (PPC) Program provides instructions for using the performance planning software.
>
> ***Note.*** The AMCOM-approved performance planning software or the charts in the AMCOM--approved aircraft operator's manual/checklist (CL) must be used for performance planning.
>
> ***Note.*** Instructions for manually computing individual elements of the performance planning card can be found in appendix E.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Compute all items of the PPC.
2. Input the appropriate information into the software.
3. Compute PPC values using accurate conditions for the time of takeoff within the following parameters:
    a. Free air temperature (FAT) ± 5 degrees Celsius.
    b. Pressure altitude (PA) ± 1,000 feet.
    c. Gross weight ±500 pounds.
    d. Engine torque factor (ETF) 0.05.
4. When manual calculations are required, calculate PPC values per the appropriate operator's manual and the instructions in appendix E. Compute values within following parameters:
    a. Torque values ±2 percent.
    b. Weight values ±500 pounds.
    c. Fuel flow ±100 pounds per hour.
    d. Airspeeds ±5 knots.
5. Correlate planning information to determine aircraft and mission capabilities.

DESCRIPTION:

1. Crew actions.
    a. The pilot in command (PC) will compute or direct other members of the crew to compute or obtain the aircraft performance data using one of the following procedures.
        (1) AMCOM approved electronic PPC software.
        (2) Performance data computed using the appropriate operator's manual.
    b. The PC will verify that the aircraft meets the performance requirements for the mission and will brief the other crewmembers on the performance planning data..
2. Procedures.

a. Use of the PPC is mandatory to organize performance planning data required for the mission.

b. Determine and have available aircraft performance data required to complete the mission.

Note. The data presented in the performance charts in the aircraft operator's manual are primarily derived for either a "clean" or "high drag" aircraft. When the external equipment or configuration differs significantly from the clean or high drag configuration, drag compensations will be made. This configuration is referred to as the alternative or sling load configuration, and the appropriate drag compensation is described.

Note. The procedures for determining performance planning data are the same for the UH-60A/L/M and HH-60A/L/M aircraft unless specifically noted.

Note. Figures 4-1 and 4-2 are examples of an H-60 PPC.

H-60 PERFORMANCE PLANNING CARD

For use of this form, see TC 1-237; the proponent agency is TRADOC.

DEPARTURE

AIRCRAFT GWT: (3) lb	PA: (1) ft / (1) ft		FAT: (2) °C/ (2) °C		
STORES WEIGHT: (4) lb	DUAL ENGINE		SINGLE ENGINE		
FUEL WEIGHT: (5) lb					
ZERO FUEL WEIGHT: (14) lb			# 1	# 2	
	ATF: (6)		ETF: (6)	ETF: (6)	
TORQUE RATIO	(7)		(7)	(7)	
MAX TORQUE AVAILABLE	(8) %		(8) %	(8) %	
MAX ALLOWABLE GWT OGE/ IGE	(9) lb	(9) lb			
GO/NO GO TORQUE OGE/ IGE	(10) %	(10) %			
MAX HOVER HEIGHT IGE	(11) ft				
PREDICTED HOVER TORQUE	(12) %		(12) %	(12) %	
MIN SE AIRSPEED - IAS- WO/W STORES			(13) kts	(13) kts	

REMARKS:
(15)

EMER SE IAS:

CRUISE

PA: (1) ft	FAT: (2) °C	MAX ANGLE: (21) °		Vne-IAS: (22) kts	
	DUAL ENGINE		SINGLE ENGINE		
			# 1	# 2	
MAX TORQUE AVAILABLE	(5) %		(16) %	(16) %	
MIN / MAX - IAS	(3) kts	(3) kts	(14) kts	(14) kts	
CRUISE SPEED - IAS / TAS	(4) kts	(4) kts	(15) kts	(15) kts	
CRUISE TORQUE / CONT TORQUE AVAILABLE	(6) %	(6) %	(17) %	(17) %	
CRUISE FUEL FLOW	(7) pph		(18) pph		
MAX RANGE - IAS / TORQUE	(8) kts	(8) %			
MAX ENDURANCE - IAS / TORQUE	(9) kts	(9) %			
CRITICAL TORQUE	(10) %				
MAX ALLOWABLE GWT	(11) lb		(19) lb		
OPTIMUM IAS AT MAX ALLOWABLE GWT	(11) kts		(19) kts		
MAX R/C - IAS / TORQUE	(12) kts	(12) %			
MAX ALTITUDE - MSL/MAX ENDURANCE-IAS	(13) ft	(13) kts	(20) ft	(20) kts	

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Figure 4-1. Sample H-60 performance planning card (front)

ARRIVAL				
LANDING GWT: lb	PA: ft		FAT: °C	
	DUAL ENGINE		SINGLE ENGINE # 1	SINGLE ENGINE # 2
TORQUE RATIO	(4)		(4)	(4)
MAX TORQUE AVAILABLE	(5) %		(5) %	(5) %
PREDICTED HOVER TORQUE	(6) %		(6) %	(6) %
MAX ALLOWABLE GWT OGE/ IGE	(7) lb	(7) lb		
MAX HOVER HEIGHT IGE	(8) ft			
MIN SE AIRSPEED - IAS-WO/W STORES			(9) kts	(9) kts

ARRIVAL				
LANDING GWT: lb	PA: ft		FAT: °C	
	DUAL ENGINE		SINGLE ENGINE # 1	SINGLE ENGINE # 2
TORQUE RATIO				
MAX TORQUE AVAILABLE	%		%	%
PREDICTED HOVER TORQUE	%		%	%
MAX ALLOWABLE GWT OGE/ IGE	lb	lb		
MAX HOVER HEIGHT IGE	ft			
MIN SE AIRSPEED - IAS-WO/W STORES			kts	kts

REMARKS:

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Figure 4-2. Sample H-60 performance planning card (back)

c. Explanation of Items on DA Form 5701-60-R.

(1) Departure data.

- **Item 1—PA**. Forecast maximum pressure altitude (PA) for the mission and current PA for time and location of departure.
- **Item 2—FAT**. Forecast maximum free air temperature (FAT) for the mission and FAT for time and location of departure.

Note. Maximum PA and FAT will be used when computing all items in the departure section except for GO/NO GO TORQUE OGE/IGE, item 10 and PREDICTED HOVER TORQUE, item 12, which will be computed using PA and temperature for time and location of departure.

- **Item 3—AIRCRAFT GWT**. Total planned aircraft gross weight (GWT) at takeoff. This includes the aircraft basic weight, crew, internal load, internal fuel, and when applicable, external stores support system (ESSS) stores and sling load. Use the actual weight of the aircraft and all additions for these computations.
- **Item 4—STORES WEIGHT**. Planned weight of any jettisonable items such as external loads, ESSS wing stores and Volcano.
- **Item 5—FUEL WEIGHT**. Total planned fuel weight (internal and external) at takeoff.
- **Item 6—ATF/ETF**. Aircraft Torque Factor (ATF) is the ratio of individual aircraft's power available to a specification power at 35 degrees Celsius. The ATF is an average of both engines and allowed to range from .90 to 1.0. Engine Torque Factor (ETF) is the ratio of individual engine torque available to specification torque at a reference temperature of 35 degrees Celsius. The ETF is allowed to range from .85 to 1.0. The ATF and ETF values are found on the engine health indicator test (HIT) log.
- **Item 7—TORQUE RATIO**. Torque ratio (TR) is the ratio of torque available to specification torque at the desired ambient temperature and incorporates ambient temperature effects on engine performance. The TR equals the ATF/ETF for temperatures of 35 degrees Celsius and above.
- **Item 8—MAX TORQUE AVAILABLE**. The maximum torque available is also referred to as intermediate rated power (IRP)—30 minute limit (T700 and T701) or maximum rated power (MRP)—10 minute limit (T701). The maximum torque available—2.5 minute limit (T701) is also referred to as SINGLE ENGINE CONTINGENCY POWER—2.5 MINUTE LIMIT or one engine inoperative (OEI).

Not. Certain temperature and PA combinations will exceed the aircraft operator's manual, chapter 5 torque limitations. This item represents actual maximum torque available values. During normal aircraft operations, the aircraft operator's manual, chapter 5 torque limitations shall not be exceeded.

Note. Adjust the maximum torque available as required for planned use of engine anti-ice and/or cockpit heater according to the operator's manual.

Note. If the blade erosion kit is installed, adjust the torque required according to the aircraft operator's manual.

- **Item 9—MAX ALLOWABLE GWT OGE/IGE.** This is the maximum weight the aircraft is capable of at a 10-foot hover height for in ground effect (IGE) operations, or to a 100-foot hover for out of ground effect (OGE) operations. This weight will be limited by engine capabilities or aircraft structural design.

Note. If OGE capability does not exist, the MAX HOVER HEIGHT IGE, item 11, must be computed.

Note. If the blade erosion kit is installed, adjust the maximum allowable GWT according to the aircraft operator's manual.

Note. Tab data values represent a 100-foot hover height OGE and 10-foot hover height IGE.

- **Item 10—GO/NO GO TORQUE OGE/IGE**. This value provides a method to verify the aircraft weight is at or below maximum weight and is capable of lifting to an IGE or OGE altitude. The hover altitude is normally 10 feet but may be adjusted based on conditions. GO/NO-GO is computed using the departure PA, item 1, and temperature, item 2.

Note. For sling load operations, select an altitude that will place the load at an altitude of 10 feet.

Note. MAXIMUM ALLOWABLE GWT OGE/IGE was determined in item 9 using maximum PA and temperature. When the actual temperature is less than the maximum, the torque required to hover at a given gross weight is less. During the hover power check, exceeding the GO/NO GO torque value prior to the WHEEL HEIGHT ~ FT used during planning indicates the aircraft is heavier than the MAXIMUM ALLOWABLE GWT OGE/IGE (as applicable) when maximum PA and FAT conditions are encountered.

Note**.** If MAXIMUM ALLOWABLE GWT OGE/IGE, item 9, was limited by the maximum gross weight per the operator's manual, chapter 5, exceeding this torque value prior to the WHEEL HEIGHT ~ FT used during planning indicates the aircraft is above the maximum structural weight limit.

- **Item 11—MAX HOVER HEIGHT IGE**. Maximum hover height when aircraft gross weight exceeds max allowable gross weight OGE and power is not available for an OGE hover.
- **Item 12—PREDICTED HOVER TORQUE**. Estimated torque required for a stationary hover, using takeoff gross weight, and current PA and FAT.

Note**.** If the blade erosion kit is installed, adjust the torque required according to the aircraft operator's manual.

Note**.** At the time of departure, maximum torque available may be higher than what is listed in MAX TORQUE AVAILABLE, item 8, due to item 8 being computed using maximum FAT for the mission. At the time of departure, engine performance may be increased due to a lower FAT. If this is the case, the aircraft may be able to sustain hover capability, single engine even though MAX TORQUE AVAILABLE, item 8, may be less than PREDICTED HOVER TORQUE – SINGLE ENGINE.

Note**.** PREDICTED HOVER TORQUE (SINGLE ENGINE) is computed using a specific wheel height. If the predicted hover torque exceeds the MAX TORQUE AVAILABLE, the aircraft may still be capable of sustaining single-engine hover at a lower wheel height.

- **Item 13—MIN SE AIRSPEED - IAS - WO / W STORES**. Minimum (MIN) airspeed to sustain level flight single engine (SE) without or with stores. Value derived from cruise charts using departure conditions. Consideration should be given to an IGE takeoff if conditions merit.
- **Item 14—ZERO FUEL WEIGHT**: The zero fuel weight on the DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*) is computed using standard, average, or estimated weight for personnel, equipment, and fuel. Actual mission weight could vary

from that on the DD Form 365-4. If the load configuration is different than that on the 365-4, the PC may use the appropriate DD Form 365-4 from the aircraft logbook and add additional weights of cargo and personnel, then subtract indicating fuel, or use the HOVER chart from the CL to compute the adjusted ZERO FUEL WEIGHT.

Note. The PC must adjust for certain hover conditions such as wind and surface condition when utilizing the hover method.

Note. Although data needed to compute ZERO FUEL WEIGHT is noted at a hover, the calculation should be made when practical.

- **Item 15—REMARKS:** Examples of these may include drag factors, fuel requirements for the mission, GO/NO GO for sling loads, and EMER SE-IAS.

Note. The EMER SE-IAS is the emergency single-engine indicated airspeed (IAS) based on the mission and briefed to the crew for the purpose of crew coordination. This airspeed is selected from the MIN/MAX Vh–IAS range computed in item 14, CRUISE data, and is used immediately following an emergency that requires adjustment to single-engine airspeed. When an aircraft does not have single-engine capability, the MAX ENDURANCE–IAS, item 9, or the OPTIMUM IAS AT MAX ALLOWABLE GWT, item 19, as appropriate, should be briefed as the emergency single-engine airspeed.

Note. Normally only one EMER SE - IAS is selected. However, when the MIN/MAX–IAS range, item 14, is wide, the crew may select two emergency single-engine airspeeds, one slow and one fast based on mission profile, modes of flight, environmental conditions or other factors.

Note. There is no power margin available when operating single-engine at the MIN/MAX Vh–IAS, item 14. These airspeeds are computed using the maximum torque available single-engine for the lowest ETF engine. It is not recommended that the aircraft be flown at airspeeds that require maximum power for continued single-engine flight.

Note. The GO/NO GO TORQUE for sling loads is determined by using the same process as item 10 above, using the MAX ALLOWABLE GWT OGE and a wheel height that suspends the load approximately 10 feet above ground level (AGL).

(2) Cruise data.

- The maximum continuous power (MCP) line on the CRUISE chart is used to define power levels that an engine can produce continuously and remain out of time limited engine operating limitations (30 minute, 10 minute or 2.5 minute TGT values).
- The TORQUE AVAILABLE ~30 MIN lines (T700 and T701) and the TORQUE AVAILABLE ~10 MIN lines for (T701) are used to define a power level that will be limited and only used for a defined period of time.
- The SE~30 MIN lines (T700) and SE~2.5 MIN lines (T701) represent maximum single engine power OEI and are used to define single engine flight performance.
- **Item 1 - PA**. Planned cruise PA.
- **Item 2 - FAT**. Forecast FAT at the planned cruise PA.
- **Item 3 – MIN/MAX–IAS**. **(DUAL ENGINE)**. Minimum and maximum airspeeds based on gross weight, power available, and conditions.

Note. For alternative or external load configurations, refer to the operator's manual, chapter 7/7A, section VI, DRAG. Determine and add together the appropriate drag multiplying factors.

Note. The torque change to compensate for drag (alternative or external load configuration) at minimum indicated airspeed is often negligible and not computed.

- **Item 4—CRUISE SPEED–IAS/TAS (DUAL ENGINE).** Selected IAS that falls within the range of MIN / MAX–IAS (IAS~KTS scale).
- Item 5—MAX TORQUE AVAILABLE (DUAL ENGINE).

Note. The maximum torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations shall not be exceeded.

Note. Maximum torque available is derived from the cruise charts and takes into account the effect of ram-air on engine performance at a selected airspeed. Torque values may vary when flying at airspeeds other than the planned cruise airspeed.

Note. Adjust as required for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

Note. The maximum torque available 30-minute limit (T700) and the 10-minute limit (T701) can also be derived from the CL for maximum torques available. If the ATF is between 1.0 and 0.9, interpolation is required.

- Item 6—CRUISE TORQUE/CONT TORQUE AVAILABLE (DUAL ENGINE).

Note. The continuous torque available is also referred to as MAXIMUM CONTINUOUS POWER (MCP).

Note. Compare the CRUISE TORQUE with the CONTINUOUS TORQUE to determine whether the aircraft will be operating in a time limited condition (above maximum continuous power) for this IAS.

Note. The continuous torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations shall not be exceeded.

Note. Adjust CONTINUOUS TORQUE for planned use of engine anti-ice and heater according to the aircraft operator's manual.

- Alternative or external load configuration.

Note. If the new torque value exceeds the dual engine transmission torque limit, the planned cruise airspeed must be reduced.

Note. The adjusted cruise torque reflects the power required to overcome the added drag.

- Item 7—CRUISE FUEL FLOW (DUAL ENGINE).

Note. Adjust as required for FAT or planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

- **Item 8—MAX RANGE–IAS/TORQUE (DUAL ENGINE)**. Airspeed which yields the maximum distance per pound of fuel for a specific configuration, weight, and altitude. The airspeed is derived from the cruise chart for a no-wind condition.

Note. A method of adjusting the maximum range airspeed to reduce flight time and minimize loss in range is to increase IAS by 2.5 knots for every 10 knots of effective headwind and decrease IAS by 2.5 knots for every 10 knots of effective tailwind.

- **Item 9—MAX ENDURANCE–IAS/TORQUE (DUAL ENGINE).** This IAS and torque yields the minimum fuel flow for a specific weight and altitude. In addition, total drag is at its lowest, and at this airspeed the aircraft will remain aloft for the longest period of time.

- **Item 10—CRITICAL TORQUE (DUAL ENGINE)**. Critical torque (CT) is the dual engine torque value, which when exceeded, may not allow the aircraft to maintain % RPM R within normal limits under single-engine operations in the same flight conditions.
- **Item 11— MAX ALLOWABLE GWT and OPTIMUM IAS AT MAX ALLOWABLE GWT (DUAL ENGINE)**. The maximum allowable gross weight the aircraft is capable of flying at cruise conditions and the associated maximum endurance airspeed.

Note. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is often negligible and not computed.

- **Item 12— MAX R/C–IAS/TORQUE (DUAL ENGINE).** IAS that allows the aircraft to climb from one altitude to a higher altitude in the least amount of time when using maximum torque available.

Note. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is often negligible and not computed.

- **Item 13—MAX ALTITUDE–MSL/MAX ENDURANCE–IAS (DUAL ENGINE)**. The maximum altitude the aircraft is capable of flying at maximum endurance airspeed.

Note. Several different cruise charts may have to be referenced when computing the MAX ALTITUDE–MEAN SEA LEVEL (MSL). It is recommended to start with the 10,000 FT CRUISE chart and forecast temperature.

Note. MAX END–IAS is used to calculate MAX ALTITUDE–MSL.

Note. Ensure FAT is adjusted for pressure altitude in the CRUISE charts.

Note. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is negligible and not computed.

- **Item 14—MIN/MAX–IAS (SINGLE ENGINE)**. Minimum and maximum airspeeds based on gross weight, power available and conditions.

Note. Single engine level flight may not be possible at takeoff but may become possible as fuel is consumed.

Note. The torque change to compensate for drag (alternative or external load configuration) at minimum indicated airspeed is often negligible and not computed.

- **Item 15—CRUISE SPEED-IAS (SINGLE ENGINE)**. Select a CRUISE SPEED-IAS that falls within the range of MIN/MAX–IAS (SINGLE ENGINE), item 14 above.
- Item 16—MAX TORQUE AVAILABLE (SINGLE ENGINE).

Note. The maximum torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations shall not be exceeded.

Note. Max torque is derived from the cruise charts and takes into account the effect of ram-air on engine performance at a selected airspeed. Torque values may vary when flying at airspeeds other than the planned cruise airspeed.

Note. The maximum torque available—30-minute limit (T700) and the 10-minute limit (T701) can also be derived from the tabular data in the CL. If the ATF is between 1.0 and 0.9, interpolation is required.

Note. Adjust as required for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

- Item 17 –CRUISE TORQUE/CONT TORQUE AVAILABLE (SINGLE ENGINE).

Note. Compare the cruise torque to the CONT TORQUE AVAILABLE to determine whether the aircraft will be operating in a time limited condition (above maximum continuous power) for this IAS.

Note. The continuous torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations shall not be exceeded.

Note. Adjust CONT TORQUE for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

- Item 18—CRUISE FUEL FLOW (SINGLE ENGINE).

Note. Adjust as required for FAT or planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

- **Item 19—MAX ALLOWABLE GWT and OPTIMUM IAS AT MAX ALLOWABLE GWT (SINGLE ENGINE)**. The maximum allowable gross weight the aircraft is capable of flying at maximum endurance airspeed.

Note. If the MAX ALLOWABLE GWT is less than the AIRCRAFT GWT, then the aircraft cannot maintain single engine level flight for the conditions. As fuel is consumed, single engine capability may become possible.

- Alternative or external load configuration.

Note. If the adjusted torque value does not intersect the AIRCRAFT GWT (item 3, departure data), the aircraft cannot maintain single-engine level flight for the conditions. As fuel is consumed, single engine capability may become possible.

- **Item 20—MAX ALTITUDE–MSL/MAX ENDURANCE–IAS (SINGLE ENGINE)**. The maximum altitude the aircraft is capable of flying at maximum endurance airspeed single engine.

Note. When the capability to maintain level flight after an engine failure or malfunction is not possible, continued flight may be possible by adjusting airspeed to MAX END–IAS and adjusting collective to the MAXIMUM TORQUE AVAILABLE to attain minimum rate of descent while descending to a lower PA (where level flight may be possible) or jettisoning the external stores (if no allowable altitude/temperature combination cruise charts yield a GWT greater than or equal to the AIRCRAFT GWT, item 3, departure data).

Note. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is often negligible and not computed.

Note. If aircraft is equipped with stores and no CRUISE chart will yield a MAX ALLOWABLE GWT–(SINGLE ENGINE) that is greater than or equal to the AIRCRAFT GWT, level flight is not possible. Subtract the weight of the stores and adjust the AIRCRAFT GWT to reflect the new AIRCRAFT GWT (without stores) and recompute the MAX ALTITUDE–MSL (SINGLE ENGINE).

Note. If level flight cannot be maintained either with or without stores, record NA in MAX ALTITUDE–MSL (SINGLE ENGINE) block.

- **Item 21—MAX ANGLE**. Value derived from the AIRSPEED FOR ONSET OF BLADE STALL chart in the aircraft operator's manual, chapter 5. While not a limitation, the value provides the level flight angle of bank at which blade stall will begin to occur as a function of airspeed, gross weight, PA, and temperature.
- **Item 22—Vne - IAS**. Value derived from the AIRSPEED OPERATING LIMITATIONS chart in the aircraft operator's manual, chapter 5. The value defines the maximum allowable airspeed as a function of altitude, temperature, and gross weight.

(3) Arrival data. Complete this section in its entirety if arrival conditions at destination have **increased** from departure data in any of the following by the minimum amount: 5 degrees Celsius, 1,000 feet PA, or 500 pounds.

Note. If mission requirements dictate the need for additional arrival information, complete the second arrival section as described below using applicable PA, FAT, and landing gross weight data. Additional copies of page 2 may be attached for multiple arrivals.

- **Item 1—PA**. Forecast PA for time of arrival.
- **Item 2—FAT**. Forecast FAT for time of arrival. If unavailable, use maximum forecast FAT for the mission.
- **Item 3—LANDING GWT**. Estimated gross weight for arrival.
- **Item 4—TORQUE RATIO**. Torque ratios for dual and single engine are computed the same as item 7 (departure data), using arrival FAT.
- **Item 5—MAX TORQUE AVAILABLE**. Maximum torque available for dual and single engine are computed the same as item 8 (departure data), using arrival forecast PA and FAT.

Note. Adjust as required for planned use of engine anti-ice or cockpit heater according to the aircraft operator's manual.

Note. Dual engine information may also be derived from the tabular performance data in the aircraft operator's CL.

- **Item 6—PREDICTED HOVER TORQUE**. The predicted hover torque is computed the same as item 12 (departure data), using arrival forecast PA and FAT.
- **Item 7—MAX ALLOWABLE GWT OGE/IGE**. The maximum allowable gross weight is computed the same as item 9 (departure data), using arrival forecast PA and FAT.
- **Item 8— MAX HOVER HEIGHT IGE. T**he maximum hover height is computed the same as item 11 (departure data), using arrival forecast PA and FAT.
- **Item 9—MIN SE AIRSPEED IAS – WO / W STORES.** The minimum single-engine airspeed is computed the same as item 13 (departure data), using arrival forecast PA and FAT.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references plus the following:
DD Form 365-4
DA Form 5701-60-R
Turbine Engine Health Indicator (HIT) Log
TC 1-237, appendix E

TASK 1011

Determine aircraft performance using tabular data

CONDITIONS: Given an operator's and crewmembers checklist (CL), mission conditions, engine torque factors, and aircraft basic weight.

> ***Note.*** Tabular data values were derived for aircraft operating in the clean configuration. For alternative or external drag configurations the charts in the operator's manual must be used.
>
> ***Note.*** To ensure accurate values are derived when using tabular data, the aircrew must be accurate in determining aircraft zero fuel weight.

- **STANDARDS:** Appropriate common standards plus the following additions/modifications:

1. Update aircraft performance data when either of the following conditions apply:
    - a. Intent to land or takeoff when operating within 3,000 pounds of MAX ALLOWABLE GWT OGE.
    - b. Increase of 1,000 feet pressure altitude, and/or 5 degrees Celsius from the planned performance planning card (PPC).
2. Update aircraft performance data using the tabular data tables found in the operator's and crewmembers checklist for the following items:
    - a. Maximum torque available.
    - b. Maximum allowable gross weight OGE.
    - c. Torque required to hover at maximum gross weight OGE and in ground effect (IGE).
    - d. Aircraft operating weight.
3. Determine values within following parameters:
    - a. Torque values ±2 percent.
    - b. Weight values ±500 pounds.

DESCRIPTION:

1. Crew actions.
    - a. The pilot in command (PC) will compute or direct crewmembers to compute the aircraft performance data using the tabular data tables in the operator's and crewmembers checklist.
    - b. The PC will verify that the aircraft meets the performance requirements for the mission and will brief the other crewmembers on the performance data.
2. Procedures.
    - a. When conditions have changed from the planned PPC data or an in-flight update is required; derive values for MAX TORQUE AVAILABLE, MAX ALLOWABLE GWT OGE, and GO/NO-GO TORQUE.
    - b. Determine and have available aircraft performance data required to complete the mission.

> ***Note.*** The procedures for determining performance planning data are the same for the UH-60A/L/M and HH-60A/L/M aircraft unless specifically noted in the appropriate items.

Note. Tabular performance data. Figures 4-3 and 4-4 explain the tabular performance data presented in the checklist.

- **MAX TORQUE AVAILABLE**. Use the MAXIMUM TORQUE AVAILABLE * - 30-minute limit (T700) or 10-minute limit Figures 1 and 6 in the operator's manual CL.
- At the intersection of pressure altitude (height pressure) (HP)~FT and FREE AIR TEMPERATURE ° C read the MAXIMUM TORQUE AVAILABLE for the aircraft torque factor (ATF). If the ATF is between .90 and 1.0, interpolate value per the example in Figure 4-3.

Note. The maximum torque available is also referred to as intermediate rated power (IRP)—30-minute limit (T700 and T701) or maximum rated power (MRP)—10-minute limit (T701).

Note. Certain temperature and PA combinations will exceed the aircraft operator's manual, chapter 5 torque limitations. This item represents actual maximum torque available values. During normal aircraft operations, the aircraft operator's manual, chapter 5 torque limitations shall not be exceeded.

Note. Adjust the maximum torque available as required for planned use of engine anti-ice and cockpit heater according to the operator's manual.

Note. If the blade erosion kit is installed, adjust the maximum torque available according to the aircraft operator's manual.

MAXIMUM TORQUE AVAILABLE* - 30 MINUTE LIMIT
ANTI-ICE OFF T700-GE-700 ENGINE (CONTINUED)

HP ~FT	ATF	FREE AIR TEMPERATURE ~ °C						
		-15	-10	-5	0	5	10	15
8000	1.0	89	90	90	90	88	85	84
	0.9	89	88	86	85	83	81	78

Pressure Altitude (PA)

ATF – If the aircraft ATF is between 0.9 and 1.0, Interpolate the maximum torque available as described below.

Free air temperature (FAT)

EXAMPLE: UH-60A/Q
PA: +8000'
ATF: 0.96
FAT: +10°C

96 is 6/10 of the difference between ATF .90 (0.9) and 1.00 (1.0)

Maximum Torque Available

85 – 81 = 4 % TRQ
4 X 6/10 = 2.4 % TRQ
81 + 2.4 = 83.4 % maximum torque available

Figure 4-3 Example maximum torque available chart.

- **<u>MAX ALLOWABLE GWT OGE.</u>** Use MAXIMUM OGE HOVER WEIGHT AND TORQUE REQUIRED ANTI-ICE OFF (T700 or T701) as appropriate; figures 4 and 9 in the operator's manual CL.
- At the intersection of the HP ~ FT and FREE AIR TEMPERATURE ° C read the MAXIMUM ALLOWABLE GWT in the GW ~ 100 LB column under the aircraft ATF. If the ATF is between .90 and 1.0 interpolate value per the example in Figure 4-4.

Note. If the OGE weight is less than the structural limit, then the OGE hover torque is also the maximum torque.

Note. If the blade erosion kit is installed, adjust the maximum allowable GWT according to the aircraft operator's manual.

Note. Tab data values represent a 100 foot hover height OGE and 10-foot hover height IGE.

Note. Maximum hover weight is limited to 22,000 lb 100-percent torque transmission limit or 30-minute engine torque limit.

- **<u>TORQUE REQUIRED TO HOVER at MAX GWT OGE and IGE.</u>** Use MAXIMUM OGE HOVER WEIGHT AND TORQUE REQUIRED ANTI-ICE OFF (T700 or T701) as appropriate; figures 4 and 9 in the operator's manual CL.
- At the intersection of the HP~FT and FREE AIR TEMPERATURE °Celsius read the MAXIMUM Q~OGE percentage under the aircraft ATF and read TORQUE REQUIRED to HOVER OGE at MAX GWT. If the ATF is between .90 and 1.0, interpolate value per the example in Figure 4-4.
- At the intersection of the HP~FT and FREE AIR TEMPERATURE °Celsius read the MAXIMUM Q~IGE percentage under the aircraft ATF and read TORQUE REQUIRED to HOVER IGE at MAX GWT. If the ATF is between .90 and 1.0, interpolate value per the example in Figure 4-4.

Note. Tab data values represent a 100-foot hover height OGE and 10-foot hover height IGE.

MAXIMUM OGE HOVER WEIGHT AND TORQUE REQUIRED
ANTI-ICE OFF T700-GE-700 ENGINE (CONTINUED)

HP ~FT	ATF *	FREE AIR TEMPERATURE ~°C							
		10		15		20		25	
		1.0	0.9	1.0	0.9	1.0	0.9	1.0	0.9
8000	GW ~ 100 LB	173	166	169	162	166	157	162	152
	Q ~ OGE ~ %	85	81	84	78	82	75	79	72
	Q ~ IGE ~ %	73	69	71	67	70	64	67	62

GW ~ 100 LB (aircraft gross weight) – Multiply this value times 100.

Q ~ OGE ~ % (torque required to hover OGE at 100-feet wheel height) at maximum allowable gross weight OGE above (GW ~100 LB).

Q ~ IGE ~ % (torque required to hover IGE at 10-feet wheel height) at maximum allowable gross weight OGE above (GW ~100 LB).

EXAMPLE: UH-60A/Q
PA: +8000'
ATF: 0.96
FAT: +10°C

.96 is 6/10 of the difference between ATF .90 (0.9) and 1.00 (1.0)

GW~100 LB

Maximum allowable gross weight OGE, (0.9): 166 X 100 = 16,600, (1.0): 173 X 100 = 17,300 pounds.
17,300 – 16,600 = 700 pounds
700 X 6/10 = 420 pounds
16600 + 420 = 17,020 pounds maximum allowable gross weight OGE

Q~OGE~%

85 – 81 = 4 % TRQ
4 X 6/10 = 2.4 % TRQ
81 + 2.4 = 83.4 % TRQ required to hover 17,020 pounds OGE

Q~IGE~%

73 – 69 = 4 % TRQ
4 X 6/10 = 2.4 %, TRQ
69 + 2.4 = 71.4 % TRQ required to hover 17,020 pounds IGE

Figure 4-4. Example maximum out-of-ground effect hover weight and torque required chart.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft or academically.
2. Evaluation. Evaluation will be conducted in the aircraft or academically.

REFERENCES: Appropriate common references plus the following:
DD Form 365-4
DA Form 5701-60-R

TASK 1012

Verify aircraft weight and balance

CONDITIONS: Given crew data, aircraft configuration, mission cargo, passenger data, the appropriate aircraft operator's manual, and completed DD Form(s) 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*) from the aircraft logbook.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Verify that center of gravity (CG) and gross weight (GWT) remain within aircraft limits for the duration of the flight per the appropriate aircraft operator's manual.
2. Identify all mission or flight limitations imposed by weight or CG.
3. Ensure DD Form(s) 365-4 has been completed within 90 days.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will brief crewmembers on any limitations.
   b. Crewmembers will continually monitor aircraft loading (such as fuel transfers, sling loads, cargo load) during the mission to ensure CG remains within limits.
2. Procedures.
   a. Using the completed DD Form 365-4, verify that aircraft GWT and CG will remain within the allowable limits for the entire flight. Note all GWT, loading task/maneuver restrictions/limitations. If there is no completed DD Form 365-4 that meets mission requirements, the PC will ensure adjustments are made to existing DD Form 365-4 (to meet the criteria outlined in AR 95-1) and the aircraft is capable of completing the assigned mission.
   b. Verify the aircraft CG in relation to CG limits at predetermined times during the flight when an aircraft's configuration requires special attention; for example, when it is a critical requirement to keep a certain amount of fuel in a particular tank. Conduct CG checks for fuel transfer, sling loads, and cargo loading operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references and DD Form 365-4.

TASK 1013

Operate mission planning system

CONDITIONS: Given approved computer and mission planning software, a mission briefing, signal operating instructions (SOI) information, weather information, navigational maps, Department of Defense flight information publication (DOD FLIP), intelligence data, and other materials as required.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Configure and operate the approved mission planning software.
2. Evaluate and enter all pertinent weather data, as appropriate.
3. Select and enter appropriate primary and alternate routes.
4. Select and enter appropriate tactical/terrain flight mission planning control features.
5. Select and enter appropriate communication data.
6. Load mission data to data transfer device, if applicable.
7. Print out time distance heading (TDH) cards, waypoint lists, crew cards, communication cards, and kneecards as required.

DESCRIPTION:

1. Crew actions. The pilot in command (PC) will assign tasks. The crew receives the mission briefing. Any crewmember may enter data into the approved mission planning software and brief the crew on the mission.
2. Procedures. Plan the flight according to task 1004, 1006, or 2012 as applicable, using all appropriate data.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references plus the following:

Task 1004
Task 1006
Task 2012

TASK 1014

Operate aviation life support equipment

CONDITIONS: Given the appropriate aviation life support equipment (ALSE) for the mission.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Inspect/perform operational checks on ALSE.
2. Use personal and mission ALSE.
3. Brief passengers in using ALSE.

DESCRIPTION:

1. Crew actions. The pilot in command (PC) will verify that all required ALSE equipment is onboard the aircraft before takeoff.
2. Procedures. On the basis of mission requirements, obtain the required ALSE. Inspect equipment for serviceability and perform required operational checks. Secure the required ALSE in the aircraft per the appropriate aircraft operator's manual and the unit standing operating procedure (SOP). Brief passengers in using ALSE.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references plus the appropriate ALSE technical manuals.

TASK 1016

Perform internal load operations

CONDITIONS: In an H-60 helicopter loaded with passengers/cargo.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Perform or ensure that a thorough passenger briefing has been conducted and that a passenger manifest is on file according to AR 95-1. Conduct the passenger briefing per the appropriate aircraft operator's manual/checklist (CL) and unit standing operating procedure (SOP).

   b. Ensure that the passengers/cargo is restrained.

   c. Ensure that floor loading limits are not exceeded.

2. Nonrated.

   a. Perform a thorough passenger briefing and ensure that a passenger manifest is on file according to AR 95-1. Conduct the passenger briefing per the appropriate aircraft operator's manual/CL and unit SOP.

   b. Load the aircraft per the load plan, if applicable.

   c. Ensure that floor loading limits are not exceeded.

   d. Secure passengers/cargo according to the appropriate aircraft operator's manual.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will formulate a load plan, ensure that a DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*) is verified, if required, and ensure that the aircraft will be within gross weight (GWT) and center of gravity (CG) limits. The PC will ensure that the crew loads the cargo, uses proper tie-down procedures, and completes a passenger briefing as required. The PC will determine whether the aircraft is capable of completing the assigned mission and will ensure that aircraft limitations will not be exceeded.

   b. The nonrated crewmember (NCM) will complete a passenger briefing as directed and will ensure passengers are seated and wearing seat belts according to AR 95-1. The NCM will monitor passengers/cargo during the flight for security.

2. Procedures.

   a. Load cargo per the cargo plan or DD Form 365-4, as appropriate. Secure and restrain all cargo to meet restraint criteria. (For additional information, see task 1012.)

   b. Brief passengers for the flight and seat them according to the load plan or DD Form 365-4, as appropriate. Conduct the passenger briefing per the appropriate aircraft operator's manual /CL or unit SOP and information about the mission. Ensure that the passengers understand each element of the briefing.

Note. If the aircraft is not shut down for loading, a passenger briefing may be impractical. Passengers may be prebriefed or passenger briefing cards may be used per local directives or the unit SOP.

Note. Hazardous cargo will be handled, loaded, and transported per AR 95-27.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or academically.
2. Evaluation. Evaluation may be conducted in the aircraft or academically.

REFERENCES: Appropriate common references plus the following:

AR 95-27
DA Pam 738-751
DD Form 365-4
FM 55-450-2
TM 55-1500-342-23

TASK 1020

Prepare aircraft for mission

CONDITIONS: In an H-60 helicopter and given a warning order or mission briefing and required mission equipment.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Install, secure, inspect, and inventory all mission equipment.
2. Prepare the aircraft for the assigned mission.

DESCRIPTION: After receiving a mission briefing, determine the required mission equipment. Ensure that it is installed, secured, inventoried, and operational before flight. If an airworthiness release (AWR) is required for mission equipment, ensure that a current AWR is in the aircraft logbook and that all inspections and checks have been completed according to the AWR. Check the equipment that requires aircraft power for operation per procedures in the appropriate aircraft operator's manual/checklist (CL) or appropriate mission equipment operator's manuals.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the appropriate airworthiness releases.

TASK 1022

Perform preflight inspection

CONDITIONS: With an H-60 helicopter and given the appropriate aircraft operator's manual/checklist (CL).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Perform the preflight inspection per the appropriate aircraft operator's manual/CL.

   b. Enter appropriate information on DA Form 2408-12 (*Army Aviator's Flight Record*), DA Form 2408-13 (*Aircraft Status Information Record*), and DA Form 2408-13-1 (*Aircraft Maintenance and Inspection Record*), per DA Pam 738-751.

2. Nonrated. Assist in all before preflight and preflight duties per the appropriate aircraft operator's manual/CL, unit standing operating procedure (SOP), and for the designated duty position.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) is responsible for ensuring that a preflight inspection is conducted using the appropriate aircraft operator's manual/CL. The PC may direct other crewmembers to complete elements of the preflight inspection as applicable and will verify that all checks have been completed according to the appropriate aircraft operator's manual/CL. The PC will report any aircraft discrepancies that may affect the mission and will ensure that the appropriate information is entered on DA Form 2408-12, DA Form 2408-13 and DA Form 2408-13-1.

   b. The crewmembers will complete the assigned elements and report the results to the PC.

2. Procedures.

   a. Ensure the preflight inspection is conducted per the appropriate aircraft operator's manual/CL. Verify that all preflight checks have been completed, and ensure that the crewmembers enter the appropriate information on DA Form 2408-12, DA Form 2408-13, and DA Form 2408-13-1.

   b. If circumstances permit, accomplish preflight inspection during daylight hours.

   c. The nonrated crewmember (NCM), if available, will ensure all cowlings and equipment are secured upon completing the preflight.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: If performing the preflight inspection during the hours of darkness, a flashlight with an unfiltered lens to supplement available lighting should be used. Hydraulic leaks, oil leaks, and other defects are difficult to see using a flashlight with a colored lens. TC 1-204 contains details on preflight inspection at night.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted at the aircraft.
2. Evaluation. Evaluation will be conducted at the aircraft.

REFERENCES: Appropriate common references plus DA Pam 738-751.

TASK 1024

Perform before-starting-engine through before-leaving-helicopter checks

CONDITIONS: In an H-60 helicopter and given the appropriate aircraft operator's manual/checklist (CL).

STANDARDS: Appropriate common standards plus the following additions/modifications.

1. Perform procedures and checks per the appropriate aircraft operator's manual/CL and health indicator test (HIT) check procedures.
2. Enter appropriate information on DA Form 2408-12 (*Army Aviator's Flight Record*), DA Form 2408-13 (*Aircraft Status Information Record*), and DA Form 2408-13-1 (*Aircraft Maintenance and Inspection Record*), and the HIT log.

DESCRIPTION:

1. Crew actions.
   a. Each crewmember will complete the required checks pertaining to his assigned crew duties per the appropriate aircraft operator's manual/CL. Crewmembers will coordinate with each other before entering data into aircraft systems.
   b. The pilot not on the controls (P) will read the checklist and announce auxiliary power unit (APU) and engine starts.
   c. The appropriate crewmember(s) will clear the area around the aircraft before APU start and each engine start.
   d. The nonrated crewmembers (NCMs) will perform duties as required by his duty position and as directed by the pilot in command (PC), according to the unit standing operating procedure (SOP), while maintaining situational awareness.
   e. The PC will ensure the appropriate information is entered on DA Form 2408-12, DA Form 2408-13, DA Form 2408-13-1 and the HIT log according to the unit SOP and DA Pam 738-751.
   f. Secure the aircraft after completing the flight per the appropriate aircraft operator's manual, the appropriate -23 series manual, TM 1-1500-250-23, and the unit SOP.
2. Procedures. Perform the before-starting-engine through before-leaving-helicopter checks per the aircraft operator's manual/CL. The call and response method should be used, as appropriate. The crewmember reading the checklist will read the complete checklist item. The crewmember performing the check will answer with the appropriate response. For example, for the call "Anticollision/position lights – as required" the response might be "Anticollision lights, both, night; position lights, steady, bright." Responses that don't clearly communicate action of information should not be used. For example, when responding to the call, "Systems – check" replying with "check" doesn't clearly indicate that the systems are within the normal operating range. A response of "All in the normal operating range" communicates more accurate information. Perform the HIT check and when complete, record data on the HIT log. After the flight, enter all information required on the appropriate Department of the Army (DA) forms.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Before starting the engines, ensure that internal and external lights are operational and set. Internal lighting levels must be high enough to easily see the instruments and to start the engines without exceeding operating limitations.

SNOW/SAND/DUST CONSIDERATIONS: Ensure all rotating components and inlets/exhausts are clear of ice and/or snow before starting APU/engines.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or the simulator.
2. Evaluation. Evaluation will be conducted in the aircraft unless flight activity category (FAC) 3 or instrument annual proficiency and readiness test (APART) is allowed in simulator.

REFERENCES: Appropriate common references plus the following:

DA Pam 738-751
HIT log
TM 1-2840-248-23
TM 1-1500-250-23

TASK 1025

Operate integrated vehicle health monitoring system (H-60M)

CONDITION: In an H-60M helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Verify administrative data on multifunction display (MFD).
2. Perform crew change procedures when appropriate.
3. Perform vibration event data capture when appropriate.

DESCRIPTION:

1. Crew actions.

   a. To verify administrative data access the integrated vehicle health monitoring system (IVHMS) page on the multifunction display (MFD) and ensure the correct aircraft type and tail number are displayed.

   b. When required to change members of the crew without shutting down engines, perform a crew change by selecting end of operation (END OF OP) on the administrative (ADMIN) page of the IVHMS.

   c. If the crew experiences an unusual vibration, unusual noise, or other abnormalities, either pilot can press the intermittent event switch (HUMS-E), located on the instrument panel next to each flight director/display control panel (FD/DCP), to capture that event for analysis by maintenance personnel.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1026

MAINTAIN AIRSPACE SURVEILLANCE

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Brief airspace surveillance procedures prior to flight. This will include scan sectors.
2. Announce any unplanned drift or altitude changes, clear the aircraft, and immediately inform other crewmembers of all air traffic or obstacles that pose a threat to the aircraft.
3. Announce when attention is focused inside the aircraft using a time limit that is appropriate for the conditions and announce when attention is focused back outside.
4. Maintain airspace surveillance in assigned scan sectors.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will brief airspace surveillance procedures prior to the flight. The briefing will include areas of responsibility and scan sectors.

   b. The pilot on the controls (P*) will announce the intention to perform a specific maneuver and will remain focused outside the aircraft. The P* is responsible for clearing the aircraft and obstacle avoidance.

   c. The pilot not on the controls (P) and nonrated crewmember (NCM), as duties permit, will assist in clearing the aircraft and will provide adequate warning of obstacles, unusual drift, or altitude changes. The P and NCM will announce when attention is focused inside the aircraft and again when attention is reestablished outside.

   d. When landing, the crew will confirm the suitability of the area and that the aircraft is clear of barriers.

2. Procedures.

   a. Maintain close surveillance of the surrounding airspace. Keep the aircraft clear from other aircraft and obstacles by maintaining visual surveillance (close, mid, and far areas) of the surrounding airspace. Inform the crew immediately of air traffic or obstacles that pose a threat to the aircraft. Call out the location of traffic or obstacles by the clock, altitude, and distance method. (The 12 o'clock position is at the nose of the aircraft.) Give distance in miles or fractions of miles for air traffic and in feet for ground obstacles. When reporting air traffic, specify the type of aircraft (fixed-wing or helicopter) and, if known, the model. The altitude of the air traffic should be reported as the same altitude, higher, or lower than the altitude at which you are flying.

   b. Prior to changing altitude, visually clear the aircraft for hazards and obstacles inclusive of what is ahead, above, below, and to the left and right of the aircraft.

   c. Prior to performing a descending flight maneuver, it may sometimes be desirable to perform clearing "S" turns to the left or right. The clearing "S" turns will provide the aircrew with a greater visual scan area.

   d. During a hover or hovering flight, inform the P* of any unannounced drift or altitude changes. When landing, the crew will confirm the suitability of the area.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Using proper scanning techniques will assist in detecting traffic and obstacles, and in avoiding spatial disorientation. Hazards such as wires are difficult to detect.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1028

Perform hover power check

CONDITIONS: In an H-60 helicopter, at an appropriate hover height, and with performance planning information available.

STANDARDS: Appropriate common standards plus determine whether sufficient power is available to perform the mission.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will determine whether the aircraft is capable of completing the assigned mission and will ensure that aircraft limitations will not be exceeded.

   b. The pilot on the controls (P*) will announce his/her intent to bring the aircraft to a stationary hover for a hover power check. During the ascent, check for proper center of gravity (CG) and control response. Remain focused outside the aircraft and announce when the aircraft is stabilized at the desired hover altitude. Use a 10-foot stationary hover into the wind when performing a hover power check unless the mission or terrain constraints dictate otherwise.

   c. The pilot not on the controls (P) will monitor the aircraft instruments and verify the power check. The P will compare the actual hover performance data to the computed data on the performance planning card (PPC) and announce the results to the P*. If GO/NO GO in ground effect (IGE) or out of ground effect (OGE) torque is indicated prior to reaching the planned hover height used during performance planning, the P will tell the P* to stop the hover power check and land the aircraft. The PC will confirm the GO/NO GO torque and adjust the mission as required.

   d. The nonrated crewmember (NCM) will remain focused primarily outside the aircraft to assist in clearing and to provide adequate warning of obstacles.

Note. If an adjusted zero fuel weight is required, the data should be recorded when time permits.

2. Procedures.

   a. Use the hover height computed during performance planning when performing this task unless the mission or terrain constraints dictate otherwise.

   b. At desired hover height, monitor the aircraft instruments and verify the power check. Compare the actual performance data to that computed.

Note. If the torque required to maintain a stationary hover does not exceed the GO/NO GO torque OGE, any maneuver requiring OGE/IGE power or less may be attempted. If the torque required to maintain a stationary hover exceeds the GO/NO GO torque OGE but does not exceed the GO/NO GO torque IGE, all IGE maneuvers may be attempted. If the torque required to maintain a stationary hover exceeds the GO/NO GO IGE and structural limits have been exceeded, further flight is prohibited until appropriate maintenance action is performed.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft unless flight activity category (FAC) 3 or instrument annual proficiency and readiness test (APART) is allowed in the simulator.

REFERENCES: Appropriate common references.

TASK 1032

Perform radio communication procedures

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Program, check, and operate aircraft avionics.
   b. Establish radio contact with the desired unit or air traffic control (ATC) facility. When communicating with ATC facilities, use correct radio communication procedures and phraseology per the Department of Defense flight information publication (DOD FLIP) and Department of Transportation/Federal Aviation Administration (DOT/FAA) 7110.65.
   c. Operate intercommunication system.
   d. Perform two-way radio failure procedures per the DOD FLIP or host-nation regulations.
2. Nonrated.
   a. Operate intercommunication system.
   b. Use the appropriate radio to communicate with the desired facility (as required for nonrated crewmembers [NCMs]).

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will determine radio frequencies per mission requirements during the crew briefing and will indicate whether the pilot on the controls (P*) or pilot not on the controls (P) will establish and maintain primary communications.
   b. The P* will announce information not monitored by the P.
   c. The P will adjust avionics to required frequencies. The P will copy pertinent information and announce information not monitored by the P*.
   d. During normal operations, the NCM will monitor external communications so as not to interrupt when external communications are being transmitted or received. (Monitoring external communications may not be desirable during operations requiring extensive internal communication; for example, sling loads, hoist, rappelling, or emergencies.)
   e. Certain operations may require that the NCM transmit on an aircraft radio; for example, medical evacuation (MEDEVAC). The NCM will coordinate with the PC before using aircraft radios.
   f. Crew actions for two-way radio failure:
      (1) P* or P will announce two-way radio failure to all crewmembers.
      (2) The PC will direct the efforts to identify and correct the avionics malfunction.
      (3) The P* will focus outside the aircraft visual meteorological conditions (VMC) or inside instrument meteorological condition (IMC) on the instruments, as appropriate, but should not participate in troubleshooting the malfunction.
      (4) The P will remain focused primarily inside the aircraft to identify and correct the avionics malfunction.

2. Procedures.

   a. Adjust avionics to the required frequencies. Continuously monitor the avionics as directed by the PC. When required, establish communications with the desired facility. Monitor the frequency before transmitting. Transmit the desired/required information. Use the correct radio call sign when acknowledging each communication. When advised to change frequencies, acknowledge instructions. Select the new frequency as soon as possible unless instructed to do so at a specific time, fix, or altitude. Use radio communication procedures and phraseology as appropriate for the area of operations. Use standard terms and phraseology for all intercommunications.

   b. Procedure for two-way radio failure. Attempt to identify and correct the malfunctioning radio and announce the results. If two-way radio failure is confirmed, comply with procedure outlined in the Flight Information Handbook.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted academically.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references plus the Department of Transportation/ Federal Aviation Administration (DOT/FAA) 7110.65.

TASK 1034

PERFORM GROUND TAXI

CONDITIONS: In an H-60 helicopter and the aircraft cleared.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Maintain speed appropriate for conditions.
2. Maintain the desired ground track within ±3 feet.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will ensure that the parking brake is released and the tail wheel is locked or unlocked as required before starting the ground taxi. The P* will announce his intent to begin ground taxi operations, the intended direction of any turns, and that the aircraft is clear of all traffic and obstacles. The P* will remain focused primarily outside the aircraft.

   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will help clear the aircraft and provide adequate warning of traffic and obstacles. They also will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures. Ensure the area is suitable for ground taxi operations. Initiate the taxi by centering the cyclic and increasing the collective slightly to start forward movement. If required, adjust lateral cyclic, pedals, or both to release the tail wheel lockpin. Avoid droop stop pounding contact by using proper cyclic and collective control applications. Ensure that both sets of brakes operate properly, conditions permitting. Use left or right pedal input to turn the aircraft and lateral cyclic as necessary to maintain a level fuselage attitude in the turns. To regulate the taxi speed, use a combination of collective, slight forward cyclic and brakes. Be aware that high gross weights, soft, rough, or sloping terrain may require using more than normal power.

Note. During taxi with the tail wheel unlocked, fuselage roll attitude is controlled with the cyclic. The attitude indicator, inclinometer, as well as outside visual cues, may be used to reference fuselage roll attitude. The normal method for ground taxi is with the tail wheel in the unlocked position.

Note. While ground taxiing, minor heading changes may be made with the tail wheel locked. However, care should be taken not to break or bend the tail wheel-locking pin. A slight fuselage roll in the opposite direction may indicate excessive pedal input with the tail wheel locked. Excessive collective application may activate the drag beam switch.

Note. Depending on ground velocity, emergency stops may be performed by lowering the collective and applying the wheel breaks or by bringing the aircraft to a hover.

Note. Excessive cyclic input and insufficient collective application may result in droop stop pounding or main rotor contact with mission equipment.

DROOP STOP POUNDING (DSP): DSP is a phenomenon that can occur when there is excessive downward blade travel causing the blades to strike the droop stops when they are in the fly position. The conditions, which combine to induce this type DSP, include excessive aft cyclic, low collective, and all wheels on the ground. The maneuver that is most likely to produce DSP is the roll-on landing in conjunction with aerodynamic braking; however, DSP can also occur during taxi and down slope landings.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: The landing light should be used for unaided ground taxi and the searchlight with installed infrared (IR) bypass filter when wearing night vision goggles (NVGs). Using proper scanning techniques will help detect obstacles that must be avoided.

SNOW/SAND/DUST CONSIDERATIONS: If ground reference is lost because of blowing snow/sand/dust, lower the collective, neutralize the flight controls, and apply wheel brakes until visual reference is reestablished. When initiating ground taxi, apply pressure and counterpressure to the pedals to ensure the wheels/skis are not frozen to the ground, if appropriate. Use caution when taxiing near other maneuvering aircraft because of limited visual references and possible relative motion illusion.

> ***Note.*** Because of decreased visual references and relative motion illusions, limit ground speed to a safe rate.

> ***Note.*** At night, use of the landing, search, or anticollision lights may cause spatial disorientation in blowing snow/sand/dust.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1038

PERFORM HOVERING FLIGHT

CONDITION: In an H-60 helicopter with the aircraft cleared.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Perform a smooth, controlled ascent to hover.
2. Perform a smooth, controlled descent with minimum drift at touchdown.
3. M For coupled hover, engage the appropriate hover mode.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will announce his intent to perform a specific hovering flight maneuver and will remain focused primarily outside the aircraft to monitor altitude and avoid obstacles. The P* will ensure and announce that the aircraft is cleared prior to turning or repositioning the aircraft. The P* will announce when terminating the maneuver.

   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist in clearing the aircraft and provide adequate warning of obstacles, unannounced drift, or altitude changes. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures.

   a. Takeoff to a hover. With the collective full down, place the cyclic in a neutral position and increase the collective smoothly. Apply pedals to maintain heading, and coordinate the cyclic for a vertical ascent. As the aircraft leaves the ground, check for the proper control response and aircraft center of gravity (CG).

   b. Hovering flight. Adjust the cyclic to maintain a stationary hover or to move in the desired direction. Control heading with the pedals, and maintain altitude with the collective. The rate of movement and altitude should be appropriate for existing conditions. To return to a stationary hover, apply cyclic in the opposite direction while maintaining altitude with the collective and heading with the pedals.

   M c. Coupled hovering flight. Engage coupled hover (HVR) mode by either pressing in (Z axis) on the cyclic trim beeper or manually selecting HVR on the flight director/display control panel (FD/DCP). Directional flight is achieved by moving the cyclic trim beeper in the direction of desired travel until desired rate of movement is established. The rate of movement and altitude should be appropriate for existing conditions. Change altitude by adjusting either the collective trim beeper or the RALT P-SYNC knob on the FD/DCP.

Note. Air taxi is the preferred method for ground movements on airports provided ground operations and conditions permit. Unless otherwise requested or instructed, pilots are expected to remain below 100 feet above ground level (AGL). However, if a higher than normal airspeed or altitude is desired, the request should be made prior to lift-off. The pilot is solely responsible for selecting a safe airspeed for the altitude/operation being conducted. Using air taxi enables the pilot to proceed at an optimum airspeed/altitude, minimize downwash effect, conserve fuel, and expedite movement from one point to another.

d. Hovering turns. Apply pressure to the desired pedal to begin the turn. Use pressure and counter-pressure on the pedals to maintain the desired rate of turn. Coordinate cyclic control to maintain position over the pivot point while maintaining altitude with the collective. Hovering turns can be made around any vertical axis (for example, the nose, mast, tail of the aircraft, or a point in front of the aircraft). However, turns other than about the center of the aircraft will increase the turn radius proportionately.

M e. Coupled hovering turns. Change aircraft heading by adjusting the collective trim beeper.

Note. Cyclic turns should only be used when necessary.

Note. When landing from a hover to an unimproved area, the crew must check for obstacles under the aircraft.

M ***Note.*** The P* should closely monitor the collective during coupled hover operations near the ground.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. Movement over areas of limited contrast—such as tall grass, water, or desert—tends to cause spatial disorientation. Seek hover areas that provide adequate contrast and use proper scanning techniques. If disorientation occurs, apply sufficient power and execute an instrument takeoff (ITO) (task 1170). If a go-around is not feasible, try to maneuver the aircraft forward and down to the ground to limit the possibility of touchdown with lateral or aft movement.
2. When performing operations during unaided night flight, ensure that the searchlight or landing light (white light) is in the desired position. Using the white light will impair night vision for several minutes. Therefore, exercise added caution if resuming flight before reaching full dark adaptation.

SNOW/SAND/DUST CONSIDERATIONS: During ascent to a hover, if visual references do not deteriorate to an unacceptable level, continue ascent to the desired hover altitude.

1. For hover taxi: During takeoff to a hover, simultaneously accelerate the aircraft to a ground speed that keeps the snow/sand/dust cloud aft of the main rotor mast.

M 2. For coupled hover taxi: Prior to takeoff, select the hover (HVR) display on the primary flight display (PFD) to obtain cues for maintaining position and velocity reference (VREF). During takeoff to a hover, press in on the cyclic trim beeper (Z axis) and adjust to an appropriate altitude. Move the cyclic trim beeper in the desired direction to accelerate the aircraft to a ground speed or velocity reference (VREF) that keeps the snow/sand/dust cloud aft of the main rotor mast. Hover velocity hold (HVR VHLD) will be displayed on the appropriate FD/DCP and will maintain the aircraft at the desired velocity until the pilot changes the references used by the flight director (FD).

Note. Maintain optimum visibility by observing references close to the aircraft. Exercise caution when operating in close proximity to other aircraft or obstacles.

Note. When visual references deteriorate making a hover taxi unsafe, determine whether to abort the maneuver, ground taxi, air taxi, or perform an ITO (task 1170).

Note. Hovering out of ground effect (OGE) reduces available ground references and may increase the possibility of spatial disorientation. Be prepared to transition to instruments and execute an ITO (Task 1170) or unusual attitude recovery (task 1182) if ground reference is lost.

Note. At night, use of landing, search, or anticollision light may cause spatial disorientation while in blowing snow/sand/dust.

CONFINED AREA CONSIDERATIONS: Select good references to avoid unanticipated drift. All crewmembers must be focused primarily outside for obstacle avoidance.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1040

PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF

CONDITIONS: In an H-60 helicopter given visual meteorological conditions (VMC) conditions.

STANDARDS: Appropriate common standards plus (rated only) maintain aircraft in trim above 50 feet above ground level (AGL) or as appropriate for transition to mission profile.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will determine the direction of takeoff by analyzing the tactical situation, the wind, the long axis of the takeoff area, and the lowest obstacles, and will confirm that required power is available by comparing the information from the performance planning card (PPC) to the hover power check.

   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver to provide obstacle clearance. The P* will announce whether the takeoff is from the ground or from a hover and his intent to abort or alter the takeoff. The P* will select reference points to assist in maintaining the takeoff flight path.

   c. The pilot not on the controls (P) and nonrated crewmember (NCM) will announce when ready for takeoff and will remain focused primarily outside the aircraft to assist in clearing and to provide adequate warning of obstacles.

   d. The P will monitor power requirements and advise the P* if power limits are being approached. The P and NCM will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures.

   a. From the ground. Select reference points to maintain ground track. With the cyclic and pedals in the neutral position, increase power. Continue applying power as required to transition to mission profile. As the aircraft leaves the ground, maintain heading with pedals and apply forward cyclic as required to establish an accelerative attitude appropriate for the terrain and to avoid obstacles. Adjust the cyclic to continue the acceleration to the desired climb airspeed, and maintain the desired ground track. Make the required power adjustments to clear obstacles in the flight path, and obtain the desired rate of climb. Maintain heading with the pedals when below 50-feet (AGL) or until making the transition to terrain flight; then place the aircraft in trim. After obtaining the desired airspeed, adjust the cyclic as necessary to stop the acceleration and maintain desired climb airspeed. Maintain takeoff power until reaching minimum single engine airspeed and then adjust power as necessary to continue the desired rate of climb or transition to mission profile.

   b. From a hover. Select reference points to maintain ground track. Apply forward cyclic to accelerate the aircraft while simultaneously applying power. Perform the rest of the maneuver as for a takeoff from the ground.

Note. Avoid unnecessary nose low accelerate attitudes; 5 degrees nose low is recommended for acceleration. However, 10 degrees nose low should not be exceeded.

Note. Performing this maneuver in certain environments may require hover out of ground effect (OGE) power. Evaluate each situation for power required versus power available.

c. From the ground with less than OGE power. Select reference points to maintain ground track. With the cyclic and pedals in the neutral position, increase power until the aircraft becomes "light on the wheels." Continue applying power until the aircraft is airborne. As the aircraft leaves the ground, apply forward cyclic as required to avoid obstacles and to accelerate smoothly through effective translational lift (ETL) at an altitude appropriate for the terrain. Adjust the cyclic to continue the acceleration to the desired climb airspeed and maintain the desired ground track. Make the required power adjustments to clear obstacles in the flight path and to obtain the desired rate of climb. Maintain heading with the pedals when below 50 feet AGL or until making the transition to mission profile; then place the aircraft in trim. After obtaining the desired airspeed, adjust the cyclic as necessary to stop the acceleration. Adjust power as necessary to continue or to stop the rate of climb.

d. From a hover with less than OGE power. Apply forward cyclic to accelerate the aircraft while applying power to maintain the desired hover altitude. Perform the rest of the maneuver as for a takeoff from the ground with less than OGE power.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. If sufficient illumination exists to view obstacles, accomplish the takeoff in the same way as a visual meteorological conditions (VMC) takeoff during the day. Visual obstacles, such as shadows, should be treated the same as physical obstacles. If sufficient illumination does not exist, perform an altitude-over-airspeed takeoff by applying takeoff power first followed by a slow acceleration to ensure obstacle clearance. The P* may perform the takeoff from a hover or from the ground.

2. Maintain the takeoff power setting until reaching climb airspeed. Adjust power as required to establish the desired rate of climb and cyclic to maintain the desired airspeed. Alternate attention between cross-checking instruments and assisting in obstacle avoidance. The P* and NCM should maintain orientation outside the aircraft and concentrate on obstacle avoidance. The P should make all internal checks.

   a. Maintain desired ground track. Reduced visual references during the takeoff—and throughout the ascent at night—may make it difficult to maintain the desired ground track. Knowledge of the surface wind direction and velocity will assist in maintaining the desired ground track.

   b. Use proper scanning techniques to avoid spatial disorientation.

   c. When performing operations during unaided night flight, ensure that the searchlight or landing light (white light) is in the desired position. Using the white light will impair night vision several minutes. Therefore, exercise added caution if resuming flight before reaching full dark adaptation.

SNOW/SAND/DUST CONSIDERATIONS: As the aircraft leaves the surface, maintain heading with the pedals and a level attitude with the cyclic. As the aircraft clears the snow/sand/dust cloud and clears the barriers, accelerate to climb airspeed and trim the aircraft.

Note. In some cases, applying collective to blow away loose snow/sand/dust from around the aircraft is beneficial before performing this maneuver.

Note. Be prepared to transition to instruments and execute an instrument takeoff (ITO) if ground reference is lost.

Note. At night, use of the landing, search, or anticollision lights may cause spatial disorientation while in blowing snow/sand/dust.

CONFINED AREA CONSIDERATIONS: Confirm the takeoff plan prior to departure. Perform a hover power check. Re-position the aircraft, if desired, to afford a shallower departure angle and minimize power requirements. During departure, adjust the cyclic and the collective as required to establish a constant departure angle to clear obstacles. All crewmembers must focus primarily outside for obstacle avoidance.

MOUNTAIN/PINNACLE/RIDGELINE CONSIDERATIONS: Analyze winds, obstacles, and density altitude. Perform a hover power check. Determine the best takeoff direction and path for conditions. After clearing any obstacle(s), accelerate the aircraft to the desired airspeed.

Note. Where drop-offs are located along the takeoff path, the aircraft may be maneuvered down slope to gain airspeed.

MUD/MUSKEG/TUNDRA CONSIDERATIONS: Perform one of the following takeoff techniques:

1. From dry muskeg/tundra areas. A vertical takeoff may be best in drier areas where the aircraft has not sunk into the muskeg/tundra or where obstacles prohibit motion. Smoothly increase the collective until the crew confirms that the wheels/skis are free. Adjust controls as necessary to perform a VMC takeoff.
2. From wet areas. In wet areas where the aircraft is likely to have sunk or is stuck in the mud/muskeg/tundra, the following technique may be best: With the cyclic in the neutral position, smoothly increase the collective. As hover power is approached, place the cyclic slightly forward of the neutral position and slowly move the pedals back and forth. Continue increasing the collective and "swim" the aircraft forward to break the suction of the wheels/skis. When free, adjust the controls as necessary to perform a VMC takeoff.

Note. Before performing operations in a mud/muskeg/tundra environment, the crew must understand dynamic roll over characteristics.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1044

NAVIGATE BY PILOTAGE AND DEAD RECKONING

CONDITIONS: In an H-60 helicopter with the appropriate maps, plotter, flight computer, and flight log.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Maintain orientation within ½ mile or 800 meters.
2. Arrive at checkpoints/destination at estimated time of arrival (ETA) ±1 minute.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft and respond to navigation instructions or cues given by the pilot not on the controls (P). The P* will acknowledge commands issued by the P for the heading, altitude, and airspeed changes necessary to navigate the desired course. The P* will announce significant surface features to assist in navigation.

   b. The P will direct the P* to change aircraft heading, altitude, and airspeed as appropriate to navigate the desired course. The P will use rally terms, specific headings, relative bearings, or key terrain features to accomplish this task. He will announce all plotted wires before approaching their location. The P and nonrated crewmember (NCM) will monitor aircraft instruments, assist in clearing the aircraft, and provide adequate warning to avoid traffic and obstacles. The P and NCM will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures.

   a. Both pilotage and dead reckoning will be used to maintain the position of the aircraft along the planned route. Planned headings will be adjusted as necessary to compensate for the effects of the wind.

   b. Perform a ground speed check as soon as possible by computing the actual time required to fly a known distance. Adjust estimated times for subsequent legs of the flight route using the computed ground speed. Compare planned ground speed with computed ground speed and adjust airspeed as required to arrive at each control point at its original ETA.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: More detailed flight planning is required when the flight is conducted at night. Interior cockpit lighting should be considered when selecting colors for preparing navigational aids such as maps and kneeboard notes.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or the simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1046

Perform electronically aided navigation

CONDITION: In an H-60 helicopter with an electronically aided navigation system installed and operational.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Operate the installed electronically aided navigational system per the appropriate technical manual (TM).
2. Determine the position of the aircraft along the route of flight within 300 meters.

M 3. Configure the flight director/display control panel (FD/DCP) and multifunction display (MFD) for desired processed data.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft and respond to navigation instructions or cues given by the pilot not on the controls (P). The P* will acknowledge commands issued by the P for the heading, altitude, and airspeed changes necessary to navigate the desired course. The P* will announce significant terrain features to assist in navigation.

   b. The P will be the primary operator of the electronically aided navigation system. The P will direct the P* to change aircraft heading, altitude, and airspeed as appropriate to navigate the desired course. The P will use rally terms, specific headings, relative bearings, or key terrain features to accomplish this task. The P will announce all plotted wires before approaching their location. The P and nonrated crewmember (NCM) will monitor aircraft instruments, assist in clearing the aircraft, and provide adequate warning to avoid traffic and obstacles.

2. Procedures.

A/L a. Perform the turn-on, test, and programming procedures per the appropriate TM. If the CIS processed data is selected, the displayed course may be flown. The proper updating and shutdown procedures will be performed per the appropriate TM.

M b. Program the desired routes using the flight management system (FMS) and digital map.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1048

Perform fuel management procedures

> **WARNING**
>
> **Failure to monitor fuel balancing operations could result in engine flameout because of fuel starvation.**

CONDITIONS: In an H-60 helicopter with a (CPU)-26A/P computer or calculator.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Verify that the required amount of fuel is onboard at the time of takeoff.

   b. Initiate an alternate course of action if the actual fuel consumption varies from the planned value and the flight cannot be completed without the planned use of the required reserve.

   c. Balance/manage fuel tank levels to maintain aircraft within center of gravity (CG) limits.

2. Rated/nonrated.

   a. Initiate an in-flight fuel consumption check within 10 minutes of leveling off or within 10 minutes of entering into the mission profile.

   b. Within 15 to 30 minutes after taking the initial readings, compute the fuel consumption rate ±50 pounds per hour and complete the fuel consumption check.

   c. Monitor the remaining fuel quantity and the continuing rate of consumption.

DESCRIPTION:

1. Crew actions.

   a. The pilot not on the controls (P) or nonrated crewmember (NCM) will record the initial fuel figures, fuel flow computation, burnout, and reserve times. The P or NCM will announce when initiating the fuel check and when completing the fuel check. The P or NCM also will announce the results of the fuel check.

   b. The pilot on the controls (P*) will acknowledge the results of the fuel check.

   c. The pilot in command (PC) will confirm the results of the fuel check.

   d. If applicable, the P will announce when the fuel transfer switch or fuel selector lever(s) are repositioned and when the fuel transfer/balancing operation is completed.

   e. The NCM will acknowledge and monitor the fuel transfer/balancing operation until the operation is completed.

2. Procedures.

   a. When performing the before takeoff check, determine the total fuel onboard, and compare it with fuel required for the mission. If the fuel onboard is inadequate, add sufficient fuel or abort or revise the mission.

   b. Initial airborne fuel reading. Within 10 minutes after leveling off or within 10 minutes of entering into the mission profile, record the total fuel quantity and the time of reading.

Complete the fuel consumption check 15 to 30 minutes after taking the initial airborne fuel reading. Determine whether the remaining fuel is sufficient to complete the flight without the planned use of the required reserve.

Note. Crews should verify ability to transfer fuel from external to internal tanks before using external tank fuel quantities in fuel reserve/burnout computations.

Note . Do not perform fuel consumption checks while transferring fuel from external fuel tank(s) to internal fuel tanks.

c. Fuel quantity and consumption. Periodically monitor the fuel quantity and consumption rate. If the fuel quantity or flow indicates a deviation from computed values, repeat the fuel consumption check to determine if the amount of fuel is adequate to complete the flight. Periodically check individual fuel tank indicators to determine that the system is operating properly.

Note. If an emergency or urgent situation requires placing an ENG FUEL SYS selector to cross-feed (for example, fuel filter bypass caution light), recalculate burnout time and reserve entry time based on the usable fuel remaining.

d. Main fuel balance operations. Place the ENG FUEL SYS selector of the lowest fuel indicator to crossfeed (XFD). After the fuel quantities equalize, return the selector to direct (DIR).

e. Auxiliary fuel management. Follow procedures outlined in the appropriate aircraft operator’s manual when using the external extended range fuel system. When using nonstandard auxiliary fuel systems, use the appropriate manufacturer’s operator’s manuals.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references plus the manufacturer's operator’s manual.

TASK 1052

PERFORM VISUAL METEOROLOGICAL CONDITIONS FLIGHT MANEUVERS

CONDITIONS: In an H-60 helicopter given visual meteorological conditions (VMC) conditions.

STANDARDS: Appropriate common standards plus (rated only) enter, operate in, and depart a traffic pattern.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused primarily outside the aircraft. The P* will announce and clear each turn, climb, and descent.

   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist in clearing the aircraft and will provide adequate warning of traffic and obstacles. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures. Adjust cyclic as required to maintain the desired airspeed, course, ground track, or heading as appropriate. Adjust collective as required to maintain the desired climb/descent rate or altitude and maintain aircraft in trim with the pedals. Perform traffic pattern operations per air traffic control (ATC) directives, local standing operating procedure (SOP), and FM 3-04.203.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:
The P* will focus primarily outside the aircraft and should concentrate on obstacle avoidance and aircraft control. The P will make all internal cockpit checks.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1054

Select landing zone/pickup zone/holding area

> **WARNING**
>
> **Not all hazards will be shown on a map. When using a map reconnaissance to determine suitability, the added risk of unknown hazards must be addressed during the mission risk assessment process.**

CONDITIONS: In an H-60 helicopter given a map or photo data.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Perform map, photo, or visual reconnaissance.
2. Determine that the landing zone (LZ), pickup zone (PZ), or holding area is suitable for operations and provide accurate and detailed information to supported unit (if applicable).
3. Confirm suitability on initial approach.

DESCRIPTION:

1. Crew actions. The crew will confirm the location of plotted hazards and call out location of unplotted hazards.
   a. The pilot in command (PC) will confirm suitability of the area for the planned mission.
   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver for aircraft control and obstacle avoidance. The P* will announce his or her intent to deviate from the maneuver.
   c. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist in LZ reconnaissance and clearing the aircraft. They will provide adequate warning of obstacles and will acknowledge the P*'s intent to deviate from the maneuver.
2. Procedures. Gather map or photo data on potential LZ(s) or conduct an in-flight suitability check when map or photo data is unreliable. Determine the suitability by evaluating size, long axis, barriers, surface conditions, tactical situation, and effects of the wind. Select a flight path, altitude, and airspeed that afford the best observation of the landing area, as required. Determine an approach, desired touchdown point, and departure path. The tactical, technical, and meteorological elements must be considered in determining suitability.

Note. If wind conditions will be a factor, a wind evaluation should be performed. Techniques for evaluating wind conditions are found in FM 3-04.203.

Note. Depending on the mission, an in-flight suitability check may not be feasible. Suitability may be determined by a map reconnaissance. Make a final determination of suitability upon arrival to the landing zone/pickup zone (LZ/PZ).

a. Tactical.

(1) Mission. Determine whether the mission can be done from the selected LZ. Consider flight time, fuel, number of sorties, and access routes.

(2) Location. To reduce troop fatigue, consider distance of PZ or LZ from supported unit or objective. Also consider the supported unit's mission, equipment, and method of travel to/from PZ/LZ.

(3) Security. Consider size and proximity of threat elements versus availability of security forces. The supported unit normally provides security. Consider cover and concealment, key terrain, avenues of approach and departure. The area should be large enough to provide dispersion.

b. Technical.

(1) Number and type of aircraft. Determine if the size of the LZ can support all the aircraft at once or if they must rotate into LZ for in-flight linkup.

(2) Landing formation. Plan landing formation for shape and size of LZ.

(3) Sling loads. For missions requiring sling loads at or near maximum gross weight of the helicopter, select larger LZs where barriers have minimum vertical development.

(4) Surface conditions. Consider slopes; blowing sand, snow, or dust. Be aware that vegetation may conceal surface hazards (for example, large rocks, ruts, or stumps). Areas selected should also be free of sources of rotor wash signature.

(5) Obstacles. Hazards within the LZ that cannot be eliminated must be plotted. Plan approach and departure routes over lowest obstacles.

c. Meteorological.

(1) Ceiling and visibility. Ceiling and visibility are critical when operating near threat elements. Inadvertent instrument meteorological condition (IMC) recovery can expose the aircraft and crew to radar guided and heat-seeking weapons, with few options for detection and avoidance. If one aircrew of a multiship operation must respond to inadvertent IMC, the element of surprise will be lost, the assets onboard will not be available for the mission, and the entire mission may be at risk.

(2) Winds. Determine approach and departure paths.

(3) Pressure altitude (PA). High PA may limit loads and, therefore, require more sorties.

Note. Avoid planning approach or departure routes into a rising or setting sun or moon.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. Unimproved and unlit areas are more difficult to evaluate at night because of low contrast. Knowledge of the various methods for determining the height of obstacles is critical to successfully completing this task. Visual obstacles such as shadows should be treated the same as physical obstacles.

2. When performing operations during unaided night flight, ensure that the searchlight or landing light (white light) is in the desired position. Using the white light will impair night vision for several minutes. Therefore, exercise added caution if resuming flight before reaching full dark adaptation.

CONFINED AREA CONSIDERATIONS: Determine a suitable axis and path for a go-around. For multiaircraft operations, determine the number of aircraft that the area can accommodate safely.

SNOW/SAND/DUST CONSIDERATIONS: Evaluate surface conditions for the likelihood of encountering a whiteout/brownout. Determine a suitable axis and path for a go-around.

MOUNTAIN/PINNACLE/RIDGELINE CONSIDERATIONS: When practical, position the aircraft on the windward side of the area. Evaluate suitability—paying particular attention to PA and winds. Determine a suitable axis and escape route for a go-around. Operations at high altitudes are more likely to expose the crews to visual detection, radar, or heat-seeking weapons.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1058

PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH

CONDITIONS: In an H-60 helicopter given visual meteorological conditions (VMC) conditions.

STANDARDS: Appropriate common standards plus the following additions/modifications:

Rated.

1. Select a suitable landing area (analyze suitability, barriers, wind, approach path, touchdown point, and takeoff direction).
2. Ensure that sufficient power exists for the type of approach/landing desired.
3. Maintain a constant approach angle clear of obstacles to desired point of termination (hover) or touchdown (surface).
4. Maintain rate of closure appropriate for the conditions.
5. Maintain ground track alignment with the landing direction, as appropriate.
6. Align aircraft with landing direction below 50 feet above ground level (AGL) or as appropriate for transition from terrain flight.
7. Perform a smooth and controlled termination to a hover or touchdown to the surface.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft to provide obstacle clearance throughout the maneuver. The P* will announce when he begins the approach and whether the approach will terminate to a hover or to the surface. The P* also will announce the intended point of landing and any deviation to the approach, if required.

   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will confirm the suitability of the area, assist in clearing the aircraft, and provide adequate warning of traffic and obstacles. The P and NCM will acknowledge any deviation during the approach. The P and NCM will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures. Evaluate winds. Select an approach angle that allows obstacle clearance while descending to the desired point of termination. Once the termination point is sighted and the approach angle is intercepted (on base or final), adjust the collective as necessary to establish and maintain a constant angle. Maintain entry airspeed until the rate of closure appears to be increasing. Above 50 feet AGL, maintain ground track alignment and the aircraft in trim. Below 50 feet AGL, align the aircraft with the landing direction. Progressively decrease the rate of descent and rate of closure until reaching the termination point (hover or touchdown).

   a. To a hover. The approach to a hover may terminate with a full stop over the planned termination point, or continue movement to transition to hovering flight. Progressively decrease the rate of descent and rate of closure until an appropriate hover is established over the intended termination point.

   b. To the surface. Proceed as for an approach to a hover, except determine an approach angle that allows obstacle clearance while descending to the desired point of touchdown. (The decision to terminate to the surface with zero speed or with forward movement will depend on the aircraft's loading or environmental conditions.)

c. Touch down with minimum lateral movement. After surface contact, ensure that the aircraft remains stable until all movement stops. Smoothly lower the collective to the full down position and neutralize the pedals and cyclic. Apply brakes if required.

Note. If wind conditions may be a factor, a wind evaluation should be performed. Techniques for evaluating wind conditions are found in FM 3-04.203.

Note. Steep approaches can place the aircraft in potential settling with power conditions.

Note. Performing this maneuver in certain environments may require hover out of ground effect (OGE) power. Evaluate each situation for power required versus power available.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. Altitude, apparent ground speed, and rate of closure are difficult to estimate at night. The rate of descent during the final 100 feet should be slightly less than during the day to avoid abrupt attitude changes at low altitudes. After establishing the descent during unaided flights, airspeed may be reduced to approximately 50 knots until apparent ground speed and rate of closure appear to be increasing. Progressively decrease the rate of descent and forward speed until termination of maneuver.
2. Surrounding terrain or vegetation may decrease contrast and cause degraded depth perception during the approach. Before descending below obstacles, determine the need for artificial lighting.
3. Use proper scanning techniques to avoid spatial disorientation.
4. When performing operations during unaided night flight, ensure that the searchlight or landing light (white light) is in the desired position. Using the white light will impair night vision for several minutes. Therefore, exercise added caution when resuming flight before reaching full dark adaptation.

SNOW/SAND/DUST CONSIDERATIONS:

1. Termination to a point OGE. This approach requires OGE power and may be used for most snow landings and some sand/dust landings. Make the approach to a hover OGE over the intended landing location. Slowly lower the collective and allow the aircraft to descend. The rate of descent will be determined by the rate in which the snow/sand/dust is blown from the intended landing point. Remain above the snow/sand/dust cloud until it dissipates and visual references can be seen for touchdown. After ground contact, slowly lower the collective to the full down position and neutralize the flight controls.
2. Termination to the surface with forward speed. This termination may be made to an improved landing surface or suitable area with minimal ground references. Once the appropriate approach angle is intercepted, adjust the collective as necessary to establish and maintain the angle. As the apparent rate of closure appears to increase, progressively reduce the rate of descent and closure to arrive at the touchdown area slightly above effective translational lift. At this point, maintain the minimum rate of closure that ensures that the snow/sand/dust cloud remains behind the pilot's station. Apply slight aft cyclic just prior to touchdown to prevent burying the wheels or toes of the skis. When the wheels or heels of the skis contact the snow/ground, slowly lower the collective and allow the aircraft to settle. Lower the collective as necessary, neutralize the flight controls, and apply brakes as necessary to stop forward movement.
3. Termination to the surface with no forward speed. This termination should be made to landing areas where slopes, obstacles, or unfamiliar terrain precludes a landing with forward speed. It is not recommended when new or powder snow or fine dust is present because whiteout/brownout conditions will occur. The termination is made directly to a reference point on

the ground with no forward speed. The angle should be slightly steeper than a normal approach and the approach speed faster than a normal approach. After ground contact, slowly lower the collective to the full down position, neutralize the flight controls, and apply brakes as necessary to ensure no forward movement.

Note. When landing in deep snow, the aircraft wheels/skis may settle at different rates and the aircraft will normally terminate in a tail low attitude.

Note. During sand/dust landings, all doors and windows should be closed and vent blowers turned off.

Note. Hovering OGE reduces available ground references and may increase the possibility of spatial disorientation. Be prepared to transition to instruments and execute an instrument takeoff if ground reference is lost.

Note. At night, using the landing, search, or anticollision light may cause spatial disorientation while in blowing snow/sand/dust.

CONFINED AREA CONSIDERATIONS: An approach to the forward one-third of the useable landing area will reduce the approach angle and minimize power requirements. Before beginning the approach, the crew will determine and brief an escape route in case a go-around is necessary. During the approach, continue to determine the suitability of the area and the possible need for a go-around. If possible, make the decision to go-around before descending below the barriers or going below effective translational lift (ETL). After touchdown, check aircraft stability as the collective is lowered.

MOUNTAIN/PINNACLE/RIDGELINE CONSIDERATIONS: Select a shallow to steep approach angle, depending on the wind, density altitude, gross weight, and obstacles. Before beginning the approach, the crew will determine and brief an escape route in case a go-around is necessary. During the approach, continue to determine the suitability of the intended landing point. The rate of closure may be difficult to determine until the aircraft is close to the landing area. Reduce airspeed to slightly above ETL until the rate of closure can be determined. Before reaching the near edge of the landing area, the descent should be stopped and the rate of closure slowed. At this point, decide whether to continue the approach or make a go-around. If a go-around is required, it should be performed before decelerating below ETL. If the approach is continued, terminate in the landing area to a hover or to the surface. After touching down, check aircraft stability as the collective is lowered.

Note. To successfully operate into small areas, the P* may have to place the nose of the aircraft over the edge of the landing area. This may cause a loss of important visual references when on the final approach. All crewmembers must assist in providing information on aircraft position in the landing area.

MUD/MUSKEG/TUNDRA CONSIDERATIONS: Select a suitable area and terminate the approach to a 10-foot hover over the intended touchdown point. Begin a vertical descent until the aircraft touches down. Check aircraft stability while lowering the collective. If the area is suitable, lower the collective to the full down position and neutralize the cyclic and pedals.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. The evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1062

PERFORM SLOPE OPERATIONS

CONDITIONS: In an H-60 helicopter with aircraft cleared and given a slope area.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Select a suitable landing area.
   b. Set the parking brake before landing.
   c. Perform a smooth and controlled descent and touchdown.
   d. Maintain heading ±5 degrees.
   e. Do not allow aircraft to drift ±3 feet until touchdown. Then no drift allowed.
   f. Perform a smooth and controlled ascent from the surface.
2. Nonrated.
   a. Confirm suitable landing area.
   b. Confirm parking brake set before landing.
   c. Announce drift and altitude.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will announce his intent to perform a slope operation and establish the helicopter over the slope. The P* will ensure the brakes are set and. will announce his or her intended landing area and any deviation from the intended maneuver. P* should be aware of the common tendency to become tense and, as a result, to over control the aircraft while performing the slope operation. The P* will note the aircraft attitude at a hover, prior to starting descent to land on the slope.

   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will provide adequate warning of obstacles, unannounced drift, or altitude changes. The P will assist in setting the parking brakes and verify when they are set. The P will note the aircraft attitude on the vertical situation indicator (VSI), and notify the P* prior to exceeding aircraft slope limitations. The P and NCM will confirm the suitability of the intended landing area and announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures.

   a. Landing. Select a suitable area for slope operations. If possible, orient the aircraft into the wind. Set the parking brakes. Announce the initiation of the slope landing. Smoothly lower the collective until the tail or main landing gear contacts the ground. Adjust the cyclic to maintain the aircraft in a level attitude while maintaining heading with the pedals. Continue lowering the collective and simultaneously apply cyclic into the slope to maintain the position of the up slope wheel until the landing gear is firmly on the ground. Coordinate the collective and cyclic to control the rate of attitude change when lowering the down slope gear to the slope. With the down slope gear on the ground, simultaneously lower the collective full down and neutralize the cyclic. If cyclic or aircraft slope limits are reached before the aircraft is firmly on the ground, return the aircraft to a hover. Select a new area where the slope is less steep and attempt another slope landing.

b. Takeoff. Before takeoff, announce initiation of an ascent. Smoothly increase the collective and apply the cyclic into the slope to maintain the position of the up slope wheel. Continue to increase the collective to raise the down slope wheel(s), maintain heading with the pedals, and simultaneously adjust the cyclic to attain a hover attitude. As the aircraft leaves the ground, adjust the cyclic to accomplish a vertical ascent to a hover with minimum drift.

Note. Before performing slope operations, the crew must understand dynamic roll over and droop stop pounding characteristics.

Note. When the tail wheel is locked and on the ground, overcontrolling the pedals may result in roll oscillations caused by the thrust of the tail rotor.

Note. Crewmembers must be aware of the helicopter's normal hovering attitude before putting a wheel on the ground.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. When conducting slope operations, determine the need for artificial illumination before starting the maneuver. Select reference points to determine slope angles. (References probably will be limited and difficult to ascertain.) If, at any time, successful completion of the landing is doubtful, abort the maneuver.
2. When performing operations during unaided night flight, ensure that the searchlight or landing light (white light) is in the desired position. Using the white light will impair night vision for several minutes. Therefore, exercise added caution if resuming flight before reaching fully dark adaptation.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1064

PERFORM A ROLL-ON LANDING

CONDITIONS: In an H-60 helicopter given a suitable landing area.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Select a suitable landing area.
2. Maintain a constant approach angle clear of obstacles to desired point of touchdown.
3. Maintain ground track alignment with the landing direction, as appropriate.
4. Perform a smooth, controlled touchdown and termination, appropriate for the conditions, below 60 knots ground speed aligned with the landing direction ±5 degrees.
5. Ensure speed at touchdown is no slower than that appropriate for the conditions.

DESCRIPTION:

1. Crew actions.
   a. The pilot on the controls (P*) will announce his intent to perform a roll-on landing, when beginning the approach, the intended point of landing, and any deviation from the approach.
   b. The P will verify that the brakes are released before starting the approach. The P and NCM will confirm the suitability of the landing area and will provide adequate warning of hazards or obstacles. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.
2. Procedures: When the desired approach angle is intercepted, adjust the collective as necessary to maintain a constant angle of approach and adjust the cyclic for an attitude that will result in an optimum airspeed for the conditions. Before touchdown, align the aircraft with the landing direction. Before tail wheel touchdown, increase the collective as necessary to make a smooth touchdown below 60 knots ground speed. After tail wheel contact, use collective to smoothly lower the landing gear to the surface. If desired, use aerodynamic braking while maintaining the main landing gear off the ground to assist in stopping the roll out. Allow the aircraft to descend to the surface by adjusting the collective as necessary and centering the cyclic to allow a smooth touchdown. After the main landing gear is on the surface, center the cyclic to avoid droop stop pounding, then lower the collective, and apply the brakes as necessary.

Note. When it is necessary to perform a roll-on landing because of a single engine failure, the P* should not decelerate the aircraft below minimum single engine indicated airspeed (IAS) until the aircraft is at a point from which obstacles in the flight path will be cleared and a safe landing can be assured.

DROOP STOP POUNDING (DSP)/AERODYNAMIC BRAKING:

1. DSP is a phenomenon that can occur when there is excessive downward blade travel causing the blades to strike the droop stops when they are in the fly position. The conditions, which combine to induce this type DSP, include excessive aft cyclic, low collective, and all wheels on the ground. The maneuver that is most likely to produce DSP is the roll-on landing in conjunction with aerodynamic braking; however, DSP can also occur during taxi and down slope landings. Aerodynamic braking is a procedure that uses the aerodynamic forces of the rotor system to slow or stop the aircraft. Once the tail wheel is on the ground, using the aft cyclic in conjunction with an increase in collective will slow or stop the aircraft.
2. Aerodynamic braking is permissible while the tail wheel is on the ground before main gear contact. Once the main wheels contact the ground, the cyclic must be centered, collective lowered (center cyclic before lowering the collective), and brakes applied (only when collective is full down as required). If a pilot attempts to slow the aircraft after main wheel contact by using aft cyclic as he lowers the collective, the pilot will hear an audible 4/Rev knocking. This is the first indication of DSP. With more rear cyclic applied, DSP will become heavy (you may also feel the pounding in the airframe) and main rotor blade contact with the ALQ-144 and tail rotor drive shaft may result.

Note. This maneuver may be performed in an environment where obscurants (for example, sand, dust, or snow) are present.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Altitude, apparent ground speed, and rate of closure are difficult to estimate at night. The rate of descent at night during the final 100 feet should be slightly slower than during the day to avoid abrupt attitude changes at low altitudes.

ROUGH/UNPREPARED SURFACE CONSIDERATIONS: Closely monitor touchdown speed when landing to a rough or unprepared surface. Consistent with the situation and aircraft capabilities, a more pronounced deceleration before touchdown coupled with more effective aerodynamic braking after tail wheel touchdown may be appropriate. Note that the wheel brakes may be less effective. If the surface is soft, exercise care when lowering the collective until the aircraft comes to a complete stop.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. The evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1068

PERFORM GO-AROUND

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Determine when a go-around is required.
2. Immediately apply appropriate power to initiate go-around.
3. Immediately adjust to appropriate climb airspeed for conditions.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will announce his or her intent to perform a go-around and will remain primarily focused outside to avoid obstacles.

   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist in clearing the aircraft and provide adequate warning of obstacles. The P will also monitor systems instruments to ensure aircraft limits are not exceeded.

2. Procedures.

   a. When it becomes doubtful that a safe landing can be done, announce "go-around." Immediately apply power (if available) and simultaneously adjust pitch attitude to stop the descent and clear any obstacles. Maintain aircraft in trim and adjust to the appropriate climb speed for conditions. Maintain the appropriate ground track.

M b. The pilot on the controls (P*) may engage the GO ARND mode by pressing the go-around button (GO ARND) button on the cyclic grip or engage the GO ARND mode by pressing the GO ARND button on the respective flight director/display control panel (FD/DCP).

Note. The decision to go-around may be made at any time but in limited power situations should be determined before descending below the barriers or decelerating below effective transitional lift (ETL).

CAUTION

M Selecting the coupled GO ARND mode during limited power conditions or operating at high gross weight may exceed aircraft limitations.

SNOW/SAND/DUST CONSIDERATIONS: If during the go-around, visual references are lost, initiate an instrument takeoff (ITO) immediately.

MOUNTAINOUS AREA CONSIDERATIONS: Perform one of the following:

1. Where escape routes exist, turn the aircraft away from the terrain, apply forward cyclic and lower the collective, if possible. Accelerate the aircraft to an appropriate airspeed for conditions and complete the go-around.

2. Where escape routes do not exist, adjust aircraft for maximum rate of climb to ensure obstacle clearance. Upon clearing obstacles, accelerate aircraft to an appropriate airspeed for conditions and complete the go-around.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1070

RESPOND TO EMERGENCIES

CONDITION: In an H-60 helicopter, given a specific emergency condition or the indications of a specific malfunction, and given a suitable landing area.

Note. For standardization and readiness level (RL) progression evaluations, the following emergency procedures will be evaluated:

- Single engine failure (at altitude and at a hover)
- Decreasing RPM R to include performing electronic control unit (ECU)/digital electronic control unit (DECU) lockout in flight

A/L Degraded AFCS with stability augmentation system (SAS) 1, SAS 2, TRIM, FPS, and BOOST switches off.

M Degraded AFCS with TRIM, FPS, and SAS/BOOST switches off.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Identify the malfunction, determine the appropriate emergency procedure, and perform or describe the appropriate immediate action procedures outlined in the appropriate aircraft operator's manual/checklist (CL).

   b. Select a suitable landing area.

   c. For AFCS OFF, when a hover is required, maintain altitude ±5 feet and heading ±20 degrees.

2. Nonrated.

   a. Prepare the aircraft, crew, and passengers for an emergency landing. Ensure passenger seat belts are on and crew shoulder harnesses are locked.

   b. Look for a suitable landing area and alert the crew to the landing area's location.

   c. Assist in evacuating passengers to designated assembly area according to the crew briefing.

DESCRIPTION:

1. Crew actions. Any crewmember detecting an emergency will immediately announce the emergency to the other crewmembers. If time permits, lock shoulder harnesses, make a mayday call, and tune transponder to emergency, as appropriate.

   a. The pilot on the controls (P*) will perform the underlined and non-underlined steps as appropriate depending on the environmental or aircraft conditions for the pilot on the controls (that is, non-circled items) as per the appropriate aircraft operator's manual/CL and initiate the appropriate type of landing. During visual meteorological conditions (VMC), the P* will focus primarily outside the aircraft to maintain aircraft control and to provide adequate clearance from traffic or obstacles. During instrument meteorological condition (IMC), the P* will remain focused inside the aircraft on the flight instruments to maintain aircraft control.

   b. The pilot not on the controls (P) will perform as directed or briefed. The P will perform the underlined and non-underlined steps for the pilot not on the controls (that is, circled items) as per the appropriate aircraft operator's manual/CL. If time permits, the P will verify all emergency checks with the appropriate aircraft operator's manual/CL. The P will request appropriate emergency assistance as described in the Flight Information Handbook.

c. The nonrated crewmember (NCM) will prepare the passengers for an emergency landing. During the descent the NCM will look for a suitable landing area, alert the crew to the landing area's location and assist in clearing the aircraft. After landing, the NCM will assist in evacuating the passengers to the designated assembly area. If normal exits cannot be used, the NCM will use the nearest emergency exit to expedite the evacuation. The NCM will keep communications to a minimum to allow the P* or P to attempt communications outside the aircraft. After accounting for all crewmembers and passengers, the NCM will assist the other crewmembers in any follow-on action (fire fighting, first aid, emergency signaling, or survival equipment).

2. Procedures. Analyze the information given (for example, aircraft response, caution/advisory lights, engine instrument caution advisory system [EICAS] and power pod indications as required). Determine the malfunction and select the appropriate emergency procedure. Perform the emergency procedure per the appropriate aircraft operator's manual/CL.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Take special precautions to identify the correct switches/levers when performing emergency procedures at night or while wearing night vision goggles (NVGs).

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft, simulator, or academically.
2. Evaluation. Evaluation will be conducted in the aircraft unless flight activity category (FAC) 3 or instrument annual proficiency and readiness test (APART) is allowed in the simulator.

REFERENCES: Appropriate common references.

TASK 1082
PERFORM AUTOROTATION

CONDITIONS: In an H-60 helicopter and given an emergency procedure requiring autorotation.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Identify the malfunction, determine the appropriate emergency procedure, and perform or describe the appropriate procedures outlined in the aircraft operator's manual/checklist (CL).
2. Select a suitable landing area.
3. Adjust airspeed appropriate to ensure landing area.
4. Perform a deceleration and termination as directed by the instructor pilot (IP) or as appropriate for the type of emergency per the appropriate aircraft operator's manual.

DESCRIPTION:

> **WARNING**
>
> **The deceleration altitude during an autorotation should be determined using outside visual references and cockpit indications, as necessary. Pilots should avoid focusing on the radar altimeter during critical phases of the maneuver.**

1. Crew actions.

   a. The pilot on the controls (P*) will enter the autorotation and remain focused primarily outside the aircraft throughout the maneuver and will announce "autorotation." The P* will monitor revolutions per minute rotor (RPM R), trim, airspeed, and announce the intended point of termination. The P* will acknowledge any announced warnings, recommendations, or control input made by the pilot not on the controls (P).

   b. The P will monitor RPM R, aircraft trim, and airspeed and provide adequate warning for corrective actions. If time permits, lock shoulder harnesses, place transponder to emergency; and make a mayday call. If the P must make a control input to prevent exceeding any limitations, the P will announce his or her actions to the P*. The P will cross monitor and back up the performance of the emergency procedures and flight control inputs, and confirm actions per the checklist, time permitting.

   c. The P and nonrated crewmember (NCM) will confirm the suitability of the landing area, assist in clearing the aircraft, and provide adequate warning of obstacles.

   d. The NCM will prepare the passengers for an emergency landing. During the descent the NCM will keep communications to a minimum to allow the P* or P to attempt communications outside the aircraft.

2. Procedures.

   a. Recognize the emergency and enter autorotation or during training select the correct entry point. An autorotation may be done either "straight in" or "with turn." When executing an autorotation with turn, aircrews must be aware of the tendency for RPM R to increase.

Smoothly lower the collective (at a moderate rate) to the full down position. Apply pedal as required to maintain the aircraft in trim. Adjust the cyclic to assume airspeed appropriate for the conditions, and initiate a turn, if necessary.

Note. When turning to the right, an increase in RPM R will develop rapidly in relation to the rate of cyclic application. The RPM R increase can be quite rapid with a corresponding rapid right turn. The increase in RPM R will even be further aggravated with heavy gross weight aircraft, and high density altitude. Adjust the collective as necessary to prevent rotor overspeed.

Note. When executing an autorotation with turn to the left, a slight to moderate increase in RPM R will normally occur. However, when right lateral cyclic is rapidly applied from a left turn condition into a right turn condition, an even greater increase in RPM R will be evident. The increase in RPM R will even be further aggravated with heavy gross weight aircraft and high density altitude. Adjust the collective as necessary to prevent rotor overspeed. An autorotation may be done "straight in" or "with turn."

b. During the descent, the P* and P will monitor and maintain RPM R within limits to prevent an overspeed or underspeed condition, and the P* will adjust the collective as necessary to establish and maintain a steady state autorotation. The P will call out RPM R, airspeed, and aircraft in trim. (Steady state autorotation is defined as RPM R within limits; airspeed is not below 80 knots indicated airspeed [KIAS]; torque, trim, and aircraft in position to land at the desired touchdown point.)

Note: During training if steady state autorotation is not attained by 300 feet AGL, the IP will command a "power recovery", terminate the maneuver and execute a go-around as required.

c. Between 50 and 75 feet above ground level (AGL), the aircraft must be in a decelerative attitude. The P* will adjust the cyclic for a smooth, progressive deceleration based on the size and surface of the landing area. Maintain ground track and apply pedal to align the aircraft with the direction of touchdown.

WARNING

Reaction time must be factored into the deceleration altitude and will vary with the proficiency of the pilot on the controls. The P will cross monitor the P* and ensure the control inputs are made as required.

d. Terminate the autorotation by one of the three following methods. (During training the instructor pilot [IP] will announce which is to be used.)

Note. During training when applying the collective for power recovery (to include go-around) or termination with power, be aware of the tendency for initial RPM R decay. The IP will ensure the main rotor RMPR is maintained within limits and sufficient power is available to complete the required maneuver.

(1) Power recovery. Upon receiving the command "power recovery," the P* will apply the collective as necessary to arrest the rate of descent while simultaneously maintaining trim with the pedals. The P* continues to apply sufficient collective to arrest the rate of descent and establish a normal climb.

(2) Terminate with power. Upon receiving the command "terminate with power," the P* will adjust the collective to arrest the descent at an altitude that will ensure that the tail wheel will not contact the ground. (Conditions permitting; ground speed at the termination of the maneuver should be the same as for touchdown.)

Note. For training ensure aircraft attitude is adjusted for landing as much as possible during the termination portion of the maneuver. If possible, avoid excessive nose high landing attitudes that would cause the stabilator to contact the ground and land in a excessive nose high attitude had an actual touchdown occurred.

(3) Touchdown autorotations may only be conducted in an emergency or in the simulator. During touchdown autorotations, the P* will adjust the cyclic and collective to smoothly cushion the main gear onto the landing surface. After the main wheels are on the ground, the P* smoothly lowers the collective to full down, neutralizes the cyclic, and maintains heading and ground track with the pedals. The P* will use the brakes as necessary to stop roll out.

Note. When conducting autorotation training/evaluation in the aircraft (power levers at fly), the P* should limit the torque to below 10 percent to ensure that an autorotational descent (not a steep approach) is occurring. Torque spikes as a result of collective application to arrest RPM R are acceptable as long as the collective is reduced below 10-percent dual engine torque. The intent of the torque limit is to ensure the rotor is decoupled from the engines and autorotational descent is established.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Suitable landing areas will be much more difficult to locate at night. Hazards will be difficult to detect in the landing area. Use the landing light/searchlight as appropriate.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1114

PERFORM A ROLLING TAKEOFF

WARNING

If the takeoff is aborted, it may be impossible to stop the aircraft before clearing the barriers (depending on aircraft weight, speed, surface composition, and size of the takeoff area). Some situations requiring this maneuver will usually result in very marginal single-engine characteristics. This increased risk factor will be addressed during the mission risk assessment process.

CAUTION

Do not exceed power or aircraft component limitations when actual in ground effect (IGE) hover power is not available.

CONDITIONS: In an H-60 helicopter with the aircraft cleared and from a suitable takeoff area.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Before liftoff—
   a. Establish and maintain power, as necessary.
   b. Maintain alignment with takeoff direction ±5 degrees.
   c. Accelerate to desired/planned takeoff speed not to exceed 60 knots ground speed.
2. After liftoff—
   a. Adjust power, as required, not to exceed aircraft limits.
   b. Maintain ground track alignment with the takeoff direction with minimum drift.
   c. Maintain maximum rate of climb airspeed ±5 knots indicated airspeed (KIAS).
   d. Maintain aircraft aligned with runway (or suitable liftoff surface) below maximum rate of climb airspeed.
   e. Maintain aircraft in trim above maximum rate of climb airspeed.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will confirm the aircraft gross weight (GWT), aircraft power available and that area is suitable for the maneuver. Considerations should include wind effects on takeoff direction, barriers/obstacles and density altitude.

   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft during the maneuver. The P* will announce when he initiates the maneuver and his or her intent to abort or alter the takeoff.

c. The pilot not on the controls (P) and nonrated crewmember (NCM) will announce when ready for takeoff and will remain focused primarily outside the aircraft to assist in clearing and to provide adequate warning of obstacles. The P and NCM will announce when their attention is focused inside the aircraft and again when attention is reestablished outside. The P will monitor power requirements, ground speed, and advise the P* when power limits are being approached.

Note. When conducting operations with jettisonable external stores, the P will be prepared to jettison the stores when operating below minimum single-engine airspeed or as briefed during the crew briefing.

d. The NCM will assist in clearing the aircraft, advise the P* when the tail and main landing gear are off the ground, and obstacle avoidance.

2. Procedures.

Note. A rolling takeoff may be used when hover power for takeoff is marginal or insufficient and a takeoff must be made, or as an alternate method of takeoff when sufficient power is available (dissipate dust, reduce rotor downwash). Use the rotor system thrust to accelerate the aircraft to a more efficient speed for flight.

Note. For training, use 10 percent torque below the aircraft 10-foot hover torque to simulate the maximum torque available.

Note. To determine maximum torque available when in ground effect (IGE) hover power is not present, apply collective, not to exceed dual engine torque and turbine gas temperature (TGT) limits, while observing the TGT. Maximum torque available will be indicated by a droop in rotor RPM with further increase in the collective. Note the torque and reduce the collective. Fluctuation in torque from flight control inputs and environmental conditions should be factored in to the torque value used for the maneuver.

a. Verify that the takeoff surface is suitable for the maneuver to include abort stopping distance and select ground reference points.

b. With appropriate crew actions completed, select ground reference points for longitudinal alignment with the desired takeoff direction. Maintain aircraft position with neutral cyclic and increase the collective to establish the aircraft “light on the wheels.” The amount of percentage torque will depend on gross weight. Begin accelerating the aircraft forward by smoothly applying forward cyclic while progressively increasing the collective to a power setting that will ensure that the main landing gear wheels remain in contact with the surface until takeoff airspeed is achieved. Use the pedals to maintain heading aligned with the desired takeoff direction. The tailwheel may come off the surface as the stabilator begins to produce lift with forward airspeed.

c. Upon reaching takeoff airspeed, adjust the collective to maximum torque available or as planned/briefed and cyclic as necessary to allow the aircraft to become airborne. Depending on liftoff speed the stabilator may cause a slight nose down attitude. At approximately 20 feet above the surface, apply forward cyclic to maintain an in-ground-effect level acceleration to the maximum rate-of-climb airspeed. Place the aircraft in trim as soon as maximum rate of climb airspeed is achieved after the aircraft becomes airborne commensurate with surface obstacles. Trade off altitude as necessary to gain airspeed if the area is clear of obstacles. Maintain heading with pedals so the aircraft is aligned with the runway/surface takeoff direction when the aircraft is below maximum rate-of-climb airspeed should the takeoff need to be aborted

d. Upon reaching maximum rate-of-climb airspeed, adjust the attitude to maintain the maximum rate-of-climb airspeed and maintain power as necessary until reaching the desired level-off altitude.

e. The P (pilot not on the controls) will monitor torque and TGT values for the P* (pilot on the controls), and power is available and applied as planned/briefed.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. If sufficient illumination or night vision device (NVD) resolution exists to view obstacles, accomplish the takeoff in the same way as a rolling takeoff during the day. Visual obstacles such as shadows should be treated as physical obstacles. If sufficient illumination or NVD resolution does not exist, a rolling takeoff should not be performed.
2. Reduced visual references during the takeoff and throughout the ascent at night may make it difficult to maintain the desired ground track. Knowledge of the surface wind direction and velocity will assist in establishing the crab angle required to maintain the desired ground track.
3. The landing light or searchlight is recommended at night to view obstacles and maintain awareness of the rotor tip path plane. Ensure ground clearance with the searchlight or landing light as the helicopter lifts off the ground.

SNOW/SAND/DUST CONSIDERATIONS: This task may be used in environments where these conditions are present. It may allow the aircraft to get ahead of the blowing conditions into clear air before takeoff. This maneuver should be aborted if visual cues become lost when power is applied. Extreme care should be taken to confirm that the snow, sand, or dust conditions do not cover rough areas in the takeoff path that could damage the aircraft.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1142

Perform digital communications

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Configure the appropriate tactical internet system for desired operation.
2. Transmit, receive, review, and delete messages and mission information as required.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is primarily responsible for obstacle avoidance and clearing the aircraft.

   b. The pilot not on the controls (P) or other crewmembers will operate the system and announce when focused inside.

2. Procedures. Operate system (JVMF, EDM, and BFT) in accordance with the appropriate technical manual and configure in accordance with unit standing operating procedures (SOP).

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references plus the following:
TM 1-1680-377-13&P
TM 11-7010-326-10

TASK 1155

Negotiate wire obstacles

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Locate and estimate the height of wires.
2. Determine the best method to negotiate the wire obstacle.
3. Safely negotiate the wire obstacle, minimizing the time unmasked.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused primarily outside the aircraft and will announce visual contact with wires and supporting structures.

   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will announce visual contact with wires and supporting structures. They will also provide adequate warning to avoid hazards, wires, poles, or supporting structures. They will announce when the aircraft is clear and when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures.

   a. Announce when wires are seen. Confirm the location of wire obstacles with other crewmembers. Announce the method of negotiating the wires and when the maneuver is initiated.

   b. Locate guy wires and supporting poles. Estimate the amount of available clearance between the wires and the ground to determine the method of crossing.

   c. Overflight. Before crossing the wires, identify the highest wire. Cross near a pole to aid in visual perception and minimize the time that the aircraft is unmasked.

   d. Underflight/ground taxi. When flying under wires, ensure a minimum ground-to-wire clearance of hover height plus 30 feet. Ground speed should be no greater than that of a brisk walk. Ensure lateral clearance from guy wires and poles. If terrain is suitable, consider ground taxiing under the wires.

Note. The crew must maintain proper scanning techniques to ensure obstacle avoidance and aircraft clearance.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Wires are difficult to detect at night and with night vision goggles (NVGs). Flying under wires should not be performed at night or while using NVGs, unless the location has been checked during daylight conditions and all hazards have been identified.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1162

Perform emergency egress

> **WARNING**
>
> **Removing an injured crewmember or passenger may increase the severity of the injuries. Analyze the risk of additional injury versus the risk of leaving the crewmember or passenger in the aircraft until assistance arrives.**

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Perform or describe using emergency exits on the aircraft per the appropriate aircraft operator's manual.
2. Perform or describe the emergency egress of a pilot, nonrated crewmember (NCM), or passenger from his seat.
3. Perform or describe the emergency engine shutdown of the aircraft per the appropriate aircraft operator's manual.
4 Assist in marshaling passengers to designated assembly area.
5. Perform or describe duties as briefed in the crew mission briefing.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will direct an emergency egress. The PC will determine if the egress will be done before the rotor blades have stopped. (If the PC is incapacitated, the next ranking rated crewmember/nonrated crewmember [RCM/NCM] will perform this function.) The PC will also determine and announce if an emergency engine shutdown will be performed.

   b. The pilot on the controls (P*) and pilot not on the controls (P) will egress their respective positions and assist with passenger egress.

   c. The NCM will direct passenger egress.

   d. All crewmembers will perform duties as briefed during the crew briefing and assist with the egress of incapacitated crewmembers and passengers, if required.

2. Procedures.

   a. If an emergency egress occurs, use the cabin/cockpit doors. If they are jammed, use the emergency release. If the emergency release does not work, break out the Plexiglas windows with the crash axe, boot, or other suitable object. Once out, guide yourself and passengers to clear the aircraft in a safe direction and meet at the assembly point. Account for all personnel.

   b. Perform the emergency egress of a pilot from his seat per the appropriate aircraft operator's manual. The instructions may also be found on the back of the seat.

   c. Perform emergency engine shutdown procedures per the appropriate aircraft operator's manual.

OVERWATER CONSIDERATIONS: If egress must be made from an aircraft that has gone into the water, do not exit until rotor blades have stopped. Secure a handhold within the cockpit to maintain orientation, employ underwater breathing device (if equipped), and wait for cockpit and cabin area to fill with water. Once aircraft is full of water, use the cargo/cockpit doors. If they are jammed, use the emergency release. If the emergency release does not work, break out the windows with the crash axe, boot, or other suitable object, and swim clear of the aircraft. Do not activate life preserver until clear of aircraft and on surface.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft or academically.
2. Evaluation. Evaluation will be conducted in the aircraft or academically.

REFERENCES: Appropriate common references.

TASK 1166

Perform instrument maneuvers

CONDITIONS: In an H-60 helicopter in instrument meteorological condition (IMC) or simulated IMC and given appropriate navigational publications.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Tune and identify appropriate navigational aids (NAVAIDs).
2. Determine, intercept, and maintain the desired course ± 5 degrees.
3. Maintain the desired heading ± 5 degrees.
4. Maintain the desired distance measuring equipment (DME) arc ± 1 nautical mile.
5. Identify station passage.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused inside the aircraft and will monitor radios and air traffic control (ATC) information. The P* will acknowledge all directives given by ATC or the pilot not on the controls (P). The P* will announce airspeed, heading, and altitude changes and any deviation not directed by ATC or the P.

   b. The P will select and announce radio frequencies. The P also will monitor radios and ATC information not monitored by the P*. The P will confirm airspeed, heading, and altitude changes.

   c. During visual meteorological conditions (VMC) or simulated IMC, the P and nonrated crewmember (NCM) will focus primarily outside the aircraft to provide adequate warning of traffic or obstacles. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures. Adjust cyclic as required to maintain the desired airspeed and heading. Adjust collective as required to maintain the desired climb/descent rate or altitude and maintain aircraft in trim with the pedals. Perform instrument procedures per AR 95-1, FM 3-04.240, aeronautical information manual (AIM), FAA Instrument Flying Handbook, FAA Instrument Procedures Handbook and Department of Defense flight information publication (DOD FLIP).

   a. When expecting to use the automatic direction finder (ADF), ensure that the ADF will receive on the desired band and the number 2 bearing pointer points at the selected station.

   b. When expecting to use the VHF omnidirectional range radio beacon (VOR)/instrument landing system (ILS) receiver, ensure that the VOR is operational and the vertical situation indicator (VSI) and horizontal situation indicator (HSI) give the proper indications per the appropriate aircraft operator's manual.

   c. Before using a selected NAVAID for navigation, tune and identify the NAVAID. After identifying the desired station and the position of the aircraft in relation to the desired course, turn to an appropriate intercept heading. Maintain the intercept heading until approaching an on-course indication. Depending on the rate of closure, start a turn to intercept the desired course.

   d. Maintain heading to track the desired course. If the navigational instruments show an off-course condition, turn as necessary toward the course to reintercept. If navigational instruments do not indicate movement toward the course within a reasonable time, increase the intercept angle. When reintercepting the course, turn toward the course and apply the appropriate drift correction (normally one-half of the intercept angle). Continue to bracket the course by decreasing corrections until obtaining a heading that will maintain the aircraft on course. Determine arrival at radio intersections per procedures in FM 3-04.240, FAA Instrument Flying Handbook, FAA Instrument Procedures Handbook or AIM.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1167

PERFORM FLIGHT MANEUVERS USING STANDBY FLIGHT INSTRUMENT SYSTEM (H-60M)

CONDITION: In an H-60M helicopter without reference to the primary flight display (PFD), and given appropriate navigation publications.

STANDARDS: Appropriate common standards plus maneuver the aircraft to establish and maintain the desired altitude, heading, and airspeed as appropriate.

DESCRIPTION:

Crew actions.

1. The pilot on the controls (P*) maintains pitch, roll, and yaw attitudes utilizing cues provided by the standby flight instrument system.
2. The P* will maneuver the aircraft to maintain appropriate airspeed, altitude, and heading.
3. The P and other crewmembers will provide traffic advisories and obstacle clearance.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1168

Perform command instrument system procedures (A/L)

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Configure the horizontal situation indicator/vertical situation indicator (HSI/VSI) mode select panels and command instrument system (CIS) to obtain the desired navigational data and commands.
2. Follow the cyclic roll, cyclic pitch, and collective position indicator commands, as appropriate.

DESCRIPTION: Configure the CIS MODE SEL panel and, if required, the HSI/VSI MODE SEL panel, as required per the appropriate aircraft operator's manual.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1169

Perform flight director operations (H-60M)

CONDITION: In an H-60M helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Operate the flight director per the aircraft operator's manual.
2. Program the flight management system (FMS) for the desired flight plan.
3. Select the desired display on the multifunction display (MFD).
4. Select the appropriate modes on the flight director/display control panel (FD/DCP).
5. Follow cyclic roll, cyclic pitch and collective position indicator cues as appropriate.

Note. The pilot on the controls (P*) will monitor the primary flight display (PFD) for correct aircraft responses if coupled flight is selected.

DESCRIPTION:

1. Crew Actions. The flight director is primarily the pilot on the controls (P*) responsibility.

The pilot not on the controls (P) will adjust the FD/DCP reference(s) when requested by the P* and call out the action. P will monitor the flight instruments and the FD/DCP selected mode annunciator lights and will immediately advise the P* of any abnormal indications or changes in selected modes.

2. Procedures. The P* will perform the following procedures:

   a. Perform coupled flight maneuvers (climbs, descents, and turns), by selecting the appropriate flight director modes and references.

   b. Perform uncoupled flight maneuvers (climb, descents, and turns) by following flight director cues as depicted on the PFD.

Note. The H-60M Flight Director set will only use one aircraft reference for each individual mode that is selected. Changing a mode reference on the uncoupled FD/DCP will change the active/selected mode reference on the coupled FD/DCP, causing the aircraft to fly to the new reference. The P will only change reference settings on the uncoupled FD/DCP only after coordination with the P*.

Note. The P* will maintain control of the coupled flight director. The P* may request the P to make specific adjustments to the aircraft references from the P's uncoupled FD/DCP.

Note. While in coupled flight, the transfer of the flight controls from the P* to the P is a three step process. First, the P will select all relevant modes and references on his FD/DCP so that the uncoupled FD/DCP duplicates the coupled FD/DCP. Second, the P* will relinquish the flight controls to the P. Third, the P will couple his FD/DCP to flight path stabilization (FPS).

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1170

Perform instrument takeoff

CONDITIONS: In an H-60 helicopter in instrument meteorological condition (IMC) or simulated IMC and aircraft cleared.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Adjust vertical situation indicator (VSI).
2. Maintain power as required (+5 percent, -0 percent torque) to maintain desired climb airspeed and rate of climb without exceeding aircraft limits per the appropriate aircraft operator's manual.
3. Maintain accelerative climb attitude ± 2 degrees until climb airspeed is attained.
4. Maintain the aircraft in trim after effective translational lift (ETL).

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft during the visual meteorological conditions (VMC) portion of the maneuver. The P* will announce when he or she initiates the maneuver and intents to abort or alter the takeoff. Before the aircraft enters simulated or actual IMC, the P* will make the transition to the flight instruments.

   b. The pilot not on the controls (P) will announce when ready for takeoff and will focus primarily outside the aircraft to assist in clearing during the VMC portion of the maneuver and to provide adequate warning of obstacles. The P will announce when his or her attention is focused inside the aircraft. As the aircraft enters actual IMC, the P will announce when IMC and will monitor the flight instruments to assist in establishing coordinated flight within aircraft operating limits.

   c. The nonrated crewmember (NCM) will maintain airspace surveillance during the VMC portion of the maneuver. During simulated IMC, the P and NCM will focus primarily outside the aircraft to provide adequate warning of traffic or obstacles. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures. On the runway or takeoff pad, align the aircraft with the desired takeoff heading. Set the attitude indicator for takeoff (wings level on the horizon). Initiate the takeoff by increasing the collective smoothly and steadily until takeoff power is reached. (Set power as required to accelerate to the desired climb airspeed and maintain the desired climb rate.) Adjust the pitch attitude 3 to 5 degrees below the horizon to establish the initial accelerative climb attitude. Visually maintain takeoff clearance and alignment on takeoff and transition to the flight instruments before entering IMC. Maintain the heading/course required by the departure procedure or air traffic control (ATC) instructions. When the desired climb airspeed is reached, adjust cyclic to maintain airspeed, and adjust collective to maintain the desired climb rate.

   Note. The takeoff may be initiated from the ground or a hover.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1174

Perform holding procedures

CONDITIONS: In an H-60 helicopter in instrument meteorological condition (IMC) or simulated IMC and given holding instructions and appropriate Department of Defense flight information publication (DOD FLIP).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Tune and identify the appropriate navigational aids (NAVAIDs).
2. Enter the holding pattern.
3. Time and track holding pattern legs.
4. Send the appropriate report to air traffic control (ATC) per DOD FLIP.

DESCRIPTION:

1. Crew actions.

   a. Before arrival at the holding fix, the pilot in command (PC) will analyze the holding instructions and determine the holding pattern and proper entry procedures. The PC will brief the other crewmembers on the proposed entry, outbound heading, and inbound course. (The PC may delegate this task to another rated crewmember [RCM].)

   b. The pilot not on the controls (P) will select radio frequencies and monitor radios. The P will announce ATC information not monitored by the pilot on the controls (P*). The P also will compute outbound times and headings to adjust for wind and direct the P* to adjust the pattern as necessary.

   c. The P* will fly headings and altitudes and will adjust inbound and outbound times as directed by ATC or the P. The P* will announce any deviation as well as ATC information not monitored by the P.

   d. During simulated IMC, the P and nonrated crewmember (NCM) will focus primarily outside the aircraft to provide adequate warning of traffic or obstacles. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures. Upon arrival at the holding fix, turn (if required) to the predetermined outbound heading or track and check the inbound course. Maintain the outbound heading or track as published or as directed by ATC. After the appropriate time outbound, turn to the inbound heading and apply normal tracking procedures to maintain the inbound course. Note the time required to fly the inbound leg and adjust outbound course and time if necessary. When holding at a NAVAID, begin timing the outbound leg when abeam the station. This is indicated by the # 2 bearing pointer or the TO/FROM indicator indicating a FROM indication. When holding at an intersection, begin timing the outbound leg upon establishing the outbound heading.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1176

Perform nonprecision approach

CONDITION: In an H-60 helicopter, given approach information and appropriate Department of Defense flight information publication (DOD FLIP).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Perform the approach.
2. Intercept and maintain nondirectional beacon (NDB) courses within 5 degrees of course centerline.
3. Intercept and maintain VHF omnidirectional range radio beacon (VOR) or global positioning system (GPS) course line within 5 degrees of course centerline.
4. Intercept and maintain localizer courses within 2.5 degrees of course centerline.
5. During airport surveillance radar (ASR) approaches, make immediate heading and altitude changes issued by air traffic control (ATC) and maintain heading ±5 degrees.
6. Comply with descent minimums prescribed for the approach.
7. Perform the correct missed approach procedure as published or per ATC instructions upon reaching the missed approach point (MAP) if landing cannot be completed per AR 95-1.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) is responsible for ensuring that the approach is reviewed and is briefed to all crew members before initiating the procedure. The PC will confirm with the crew the specific approach to be flown, that the correct navigational aid (NAVAID)/communication frequencies are set.

   A/L b. The horizontal situation indicator/vertical situation indicator (HSI/VSI) mode select panel and command instrument system (CIS) are selected as required. The PC may assign other crewmembers to perform these duties.

   M c. Select the appropriate navigation source and bearing pointer on the flight director display control panel (FD/DCP) to be depicted on the primary flight display (PFD) for the approach to be flown.

2. The pilot on the controls (P*) will acknowledge and follow navigation directives issued by either the pilot not on the control (P) or ATC, and announce any deviations.
3. The P will call out all pertinent or requested approach information and procedures to the P* and will advise the P* of any unannounced deviations. The P will monitor outside for visual contact with the landing environment. If the P makes visual contact suitable to complete the landing per AR 95-1, the P will announce such and may, if directed by the PC, take the controls and complete the landing. If visual contact is not made at the missed approach point, the P will announce such and call out the missed approach procedures.
4. During visual meteorological conditions (VMC), the P and nonrated crewmember (NCM) will focus primarily outside the aircraft to provide adequate warning of traffic or obstacles. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

M 5. For a coupled approach, the P* will configure the FD/DCP for the selected approach and monitor the PFD for aircraft response. The P should ensure the uncoupled flight director has the appropriate modes engaged to see visual cues on his PFD.

Note. A Doppler/global positioning system (GPS) that is not certified for instrument flight rules (IFR) flight will not be used as the primary source of navigation information for IFR operations in controlled airspace; however, its use should be considered and planned for as an emergency backup system.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1178

Perform precision approach

CONDITION: In an H-60 helicopter given approach information and appropriate Department of Defense flight information publication (DOD FLIP).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Perform the approach.
2. For an instrument landing system (ILS) approach, intercept and maintain the localizer course within 2.5 degrees of course centerline, and glide slope within 0.5 degree of glide slope center.
3. For a precision approach radar (PAR) approach, make immediate heading and altitude changes issued by air traffic control (ATC) and maintain heading ±5 degrees; for final approach, maintain glide slope as directed by ATC.
4. Comply with the published decision altitude or decision height (DH) prescribed for the approach.
5. Perform the correct missed approach procedure as published or per ATC instructions upon reaching the decision altitude/DH if landing cannot be done per AR 95-1.

M 6. When coupled flight is selected, program flight director/display control panel (FD/DCP) for the appropriate approach and monitor for correct aircraft response.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) is responsible for ensuring that the approach is reviewed and is briefed to all crewmembers before initiating the procedure. The PC will confirm with the crew the specific approach to be flown, that the correct navigational aid (NAVAID)/communication frequencies are set.

A/L b. The horizontal situation indicator/vertical situation indicator (HSI/VSI) mode select panel and command instrument system (CIS) are selected as required. The PC may assign other crewmembers to perform these duties.

M c. Select the appropriate navigation source and bearing pointer on the flight director/ display control panel (FD/DCP) to be depicted on the primary flight display (PFD) for the approach to be flown.

2. The pilot on the controls (P*) will acknowledge and follow navigation directives issued by either the pilot not on the control (P) or ATC, and announce any deviations.
3. The P will call out all pertinent or requested approach information and procedures to the P* and will advise the P* of any unannounced deviations. The P will monitor outside for visual contact with the landing environment. If the P makes visual contact suitable to complete the landing per AR 95-1, the P will announce such and may, if directed by the PC, take the controls and complete the landing. If visual contact is not made at the missed approach point, the P will announce such and call out the missed approach procedures.
4. During visual meteorological conditions (VMC), the P and nonrated crewmember (NCM) will focus primarily outside the aircraft to provide adequate warning of traffic or obstacles.

They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

M 5. For a coupled approach, the P* will configure the FD/DCP for the selected approach and monitor the PFD for aircraft response.

M WARNING

Prior to entering the zone of confusion and station passage mode, HDG mode shall be engaged and the P* must make corrections to aircraft heading reference to maintain the desired course.

Note. A Doppler/global positioning system (GPS) that is not certified for instrument flight rules (IFR) flight will not be used as the primary source of navigation information for IFR operations in controlled airspace; however, its use should be considered and planned for as an emergency backup system.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1180

Perform emergency global positioning system recovery procedure

CONDITIONS: In an H-60 helicopter in visual meteorological conditions (VMC) or simulated instrument meteorological condition (IMC), given an approved emergency global positioning system (GPS) recovery procedure.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Enter or confirm the appropriate waypoints (initial approach fix [IAF], intermediate approach fix [IF], final approach fix [FAF], missed approached point [MAP]) into the navigation system.
2. Execute the procedure according to an approved recovery procedure.
3. Maintain a briefed airspeed not to exceed 90 knots indicated airspeed (KIAS), appropriate for the conditions, during all segments of the approach.
4. Maintain the prescribed course ±5 degrees.
5. Comply with the descent minimums prescribed for the procedure.
6. Arrive at the minimum descent altitude (MDA) prior to reaching the MAP.
7. Execute a missed approach upon reaching the MAP if a safe landing cannot be done.
8. During the missed approach, immediately establish a climb using an appropriate rate of climb airspeed (until established at the minimum safe altitude [MSA]).

DESCRIPTION:

1. Before the flight, the crew should review the recovery procedure in conjunction with the map to familiarize themselves with the procedure and with local terrain and obstructions in the vicinity of the procedure. The pilot in command (PC) performs a thorough map reconnaissance to determine the highest obstruction in the area of operations.
2. Before initiating the procedure, the pilot on the controls (P*) must climb to the prescribed MSA, proceed toward the IAF, and make the appropriate radio calls. During the procedure, the P* will focus primarily inside the aircraft on the instruments. The P* will adjust the aircraft ground track to cross the IAF, IF, and then the FAF on the prescribed course. When over the FAF, the P*begins the final descent as appropriate.
3. The pilot not on the controls (P) remains primarily focused outside the aircraft to provide adequate warning for avoiding obstacles/hazards and will announce when his or her attention is focused inside the cockpit. The P and nonrated crewmember (NCM) will monitor the aircraft instruments during the procedure, and the P will tune the communication and navigation radios and transponder as required. The P will be prepared to call out the procedure to the P*, if asked, and be in a position to assume control of the aircraft and land the aircraft if VMC is encountered.
4. The NCM will position himself on the P* side of the aircraft for obstruction clearance and airspace surveillance. The NCM alerts the crew immediately if VMC is encountered.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS. The P should be in a position to assume control of the aircraft when a landing environment can be determined visually (aided/unaided). During night unaided flight, consider using the searchlight to identify the landing area.

TRAINING CONSIDERATIONS: This task will ONLY be performed under VMC or simulated IMC in a training environment.

> ***Note.*** The IAF, IF, FAF and MAP should be programmed into the navigation system as an additional route for the mission.

> ***Note.*** It is not necessary to hold after a missed approach. The PC may elect to return to the IF at the MSA and attempt to complete the approach after coordinating with air traffic control (ATC) or with other aircraft using the approach procedure.

> ***Note.*** The AN/ARN-128B Doppler/GPS will not be used as the primary source of navigation information for IFR operations in controlled airspace; however, its use should be considered and planned for as an emergency backup system.

> ***Note.*** Inadvertent IMC multiship operations must be thoroughly briefed in the mission brief as a minimum on the following topics: individual aircraft holding altitudes/separation, when individual aircraft are allowed to depart their assigned altitude, missed approach procedure with aircraft in the holding pattern, frequencies, and command/control procedures.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the unit SOP.

TASK 1182

Perform unusual attitude recovery

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Analyze aircraft attitude.
2. Without delay, use correct recovery procedures.
   a. Attitude—level the wings on the attitude indicator.
   b. Heading—maintain heading; turn only to avoid known obstacles.
   c. Torque—adjust torque as necessary.
   d. Trim—trim aircraft as necessary.
   e. Airspeed—adjust airspeed as necessary.

DESCRIPTION:

1. Crew actions.

   a. The trainer or evaluator will place the aircraft in unusual attitude and transfer aircraft controls to the pilot not on the controls (P). The P will acknowledge the transfer of controls, the unusual attitude, and recover the aircraft as pilot on the controls (P*).

   b. The P* will remain focused inside the aircraft during this maneuver and will acknowledge the unusual attitude recovery and transfer of aircraft controls.

   c. The P will assist in monitoring the aircraft instruments. The P will call out attitude, torque, and trim as necessary.

   d. During visual meteorological conditions (VMC), the P and nonrated crewmember (NCM) will focus primarily outside the aircraft to provide adequate warning of traffic or obstacles. They will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

2. Procedures.

   a. To recover from an unusual attitude, correct the pitch and roll attitude, adjust power, and trim the aircraft as required to return to level flight. All components are changed simultaneously with little lead of one over the other. The displacement of controls used in recoveries may be greater than those for normal flight. Care must be taken in making adjustments as straight-and-level flight is approached. The instruments must be observed closely to avoid over controlling.

M   b. Coupled recovery from an unusual attitude may be accomplished by pressing in on the cyclic trim beeper (Z axis). The P* must closely monitor the primary flight display (PFD) for correct aircraft response.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Instrument meteorological conditions (IMC) is not a prerequisite for an unusual attitude. Low level ambient light may induce visual illusions and spatial disorientation. During night vision goggle (NVG) operations, video noise may contribute to loss of visual cues.

SNOW/SAND/DUST CONSIDERATIONS: Obscurants other than weather can induce loss of visual contact. At low altitudes where these conditions would be encountered, it is extremely important that these procedures be initiated immediately to prevent ground contact.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1184

Respond to inadvertent instrument meteorological conditions

CONDITION: In an H-60 helicopter, in visual meteorological conditions (VMC).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Announce "IMC", maintain proper aircraft control, immediately make the transition to instrument flight, and initiate immediate climb.
2. Initiate correct inadvertent IMC recovery procedures.
   a. Attitude—level the wings on the attitude indicator.
   b. Heading—maintain heading; turn only to avoid known obstacles or as briefed for multiship operations.
   c. Torque—adjust torque as necessary.
   d. Trim—trim aircraft as necessary.
   e. Airspeed—adjust airspeed as necessary.
3. Contact air traffic control (ATC), as required. Comply with ATC instructions, local regulations, and standing operating procedure (SOP).

DESCRIPTION:

1. Crew actions.
   a. The pilot on the controls/pilot not on the controls (P*/P) will announce inadvertent IMC as appropriate.
   b. The pilot in command (PC) will announce the minimum altitude to which the crew will climb (and heading if turn required for single and multiship operations) as the procedure is initiated.
   c. The P* will announce when he or she initiates inadvertent IMC procedures. The P* will announce if he or she is disoriented and unable to recover.
   d. The P will monitor the cockpit instruments to assist in recovery, set the transponder to emergency, make the appropriate radio calls, and perform any other crew tasks as directed by the P*. It may be necessary for the P to take the controls and implement recovery procedures.
   e. The nonrated crewmember (NCM) will focus primarily outside the aircraft to provide adequate warning for avoiding terrain or obstacles. The P and NCM will perform any other crew tasks as directed by the PC.
2. Procedures. If inadvertent IMC are encountered—
   a. Immediately adjust the pitch and roll attitude, adjust power, trim, and airspeed as required to ensure obstacle clearance/avoidance. All components are changed simultaneously with little or no lead-time over the other.

M b. Pressing the go-around button on the cyclic grip will couple the flight director to current heading and set the following flight parameters:
      (1) Level roll attitude.
      (2) 70 indicated airspeed (IAS).
      (3) 750 feet per minute (FPM) rate of climb.
   c. Complete the inadvertent IMC recovery per local regulations and policies.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: When using night vision goggles (NVGs), it may be possible to see through thin obscuration, such as fog and drizzle, with little or no degradation. The NVGs may be removed or flipped up once stable flight is established. It may be beneficial for the P not to completely remove his NVGs. The NVGs may assist in recovery by allowing the P to see through thin obscuration that would otherwise prevent him from seeing the landing environment.

Note. If IMC conditions are entered with the searchlight or landing light on, spatial disorientation may occur.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1188

Operate aircraft survivability equipment

CONDITIONS: In an H-60 helicopter equipped with aircraft survivability equipment (ASE).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Describe the purpose of installed ASE.
   b. Perform/describe preflight inspection; turn on, test, operation, emergency procedures, and shutdown of installed ASE.
   c. Employ/describe using installed ASE.
2. Nonrated.
   a. Prepare equipment for operation.
   b. Employ/describe using installed ASE

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will ensure that crewmembers understand the employment of installed ASE during the conduct of the mission
   b. The PC will also ensure that all ASE payloads and settings are per the mission briefing.
2. Procedures. Perform or describe preflight inspection, turn on, test, operation, emergency procedures, and shutdown of installed ASE equipment. Evaluate and interpret the ASE visual and aural indications.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft, simulator, or academically.
2. Evaluation. Evaluation may be conducted in the aircraft, simulator, or academically.

REFERENCES: Appropriate common references plus the following:

AFTTP 3-1.
Computer based ASE trainer (CBAT) programs.
Equipment operator’s manuals.
Unit S-2/TACOPS officer.

TASK 1190

Perform hand and arm signals

CONDITIONS: Given a list of hand and arm signals from FM 21-60 to identify or perform.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated. Identify at a minimum the hand and arm signals required for moving an aircraft left, right, forward, or backward and for takeoff and landing per FM 21-60.
2. Nonrated. Identify and perform at a minimum the hand and arm signals required for moving an aircraft left, right, forward, or backward and for takeoff and landing per FM 21-60.

DESCRIPTION: Identify or perform the hand and arm signals required to move an aircraft from one point to another.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references plus FM 21-60.

TASK 1194

Perform refueling operations

CONDITIONS: With an H-60 helicopter and refueling equipment.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Ensure that safety procedures are complied with per FM 10-67-1 and the appropriate aircraft operator's manual, FM 3-04.111, and FM 1-113.
2. Ensure that all doors and windows are closed on the refueling side (for hot refueling operations).
3. Ensure that the aircraft is refueled per FM 10-67-1, the appropriate aircraft operator's manual, FM 3-04.111, FM 1-113, and the unit standing operating procedure (SOP).
4. Enter the appropriate information on DA Form 2408-12 (*Army Aviator's Flight Record)*.

DESCRIPTION:

1. Crew actions cold refueling.

    a. A crewmember will guide the refueling vehicle to the aircraft. Ensure that the driver parks the vehicle the proper distance from the aircraft per FM 10-67-1. Verify that all personnel not involved with the refueling operations are a safe distance away.

    b. Ground and refuel the aircraft per FM 10-67-1, the appropriate aircraft operator's manual, and the unit SOP. Ensure that the tanks are filled to the required level. When the refueling is completed, ensure that all caps are secured and remove the ground connection if the aircraft will not remain parked. Make the appropriate entries on DA Form 2408-12.

2. Crew actions hot refueling.

    a. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist the pilot on the controls (P*) in positioning the aircraft. Ensure that the proper separation is maintained between the fuel source, the aircraft, and the refueling equipment. Before refueling the aircraft, the PC will verify that personnel not involved with the refueling operation are a safe distance away.

    b. The crewmember outside the aircraft should position himself in view of active refueling personnel and at least one pilot, and should maintain the ability to communicate with both. He must ensure that the aircraft is grounded, refueled per FM 10-67-1, the appropriate aircraft operator's manual, and the unit SOP, and assist with the refueling operation. Ensure that the tanks are filled to the required level. When the refueling is completed, ensure that all caps are secured and remove the ground connection.

    c. The crewmember outside will inform the pilot in command (PC) when the refueling is completed. Assist passengers in boarding the aircraft and in securing their seat belts. Assist the P* and P in clearing the aircraft during the departure from the refueling area. Make the appropriate entries on DA Form 2408-12.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Supplement aircraft lighting at the refueling station by using an explosion-proof flashlight with an unfiltered lens to check for leaks and fuel venting, and for signaling, as necessary.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:
DA Pam 738-751
FM 10-67-1
FM 21-60

TASK 1253

Operate flight management system/central display unit

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Configure the flight management system (FMS)/central display unit (CDU) for the mission as per the appropriate aircraft operator's manual.
2. Initialize the FMS/CDU for operation.

DESCRIPTION:

Crew actions.

1. The pilot on the controls (P*) will focus primarily outside the aircraft and respond to information given by the pilot not on the controls (P). The P monitors all mission equipment and uses the FMS/CDU for communication, navigation, and mission information.
2. The P will place the FMS into operation during run-up and will operate in flight through shutdown by using any or all of the following functions:
    a. Initialize the FMS/CDU using the initialization (INI) page and embedded global positioning system/inertial navigation system (EGI) page according to the checklist.
    b. Enter and store data on the data (DAT) page as necessary to effectively complete assigned mission. Transfer data from the data transfer system/data transfer unit (DTS/DTU) to the FMS/CDU, and save data from the FMS to the DTS/DTU as necessary.
    c. Enter and engage flight plan (to include search patterns) of flight plan (FPN) page of the FMS/CDU. The P should also be able to modify existing flight plans in flight to accomplish mission changes en route.
    d. Use the status (STS) page of the FMS/CDU to determine system status and determine mission accomplishment relative to operational condition of displayed equipment.
    e. Select and set up the avionics using the communication (COM) page of FMS/CDU.
    f. Use the navigation (NAV) page to select and tune the proper navigation aid.
    g. Use the features of the calculator (CLC) page.
    h. Fix positions and record positions as waypoints using the FIX page of the FMS/CDU.
    i. Address emergency procedure associated with FMS/CDU failures.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Ensure lighting is set at an acceptable level for night or night vision goggle (NVG) operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 1254

Operate multifunction display

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Operate the installed multifunction display (MFD) as per the appropriate aircraft operator's manual.
2. Select the appropriate display to obtain the desired information for the current mission profile.

DESCRIPTION:

1. Crew actions. The pilot on the controls (P*) will focus primarily outside the aircraft and respond to information given by the pilot not on the controls (P).
2. Procedures. Perform the turn on, and then select the desired display for each aircraft MFD. Understand factors and emergencies adversely affecting the MFDs, which could result in degraded mission performance or the mission being aborted. Perform the proper shutdown procedures in accordance with the appropriate operator's manual.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Ensure the MFD lighting adjustment is set at an acceptable level for night or night vision goggle (NVG) operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation may be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references plus the appropriate manufacturer's references.

TASK 1260

Operate digital map (H-60M)

CONDITION: In an H-60M helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Load digital map data via the data transfer system (DTS).
2. Operate bezel keys on the multifunction displays (MFD) to select desired map configuration and orientation.
3. Operate the multifunction slew controller (MFSC) or the collective cursor slew controller to gain desired information and to manipulate desired mission data on the digital map display.

DESCRIPTION:

1. Crew actions.
   a. The pilot on the controls (P*) will primarily remain focused outside the aircraft.
   b. The pilot not on the controls (P) will primarily perform digital map operations.
2. Procedures.
   a. Select appropriate type of map for display.
   b. Select desired viewing range and scale.
   c. Select appropriate type of overlay for the tactical situation.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Ensure MFD lighting adjustment is set at an acceptable level for night or night vision goggle (NVG) operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1262

Participate in a crew-level after action review

CONDITIONS: After flight in an H-60 and given a unit-approved, crew-level after action review checklist.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. The pilot in command (PC) will conduct a detailed crew-level after action review using the example shown below or a unit-approved crew-level after action review checklist.
2. All crewmembers will actively participate in the review.

DESCRIPTION:

1. Crew actions.
   a. The PC will conduct a crew-level after action review. The PC will use a unit-approved checklist similar to the one shown in table 4-2 below. The PC will actively seek input from all crewmembers. The PC will ensure that the results of the review are passed to unit operations and flight standards.
   b. All crewmembers will actively participate in the review. The intent is to constructively review the mission and apply lessons learned into subsequent missions.
2. Procedures. Using an after action review checklist, participate in a crew-level after action review of the mission. The review should be an open and frank discussion of all aspects of the mission. It should include all factors of the mission and incorporate all crewmembers. The results of the review should be passed to operations and flight standards.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references.

Table 4-2. Suggested format for a crew-level after action review checklist

Crew-Level After Action Review Checklist

1. Restate mission objectives with METT-TC considerations.
2. Conduct review for each mission segment:
   a. Restate planned actions/interactions for the segment.
   b. What actually happened?
      (1) Each crewmember states in own words.
      (2) Discuss impacts of crew coordination requirements, aircraft/equipment operation, tactics, commander's intent, and so forth.
   c. What was right or wrong about what happened?
      (1) Each crewmember states in own words.
      (2) Explore causative factors for both favorable and unfavorable events.
      (3) Discuss crew coordination strengths and weakness in dealing with each event.
   d. What must be done differently the next time?
      (1) Each crewmember states in own words.
      (2) Identify improvements required in the areas of team relationships, mission planning, workload distribution and prioritization, information exchange, and cross monitoring of performance.
   e. What are the lessons learned?
      (1) Each crewmember states in own words.
      (2) Are changes necessary to—
         (a) Crew coordination techniques?
         (b) Flying techniques?
         (c) SOP?
         (d) Doctrine, ATM, TMs?
3. Determine effect of segment actions and interactions on the overall mission.
   a. Each crewmember states in own words.
   b. Lessons learned.
      (1) Individual level.
      (2) Crew level.
      (3) Unit level.
4. Advise unit operations of significant lessons learned.

TASK 2010

PERFORM MULTIAIRCRAFT OPERATIONS

CONDITIONS: In an H-60 helicopter**.**

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated crewmember (RCM).
   a. Participate in a formation flight briefing in accordance with unit SOP.
   b. Maneuver into the flight formation.
   c. Change position in the flight formation when required.
   d. Maintain proper horizontal and vertical separation for the type of formation flight being conducted.
   e. Announce if visual contact is lost with other aircraft.
   f. Perform techniques of movement, if required.
2. Nonrated crewmember (NCM).
   a. Assume a position in the helicopter, as briefed, to observe other aircraft in the formation.
   b. Announce if visual contact is lost with other aircraft.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft. He will maintain the briefed position in the formation and announce any maneuver or formation change before execution. If visual contact is lost with other aircraft, the crew will immediately make a radio call to the flight and begin reorientation procedures.

Note: The most important consideration when a crewmember has lost visual contact with the formation is to announce loss of visual contact to the other members of the crew and the rest of the flight and reorient. Except for enemy contact, all mission requirements are subordinate to this action.

   b. The P and NCM will provide adequate warning of traffic or obstacles detected in the flight path or identified on the map. They will inform the P* if visual contact is lost with other aircraft or if an enemy is sighted. The NCMs will position themselves in the aircraft to observe other aircraft in the formation and assist in maintaining aircraft separation and obstacle clearance.

2. Procedures.

   a. Perform formation flight in accordance with the unit standing operating procedures and the common references in this ATM.

   b. If the tactical situation requires, perform techniques of movement per FM 3-04.203. Maneuver into the briefed flight formation. Maintain horizontal and vertical separation for the type of formation being flown.

   c. The following procedures will be performed if visual contact is lost unless otherwise established in unit SOPs:

Takeoff: Immediately make a radio call to the formation. The P* will adjust to an altitude that will afford visual acquisition, above or below the briefed cruise altitude, and attempt reorientation with the formation.

Cruise: Immediately make a radio call to the formation. Lead will announce heading, altitude and airspeed. The formation should avoid any abrupt or drastic changes in the flight path until all aircraft have rejoined the flight. The aircraft that has lost visual contact with the flight will immediately assume the flight's heading and airspeed and maintain horizontal separation as briefed. If enemy and terrain allow, the aircraft that has lost visual contact will also maintain vertical separation by adjusting to an altitude other than the briefed en route altitude which will afford visual acquisition of the flight. Unit SOPs must state the procedures for reestablishing contact with the flight. Considerations should include but are not limited to rallying to a known point, use of covert/overt lighting, and ground rally. Mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC), power available, and ambient light will influence how contact is reestablished. Situations may occur when an aircraft rejoins the flight in a position other than briefed. Only after the entire flight is formed can the mission commander proceed with the mission unless a contingency has been briefed.

Approach: Immediately make a radio call to the formation and execute a go around unless an alternate course of action has been briefed**.**

Note: All multi-aircraft operations will be briefed using a unit approved multi-aircraft/mission briefing checklist. Mandatory briefing items that must be included in all multi-aircraft briefings are—

- Formation types
- Altitude(s)
- Airspeed(s)
- Aircraft lighting
- Lead change procedures
- Lost communication procedures
- Loss of visual contact procedures
- Actions on contact
- Inadvertent IMC procedures
- Downed aircraft/personnel recovery procedures

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Closure rates are more difficult to determine. Consideration should be given to keeping formation changes to a minimum. All crewmembers must avoid fixation by using proper scanning techniques. Consider the use of aircraft external lighting to aid in the visual acquisition of other aircraft during loss of visual contact.

1. Night. During unaided night flight, the crew should use formation and position lights to aid in maintaining the aircraft's position in the formation.
2. Night vision goggle (NVG). When conducting NVG formation flight, the crew should use the infrared (IR) formation lights to maintain the aircraft's position in the formation.

Note. Additional crewmember requirements are in TC 1-210, chapter 4.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 2012

PERFORM TACTICAL FLIGHT MISSION PLANNING

CONDITIONS: Before flight in an H-60 helicopter and given a mission briefing, navigational maps, a navigational computer, approved mission planning software (if available), and other flight planning materials as required.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Analyze the mission using the mission, enemy, terrain and weather, troops and support available, time available and civil considerations (METT-TC) factors available.
2. Perform a map/photo reconnaissance using the available map media or photos. Ensure that all known hazards to terrain flight are plotted or entered into the approved mission planning software (if applicable).
3. Select the appropriate altitude(s) and terrain flight modes as appropriate.
4. Select appropriate primary and alternate routes and enter all of them on a map, route sketch, or into the approved mission planning software.
5. Determine the distance ±1 kilometer, ground speed ±5 knots, and estimated time en route (ETE) ±1 minute for each leg of the flight.
6. Determine the fuel required and reserve per AR 95-1 ±100 pounds.
7. Obtain and analyze weather briefing to determine that weather and environmental conditions are adequate to complete the mission.
8. Conduct a thorough crew mission briefing.

DESCRIPTION:

1. Crew actions.
    a. The pilot in command/air mission commander (PC/AMC) will delegate mission tasks to crewmembers, have the overall responsibility for mission planning, and will conduct a thorough crew mission briefing. The PC/AMC will analyze the mission in terms of METT-TC.
    b. The other crewmembers will perform the planning tasks directed by the PC/AMC. They will report the results of their planning to the PC/AMC.
2. Procedures. Analyze the mission using the METT-TC factors. Conduct a map or aerial photo reconnaissance. Obtain a thorough weather briefing that covers the entire mission. Include sunset and sunrise times, density altitudes, winds, and visibility restrictions. If the mission is to be conducted at night, the briefing would also include moonset and moonrise times and ambient light levels, if available. Determine primary and alternate routes, flight altitudes, and movement techniques. Determine time, distance, and fuel requirements using the navigational computer or approved mission planning software. Prepare the map, overlay, or approved mission planning software with sufficient information to complete the mission according to unit standing operating procedure (SOP). This includes waypoint coordinates that define the routes for entry into the Doppler/global positioning system (GPS) and approved mission planning software. Consider such items as hazards, checkpoints, observation posts, and friendly and enemy positions. Review contingency procedures.

Note. Evaluate weather impact on the mission. Considerations should include aircraft performance and limitations.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: More detailed flight planning is required when the flight is conducted in reduced visibility, at night, or in the night vision goggle (NVG) environment. NVG navigation with standard maps can be difficult because of map colors, symbology, and colored markers used during map preparation.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted academically.
2. Evaluation. Evaluation will be conducted academically.

REFERENCES: Appropriate common references.

TASK 2014

Perform electronic countermeasures/electronic counter-countermeasures procedures

CONDITIONS: In an H-60 helicopter and given a signal operating instructions (SOI).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Test and operate aircraft avionics and voice security equipment according to the appropriate aircraft operator's manual.
2. Maintain radio discipline.
3. Use the SOI.
4. Recognize and respond to enemy electronic countermeasures.
5. Operate Mark XII identification, friend or foe (IFF) system.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will ensure assigned radio frequencies are briefed during the crew briefing. The PC will indicate whether the pilot on the controls (P*) or pilot not on the controls (P) will establish and maintain primary communications.
   b. The P* will announce mission information not monitored by the P and any deviation from directives.
   c. The P will manage and announce radio frequencies and copy and decode pertinent information. He will announce mission information not monitored by the P*.
2. Procedures. Electronic communications should not be used in a tactical environment except when absolutely necessary. If electronic communication is required, the preferred method is to operate in frequency hopping (FH)/have-quick secure voice mode. To eliminate confusion and reduce transmission time, the crew must use approved communication words, phrases, and codes. Plan what to say before keying the transmitter. Transmit information clearly, concisely, and slowly enough to be understood by the receiving station. Ideally, keep transmissions under 10 seconds. Do not pass mission critical information on unsecured nets. Do not identify a unit or an individual by name during nonsecure radio transmissions. Follow procedures listed below.
   a. Authentication. Use proper SOI procedures to authenticate all in-flight mission changes, artillery advisories, when entering or departing a radio net, when challenged, or when requesting authentication.
   b. Meaconing, interference, jamming, and intrusion/joint spectrum interference resolution (MIJI/JSIR) procedures. Keep accurate and detailed records of any MIJI incidents. Report an incident as soon as possible when a secure communications capability exists. (See task 2022 for information on transmitting a tactical report.)
   c. Visual methods. Use other visual communication methods such as flags, lights, panels, pyrotechnics, hand and arm signals, and aircraft maneuvers.
   d. Mark XII IFF. Turn on, test, and operate the IFF per the appropriate aircraft operator's manual. Operate the IFF per the tactical situation. During shutdown, hold or zeroize the code, as required.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

FM 1-103
TM 11-5895-1199-12

TASK 2022

Transmit tactical reports

CONDITIONS: In an H-60 helicopter and given sufficient information to compile a tactical report.

STANDARDS: Appropriate common standards plus transmit the appropriate report using the current signal operating instructions (SOI).

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) and nonrated crewmember (NCM) will focus primarily outside the aircraft to clear the aircraft and provide adequate warning of traffic or obstacles. The P* will announce any maneuver or movement before execution.

   b. The pilot not on the controls (P) will assemble and transmit the report. The P will use the correct format as specified in the SOI and transmit the report to the appropriate agency. The NCM(s) must also be able to transmit the report if the P is unable to do so.

2. Procedures. To save time, minimize confusion, and ensure completeness, report information in an established format. Assemble the report in the correct format and transmit it to the appropriate agency. Standard formats may be found in the SOI or other sources.

Note. Encryption is required only if information is transmitted by nonsecure means.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft, simulator, or academically.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

FM 2-0
SOI

TASK 2024

PERFORM TERRAIN FLIGHT NAVIGATION

CONDITIONS: In an H-60 helicopter and given a mission briefing and required maps and materials.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. During nap of the earth (NOE) flight (surface to 25 feet above highest obstacle [AHO]), know the en route location within 200 meters.

   b. During contour flight (25 to 80 feet AHO) or low-level flight (80 to 200 AHO), know the en route location within 500 meters.

   c. Locate each objective within 100 meters.

   d. Arrive at each objective at the planned time ±1 minute (if an objective arrival time was given in the mission briefing).

2. Nonrated. Announce significant terrain features to aid in navigation.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft and respond to navigation instructions and cues given by the pilot not on the controls (P). The P* will acknowledge commands issued by the P for heading and airspeed changes necessary to navigate the desired course. The P* and NCM will announce significant terrain features to assist the P in navigation.

   b. The P will furnish the P* with the information required to remain on course. The P will announce all plotted wires before approaching their location. The P will use rally terms and terrain features to convey instructions to the P*. Examples of these terms are "Turn left to your 10 o'clock," "Stop turn," and "Turn down the valley to the left." If using the horizontal situation indicator (HSI) during low-level flight, the P may include headings. The P should use electronically aided navigation to help arrive at a specific checkpoint or turning point.

   c. The P*, P, and nonrated crewmember (NCM) should use standardized terms to prevent misinterpretation of information and unnecessary cockpit conversation. The crew must look far enough ahead of the aircraft at all times to assist in avoiding traffic and obstacles.

2. Procedures.

   a. During NOE and contour flight, identify prominent terrain features that are located some distance ahead of the aircraft and which lie along or near the course. Using these terrain features to key on, the P* maneuvers the aircraft to take advantage of the terrain and vegetation for concealment. If this navigational technique does not apply, identify the desired route by designating a series of successive checkpoints. To remain continuously oriented, compare actual terrain features with those on the map. An effective technique is to combine using terrain features and rally terms when giving directions. This will allow the P* to focus his attention outside the aircraft.

   b. For low-level navigation, the time and distance can be computed effectively. This means that the P* can fly specific headings and airspeeds.

Note. Each of the methods for stating heading information is appropriate under specific conditions. When a number of terrain features are visible and prominent enough for the P* to recognize them, the most appropriate method is navigation instruction toward the terrain feature in view. When forward visibility is restricted and frequent changes are necessary, controlled turning instructions are more appropriate. Clock headings are recommended when associated with a terrain feature and with controlled turning instructions.

Note. For additional information, see task 1044, task 1046, and task 1172.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. Conducting the flight in reduced visibility or at night requires more detailed and extensive flight planning and map preparation. TC 1-204 contains details on night navigation. Night vision goggle (NVG) navigation with standard maps can be difficult because of map colors, symbology, and colored marker use during map preparation.
2. Use proper scanning techniques to ensure obstacle avoidance.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus FM 21-26.

TASK 2026

PERFORM TERRAIN FLIGHT

CONDITIONS: In an H-60 helicopter with tactical flight mission planning completed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Maintain altitude and airspeed appropriate for the selected mode of flight, terrain, weather, visibility, and mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC).

   b. Maintain aircraft in trim during contour and low-level flight and when appropriate for nap of the earth (NOE) flight.

2. Nonrated. Maintain constant scan of assigned sector.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft and acknowledge all navigational and obstacle clearance instructions given by the pilot not on the controls (P). The P* will announce the intended direction of flight or any deviation from instructions given by the P. During terrain flight, the P* is primarily concerned with threat and obstacle avoidance.

   b. The P will provide adequate warning to avoid obstacles detected in the flight path or identified on the map. The P and nonrated crewmember (NCM) will assist in clearing the aircraft and provide adequate warning of obstacles, unusual attitudes, altitude changes, or threat. The P and NCM will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

   c. During contour flight, the P will advise the P* whenever an unannounced descent is detected. If the descent continues without acknowledgement or corrective action, the P will again advise the P* and be prepared to make a collective control input. The P will raise the collective when it becomes apparent that the aircraft will descend below 25 feet above highest obstacle (AHO).

   d. During NOE flight, the P will advise the P* whenever an unannounced descent is detected. He will immediately raise the collective when it becomes apparent that the P* is not taking corrective action and that the aircraft will descend below 10 feet AHO.

2. Procedures. Terrain flight involves flight close to the earth's surface. The modes of terrain flight are NOE, contour, and low level. Crewmembers will seldom perform purely NOE or contour flight. Instead, they will alternate techniques while maneuvering over the desired route. The crew must look far enough ahead of the aircraft at all times to assist in avoiding traffic and obstacles.

   a. NOE flight. Perform NOE flight at varying airspeeds and altitudes as close to the earth's surface as vegetation, obstacles, and ambient light will permit.

   b. Contour flight. Perform contour flight by varying altitude and while maintaining a relatively constant airspeed—depending on the vegetation, obstacles, and ambient light. Generally, follow the contours of the earth.

c. Low-level flight. Perform low-level flight at a constant airspeed and altitude. To prevent or reduce the chance of detection by enemy forces, fly at the minimum safe altitude that will allow a constant altitude.

Note. Hover out of ground effect (OGE) power may be required for this task.

Note. Terrain flight is considered sustained flight below 200 feet above ground level (AGL) (except during takeoff and landing).

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. Wires are difficult to detect with the night vision goggle (NVG).
2. Use proper scanning techniques to ensure obstacle avoidance.
3. During NVG terrain flight, observe the NVG speed and altitude restrictions in TC 1-210.

OVERWATER CONSIDERATIONS: Overwater flight, at any altitude, is characterized by a lack of visual cues, and therefore, has the potential of causing visual illusions. Be alert to any unannounced changes in the flight profile and be prepared to take immediate corrective actions. The radar altimeter low bug should be set to assist in altitude control. Hazards to terrain flight such as harbor lights, buoys, wires, and birds must also be considered during overwater flight. These considerations may also apply to flight over desert or broad expanses of snow, especially under low ambient lighting.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

FM 21-26
TC 1-210

TASK 2034

PERFORM MASKING AND UNMASKING

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Perform a thorough map reconnaissance of the desired observation area.
   b. Mask the aircraft from enemy visual and electronic detection.
   c. Ensure that aircraft exposure time does not exceed 10 seconds during the unmasking.
   d. Observe assigned scan sector during unmasking.
   e. Maintain a sufficient distance behind obstacles to allow for safe maneuvering.
   f. Move to a new location before subsequent unmasking.
   g. Report observations if required.
2. Nonrated.
   a. Scan assigned sector.
   b. Announce if/or when the lateral sides of the aircraft are exposed or unmasked.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will assign scanning sectors to all crewmembers to maximize the area scanned during the time unmasked.

   b. The pilot on the controls (P*) will focus primarily outside the aircraft to clear the aircraft throughout the maneuver. The P* will announce the type of unmasking before executing the maneuver.

   c. The pilot not on the controls (P) and nonrated crewmember (NCM) will focus primarily outside the aircraft. They will warn the P* of obstacles and unusual or unanticipated drift and altitude changes. The NCM(s) will announce when the sides of the aircraft are exposed or unmasked. The P and NCM will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

   d. The crew must clear directly below the aircraft if descending vertically or the flight path if moving laterally.

2. Procedures. Masking is a technique using terrain to mask (cover or conceal) the aircraft from threat detection and weapons employment. Unmasking is a maneuver used when it becomes necessary to observe points of interest that are obscured while in a masked position. Before unmasking, a thorough map reconnaissance should be completed so that all eyes can be focused outside during the unmasking. The three general types of unmasking are as follows:

   a. Unmasking in flight. This type is used when the aircraft has forward speed and can best be described as a quick "pop up and peek" at the desired point or area of observation. It is usually used while flying behind a ridgeline or other linear barrier.

   b. Unmasking at a hover (vertically). Announce intent to unmask. The crew will acknowledge that they are prepared to execute the maneuver. Ensure that sufficient power is available to unmask. Increase the collective to obtain sufficient altitude to see over the mask without exceeding aircraft limitations. Maintain horizontal main rotor blade clearance from the mask in case of a power loss or a tactical need to mask the aircraft quickly. When possible, unmask at a safe distance from the mask to allow a rapid descent to a masked condition if the aircraft is detected or fired upon. Be aware of a common tendency to move forward or rearward while vertically unmasking and remasking. Establish reference points to assist in maintaining position during ascents and descents. Keep aircraft exposure time to a minimum.

c. Unmasking at a hover (laterally). Sometimes, the aircraft may be unmasked by moving laterally from the mask. Announce intent to hover the aircraft sideward to provide the smallest silhouette possible to enemy observation or fire. The crew will acknowledge that they are prepared to execute the maneuver. Keep aircraft exposure time to a minimum.

Note. Hover out of ground effect (OGE) power may be required for this task.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: When hovering above 25 feet, the P* may have difficulty in maintaining altitude and position. Use the radar altimeter to assist in maintaining altitude. Use references, such as lights, tops of trees, or manmade objects above and to the sides of the aircraft. By establishing a reference angle to these objects, the P* can detect altitude changes when his perspective to these objects changes. Ground objects—fences, trails, roads—provide excellent references for detecting lateral drift. Proper scanning techniques must be used. The P* may become spatially disoriented when alternating his viewing perspective between high and low references.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 2036

PERFORM TERRAIN FLIGHT DECELERATION

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
    a. Maintain heading alignment with the selected flight path.
    b. Maintain the tail clear of all obstacles.
    c. Decelerate to the desired airspeed or to a full stop.
2. Nonrated.
    a. Maintain the tail clear of all obstacles.

DESCRIPTION:

1. Crew actions.

    a. The pilot on the controls (P*) will focus primarily outside the aircraft to clear the aircraft throughout the maneuver. The P* will announce his intention to decelerate or come to a full stop, any deviation from the maneuver, and completion of the maneuver.

    b. The pilot not on the controls (P) and nonrated crewmember (NCM) will provide adequate warning to avoid obstacles detected in the flight path and will announce when their attention is focused inside the cockpit and again when attention is reestablished outside.

2. Procedures. Coordinate applying cyclic and collective to establish a decelerative attitude that keeps the tail clear of all obstacles. Consider variations in the terrain and obstacles when determining tail clearance. Apply aft cyclic as required to slow to the desired airspeed or to a full stop while adjusting the collective to maintain the tail clear of obstacles. Maintain heading and make all control movements smoothly. If the aircraft attitude is changed excessively or abruptly, it may be difficult to return the aircraft to a level attitude and over controlling may result.

Note. Hover out of ground effect (OGE) power may be required for this task.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Because of the limited field of view of the night vision goggle (NVG), avoid making abrupt changes in aircraft attitude. An extreme nose-high attitude limits the forward field of view and may cause disorientation. Maintain proper scanning techniques to ensure obstacle avoidance and tail rotor clearance.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 2042

Perform actions on contact

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus use the correct actions on contact consistent with the tactical situation.

1. If appropriate, immediately deploy to a covered and concealed position using suppressive fires.
2. Continue observation as appropriate for the mission.
3. Transmit tactical report per signal operating instructions (SOI), unit standing operating procedure (SOP), or mission briefing.

DESCRIPTION:

1. Crew actions. When engaged by or upon detecting the enemy, the crewmember identifying the threat will announce the nature (visual observation, radar detection, or hostile fire) and the direction of the threat.
   a. The pilot on the controls (P*) will deploy to cover or concealment. The P* will announce the direction of flight to evade detection.
   b. The pilot not on the controls (P) will remain oriented on threat location. The P will announce warnings to avoid obstacles. The P will announce when his or her attention is focused inside the aircraft and again when attention is reestablished outside.
   c. When the crew encounters a directed threat, the P* will remain primarily focused outside to avoid obstacles, perform the required evasive maneuver, reposition the aircraft as necessary to break radar or visual lock, and then avoid the threat.
   d. The P will begin dispensing chaff or flares as required. The P and nonrated crewmember (NCM) will assist in clearing the aircraft and provide adequate warning of obstacles.

Note. Remaining in the same position while activating chaff negates the effectiveness of this countermeasure.

   e. The NCM will remove and install safety pin(s) according to the appropriate aircraft operator's manual/checklist (CL) and will dispense flares as required.
   f. The NCM will remain focused primarily outside the aircraft and announce adequate warning to avoid obstacles. The NCM will also provide suppressive fire as required.
   g. The crew will transmit a tactical report per the SOI/unit tactical SOP(TACSOP).

Note. The P should note location of threat. The best method is doing a target store on the Doppler/global positioning system (GPS). If unable, note the location of a threat (distance and bearing) relative to a point on the route. Both the rated crewmembers (RCMs) and NCMs must be able to transmit a tactical report per the SOI, unit SOP, or mission briefing.

2. Procedures. Fly the helicopter to a concealed area using the evasive techniques below and suppressive fire, as required. Choose a course of action that supports the mission and the intent of the unit commander's directives. For additional information, see task 2022.
   a. The specific maneuver required will depend on the type of hostile fire encountered.
      (1) Tanks, rocket-propelled grenades (RPGs), and small arms. Immediately turn away from the fire toward an area of concealment. If concealment is unavailable, make sharp

turns of unequal magnitude and at unequal intervals and small changes in altitude to provide the best protection until you are beyond the effective range of hostile weapons. If the situation permits, employ immediate suppressive fire.

(2) Large caliber, antiaircraft fire (radar controlled). Dispense chaff and execute an immediate 90-degree turn, as appropriate for the threat location, and mask the helicopter. After turning, do not maintain a straight line of flight or the same altitude for more than 10 seconds before initiating a second chaff dispense and 90-degree turn. To reduce the danger, descend immediately to nap of the earth (NOE) altitude.

Note. Dispensing chaff while maneuvering may cause tracking radars to break lock.

(3) Fighters. Upon sighting a fighter, try to mask the helicopter. If the fighter is alone and executes a dive, turn the helicopter toward the attacker and descend. This maneuver will cause the fighter pilot to increase his attack angle. Depending on the fighter's dive angle, it may be advantageous to turn sharply and maneuver away once the attacker is committed. The fighter pilot will then have to break off the attack to recover from the maneuver. Once the breaks off the attack, maneuver the helicopter to take advantage of terrain, vegetation, and shadow for concealment.

(4) IR Missiles. With an infrared (IR) jammer installed, reduce the collective to decrease the IR signature and maneuver the aircraft to allow the jammer to be effective against the missile. If the Common Missile Warning System (CMWS) is installed and dispenses flares, ensure the distance between the IR signature created by the flares and the aircraft is maintained to allow the missile to track the IR flare(s). After manual/auto flare dispense, attempt to break line of sight with the threat location/direction and deploy to cover to preclude additional engagements.

Note. Proper operation and full protection of the flare system may require level flight.

(5) Antitank-guided missiles. Some missiles fly relatively slowly and can be avoided by rapidly repositioning the helicopter. If terrain or vegetation is not available for masking, remain oriented on the missile as it approaches. As the missile is about to impact, rapidly change flight path or altitude to evade it.

(6) Radar-guided missiles. Maneuver the helicopter to break the line of sight to the radar source. Begin a descending, decelerating turn away from the threat source and attempt to maneuver the aircraft to keep the threat system to the right or left rear of aircraft and simultaneously dispense chaff. Attempt to keep the chaff cloud between the aircraft and the threat source. Once chaff is dispensed, turn the aircraft to maneuver away from the chaff cloud and continue to chaff and turn until the aircraft is masked.

(7) Artillery. Depart the impact area and determine chemical, biological, radiological, nuclear (CBRN) requirements.

b. If hit by hostile fire, rapidly assess the situation and determine an appropriate course of action. The first step is to assess aircraft controllability. Then check all instruments and warning and caution lights. If a malfunction is indicated, initiate the appropriate emergency procedure. If continued flight is possible, take evasive action. Make a radio call to report your situation, location, and action. Also, request assistance if desired. Continue to be alert for unusual control responses, noises, and vibrations. Monitor all instruments for an indication of a malfunction. Fly the aircraft to the nearest secure location and land (determine if flight should be extended for medical attention). After landing, inspect the aircraft to determine the extent of damage and if further flight can be continued.

Note 1. Proper employment of terrain flight techniques will reduce exposure to enemy threat weapon systems.

Note 2. Performing this maneuver in certain environments may require hover out of ground effect (OGE) power. Evaluate each situation for power required versus power available.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Threat elements will be harder to detect. Rapid evasive maneuvers will be more hazardous due to division of attention and limited visibility. Maintain situational awareness with regard to threat and hazard location. Flare deployment will degrade vision and night vision goggles (NVGs).

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:
Computer Based ASE Trainer (CBAT)
FM 34-25-7

TASK 2048

PERFORM SLING LOAD OPERATIONS

WARNING

When performing this task with cabin doors open, ensure that personnel in the cabin area are wearing safety harnesses secured to tie-down rings or are seated in seats with seat belts on.

CAUTION

A static electricity discharge wand will be used according to FM 4-20.197.

CONDITIONS: In an H-60 or a UH-60 FS helicopter with an operational cargo hook, sling load, completed DA Form 7382 (*Sling Load Inspection Record)* or training load according to FM 4-20.197.

Note. Prior to sling load operations, a qualified sling load inspector will inspect all sling loads. Certification must be recorded on a DA Form 7382 and a copy provided to the aircrews.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Before hookup. Verify copy of DA Form 7382 is complete and on file and that the aircraft will remain within gross weight and center of gravity (CG) limitations.
   b. Hook up and hover.
      (1) Ensure that the aircraft remains clear of the load and any obstacles.
      (2) Perform a vertical ascent with the load to a load height of 10 feet ±5 feet.
      (3) Determine power sufficient to complete the maneuver without exceeding aircraft limitations.
   c. Take off. Maintain aircraft in trim (above 100 feet above ground level [AGL]).
   d. Approach and load release.
      (1) Maintain a constant approach angle to ensure the load safely clears obstacles and terminate over the intended point of landing with a load height of 10 feet ±5 feet.
      (2) Perform a vertical descent with the load to the desired touchdown point ±5 feet.
2. Nonrated.
   a. The nonrated crewmember (NCM) will ensure that the aircraft is prepared for sling load operations. The NCM will also ensure that all slings have been inspected according to FM 4-20.197, and all sling equipment is secured in the aircraft before takeoff.
   b. Provide aircraft guidance for hookup and release.

c. Clear the aircraft and sling load during the operation.

d. Confirm load is hooked and secure.

e. Ensure load is free of entanglements.

f. Continue to monitor load for oscillation.

DESCRIPTION:

1. Crew actions.

a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers are familiar with sling load operations, emergency, and communication procedures. The PC will ensure that DA Form 7382 has been completed. The PC will determine the direction of takeoff by analyzing the tactical situation, the wind, the long axis of the takeoff area, and the lowest obstacles. The PC also will confirm that required power is available by comparing the information from the performance planning card (PPC) to the hover power check.

b. The pilot on the controls (P*) will remain primarily focused outside the aircraft throughout the maneuver. The P* will monitor altitude and avoid obstacles.

c. The pilot not on the controls (P) will monitor the cockpit instruments and assist the P* in clearing the aircraft. The P will set cargo hook switches, as required, and should make all radio calls. When directed by the P* during the approach, the P will place the cargo hook arming switch to the ARMED position. The P or NCM will release the load.

d. The P and NCM will assist in clearing the aircraft and will provide adequate warning of obstacles.

e. The NCM will remain primarily focused on the load. He will guide the P* during the load pickup, advise of the load condition in flight, and direct the P* when setting down the load.

2. Procedures.

a. Hookup and hover. Set cargo hook control switches per the appropriate aircraft operator's manual. Follow hand and arm signals from the signalman and commands from the NCM to hover over the load. Remain vertically clear of and centered over the load. When the load is hooked up, remove slack from the sling and ascend vertically to a load height of 10 feet AGL. Ensure aircraft limitations are not exceeded.

b. Takeoff. Establish a constant angle of climb that will permit safe obstacle clearance. When above 100 feet AGL or when clear of obstacles, adjust attitude and power as required to establish the desired rate of climb and airspeed. Smoothly adjust flight controls to prevent load oscillation. After passing above 300 feet AGL, place the cargo hook arming switch to the SAFE position.

Note. Ensure that the cargo hook-arming switch is in the ARMED position when operating at altitudes below 300 feet above highest obstacle (AHO).

c. Enroute. Maintain the desired altitude, flight path, and airspeed. Make smooth control applications to prevent load oscillation. If a lateral load oscillation occurs, reduce airspeed. If a fore-and-aft oscillation occurs, begin a shallow turn while reducing airspeed.

d. Approach and load release. Establish and maintain an approach angle that will keep the load clear of obstacles to the desired point of termination. Establish a rate of closure appropriate for the conditions and the load. When passing below 300 feet AGL, place the cargo hook arming switch to the ARMED position. Terminate the approach at a stationary hover with the load 10 feet above the intended release point. Confirm with the NCM that the release point is clear. Descend vertically until the load rests completely on the ground.

Continue descent to obtain slack in the sling, and then hover laterally to ensure the clevis is clear of the load before releasing the load. Confirm that the load is released before moving away from the release point.

Note. Loads will meet external air transportability (EAT) requirements according to FM 4-20.197. Procedures for air transportation of hazardous material will be according to AR 95-27.

Note. Avoid flight over populated areas.

Note . Before the mission, the PC will ensure that all crewmembers are familiar with the hand and arm signals shown in FM 21-60 and with forced landing procedures. In case of a forced landing, the aviator will land the aircraft to the left of the load. The hookup man will move to his left (which is to the right of the aircraft) and lie facedown on the ground. The signalman will remain in place and lie facedown on the ground.

Note. Control switches will not be moved without verbal announcement first. If the crewmember pendant is used, the crewmember must be trained according to the unit standing operating procedure (SOP).

Note. Sling extenders or "reach pendants" will be used to ensure load clearance when transporting the following: M119/105 (forward firing position), any "built up" high mobility multipurpose wheeled vehicle (HMMWV) (Avenger, ambulance, shelter, and so forth), or any other equipment that requires additional clearance.

Note. Self-hookup operations are authorized provided planning, briefing, and training has been done according to the unit SOP. Self-hookup is used to support gun raids, forward arming and refueling point (FARPs), and so forth when support personnel are not available. The type of load, as well as the size and height, must be considered before attempting a self-hookup. Some loads are more prone to entangle the sling straps than others. A "shepherd's hook," "Q-Tip," or similar device may be used by the NCM to grab the clevis. Hands and arms will not be used to grab the clevis.

Note. The following standard words and phrases are some examples of terminology used for sling load operations:

- "Hook is armed."
- "Load under the nose."
- "Load in sight."
- "Forward."
- "Back."
- "Left."
- "Right."
- "Down."
- "Up."
- "Hold."
- "Load is hooked."
- "Hookup crew clear."
- "Slings coming tight."
- "Load is centered."
- "Load is off the ground."
- "Load on ground."
- "Slack in the slings."
- "Release the load."
- "Load is released."
- "Clear to reposition."

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. For unaided night flight, the landing light and searchlight should be operational. If a night vision goggle (NVG) filter is installed, it should be removed.

2. When NVGs are used, hovering with minimum drift is difficult and requires proper scanning techniques and crewmember coordination. If possible, an area with adequate ground contrast and reference points should be used. Visual obstacles such as shadows should be treated the same as physical obstacles.
3. The rate of descent and rate of closure should be slightly slower to avoid abrupt attitude changes at low altitudes.
4. Sling loads should be marked with chemstick lighting.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

AR 95-27
DA Form 7382
FM 55-450-2
FM 4-20.197
FM 21-60

TASK 2050

Develop an emergency global positioning system recovery procedure

> **WARNING**
>
> **This procedure is designed strictly for recovery under visual meteorological conditions (VMC) in a training environment. If the operational environment requires the possible actual use of the procedure for inadvertent instrument meteorological conditions (IIMC) recovery, the procedure will be submitted for terminal instrument procedures (TERPS) review and approval through Headquarters (HQ), United States Army Aeronautical Services Agency (USAASA) or United States Army Aeronautical Services Agency-Europe (USAASD-E).**

Note. This task should be selected for instrument examiners (IEs).

CONDITIONS: With a 1/50,000 scale or larger tactical map or visual flight rules (VFR) sectional or joint operations graphic (JOG) map and obstruction information.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Select a suitable recovery/landing area.
2. Determine the highest obstruction in the area of operations and establish the minimum safe altitude (MSA) for the area operations.
3. Select a missed approach point (MAP), approach course (degrees magnetic), missed approach course, missed approach holding fix (MAHF), final approach fix (FAF), intermediate approach fix (IF), and initial approach fix (IAF).
4. Determine the highest obstacle within the final approach segment that extends from the FAF to the MAP.
5. Determine minimum descent altitude (MDA) for obstacle clearance in the final approach segment.
6. Determine the appropriate obstacles in the missed approach segment and determine 20:1 slope penetration.
7. Determine the highest obstacle in the intermediate approach segment from the IF to the FAF.
8. Determine altitude for obstacle clearance in the intermediate approach segment.
9. Determine the highest obstacles within the initial approach segment from the IAF to the IF.
10. Determine altitude for obstacle clearance in the initial approach segment.
11. Establish a 1-minute inbound holding pattern at the MAHF.
12. Prepare an emergency recovery procedure diagram per the example.
13. Complete a suitability/flyability check to include loading waypoints under vertical meteorological conditions (VMC) to validate the procedure.

Note. If unable to complete a suitability/flyability check due to the operational environment, the command should consider an elevated risk when using this recovery procedure.

DESCRIPTION:

Note. All altitudes are in feet, all waypoints are latitude (LAT)/longitude (LONG), all distances are in nautical miles (NMs), and visibility is in statute miles (SMs). (The flight information handbook [FIH] has the necessary conversion tables.)

1. Select the most suitable recover/landing area. Determine the MSA for the landing area. Use the off route obstruction clearance altitude (OROCA) or off route terrain clearance altitude (ORTCA) elevation from the en route low altitude (ELA) chart for the area of operations. Select the highest altitude within 30 NM of the MAP. If an ELA is not available, the minimum sector altitude will be determined by adding 1,000 feet to the maximum elevation figures (MEF). When a MEF is not available, apply the 1,000-foot rule to the highest elevation within 30 NM of the MAP. Minimum sector altitudes can be established with sectors not less than 90 degrees and with sector obstacle clearance having a 4-NM overlap. Rounding is allowed to the next higher 100-foot increment.

2. All waypoints (IAF, IF, FAF, MAP, and MAHF) will be verified by two separate GPS NAV systems (for example, Doppler global positioning system navigation system [DGNS], embedded global positioning system/inertial navigation system [EGI], precision lightweight global positioning system receiver [PLGR]).

3. Approach segment construction.

   a. Final approach segment. The final approach segment begins at the FAF and ends at the MAP.

      (1) Determine the MAP (normally associated with the landing area or threshold).

      (2) Determine the FAF. The minimum distance is 2 NM from the MAP. The optimum length is 3 NM. The maximum length is 10 NM.

      (3) Determine area of consideration for obstacle clearance.

      - Starting .3 NM prior to the FAF, draw a line that is 1.2 NM long on both sides of centerline (total 2.4 NM) perpendicular to the final approach course.
      - At .3 NM past the MAP, draw a line that is 1 NM long on both sides of the centerline (total 2 NM) perpendicular to the final approach course.
      - Complete the trapezoid by connecting the outer ends of the lines. This trapezoid is the area of consideration for obstacle clearance.

      (4) Determine MDA obstacle clearance. Locate the highest obstacle in the final segment trapezoid. Add 250 feet of required obstacle clearance (ROC) and round up to the next higher 20-foot increment.

Note. For visibility requirements, use table 4-3, located under the recovery procedure diagram, page 4-139.

   b. Missed approach segment. The missed approach segment starts at the .3 NM prior to the MAP and ends at a holding point designated by a MAHF clearance limit. Optimum routing is straight ahead (within 15 degrees of the final approach course) to a direct entry. However, a turning missed approach may be designated if needed for an operational advantage.

      (1) Determine the MAHF. The maximum distance is 7.5 NM from the MAP to MAHF.

      - Starting .3 NM prior the MAP draw a line perpendicular to the missed approach course that is 1 NM long on both sides of the centerline (total 2 NM).
      - At the MAHF draw a line perpendicular to the missed approach course that is 2 NM long on both sides of the centerline (total 4 NM).
      - Complete the trapezoid by connecting the outer ends of the lines.

Note. This trapezoid is the area of consideration for missed approach surface and the 20 to 1 obstacle clearance evaluation.

(2) Determine a turning missed approach. If a turning missed approach is developed, use a flight path turning radius of 1.3 NM until a straight line from apex of radius can be made to the MAHP (usually made back to the FAF). The outer edge of the area should have a 2.6 NM radius. Once the turn is completed, expand the missed approach area to 2 NM on both sides of centerline at the MAHF. The outer edge will be a straight line from the left outer edge of primary area of final segment to the point 2 NM perpendicular to the MAHP.

(3) Determine missed approach obstacle clearance. This surface begins over the MAP at a height of MDA minus required obstacle clearance (ROC). The missed approach surface area ascends uniformly at the rate of 1 foot vertically, for each 20 feet Horizontally (20H:1V). Evaluate the 20:1 surface from .3 NM past the MAP to the MAHF. The height of the missed approach surface over an obstacle is determined by measuring the straight line distance from .3 NM line past the MAP to the obstacle defining the 20:1 surface. If obstacles penetrate the surface area, establish a higher climb gradient, a higher MDA, move the MAP, or turn the missed approach.

Note. Where the 20:1 surface reaches a height of 1,000 feet below the MSA, further application of the surface is not required.

Note. To determine the maximum allowable height of an obstacle at a given point, measure the distance from the obstacle to the .3 NM point as described above in paragraph 3b(3). Multiply the distance by 304 (20:1 ratio) and add to the beginning 20:1 surface height. If there is no penetration, the area is clear. At the MAHF, if the surface has not reached the MSA, specify a climb to the MSA.

Note. The area for the missed approach holding falls within the MSA area so the MSA altitude normally will be use as the MAHF altitude if it meets the surface evaluation requirements.

c. Intermediate approach segment. The intermediate segment begins at the IF and ends at the FAF.

(1) Determine the IF. The minimum distance is 3 NM from the FAF. The maximum length is 5 NM.

(2) Determine the area of consideration for obstacle clearance.

- Starting 1 NM prior to the IF, draw a line that is 2 NM long on both sides of centerline (total 4 NM) perpendicular to the intermediate approach course.
- At the FAF, draw a line that is 1.2 NM long on both sides of the centerline (total 2.4 NM) perpendicular to the intermediate approach course.
- Complete the trapezoid by connecting the outer ends of the lines. This trapezoid is the area of consideration for obstacle clearance.

Note. The angle(s) of offset from the final approach course may not exceed 60 degrees.

(3) Determine intermediate segment altitude. Locate the highest obstacle in the intermediate segment trapezoid. Add 500 feet of ROC and round to the nearest 100 feet. Use this altitude en route to the FAF.

d. Initial approach segment. The initial approach segment begins at the IAF and ends at the IF.

(1) Determine the IAF. Up to three IAFs are allowed. The minimum distance is 3 NM from the IF. The maximum length is 10 NM.

(2) Determine the area of consideration for obstacle clearance.

- Starting 1 NM prior to the IAF and at the IF, draw a line 2 NM long on both sides of centerline (total 4 NM) perpendicular to the initial approach course.
- Complete the rectangular box by connecting the outer ends of the lines. This box is the area of consideration for obstacle clearance.

Note. The angle(s) of offset from the intermediate course may not exceed 60 degrees.

Note. For other than straight configurations, connect the outside of the boxes by drawing a 2 NM arc (from the IF) between the initial and intermediate segments.

(3) Determine the initial approach segment altitude – Locate the highest obstacle in the initial segment box. Add 1,000 feet of ROC and round to the nearest 100 feet. Use this altitude en route to the IF.

(4) Determine IAF obstacle clearance – Use the MSA altitude en route to the IAF within 30 NM.

4. Recovery procedure diagram. When preparing the recovery procedure diagram, show "FOR VFR TRAINING AND EMERGENCY USE ONLY" twice conspicuously in the plan view. Prior to publication, the diagram will include as a minimum all those items included in the example procedure diagram (figure 4-5).

5. Flyability check. Complete a flight check under VMC in an aircraft to finalize the procedure and validate the diagram. The flight should validate the following:

   a. Locations – IAF, IF, FAF, MAP, and MAHF.

   b. Obstacles.

   c. Approach course.

   d. Obstacle clearance.

   e. Altitudes – MDA, FAF, IF, IAF, MSA/holding pattern altitude.

6. Flyability validation. Once a successful flyability/suitability check has been completed, the developer will validate the diagram in the lower marginal data area. Once validated by the developer, the procedure must be approved by at least the high-risk approval authority of the unit in the lower marginal data area prior to publication..

Note: Digital maps may be used to complete the initial planning for these procedures. Templates made to the appropriate scale may be used also.

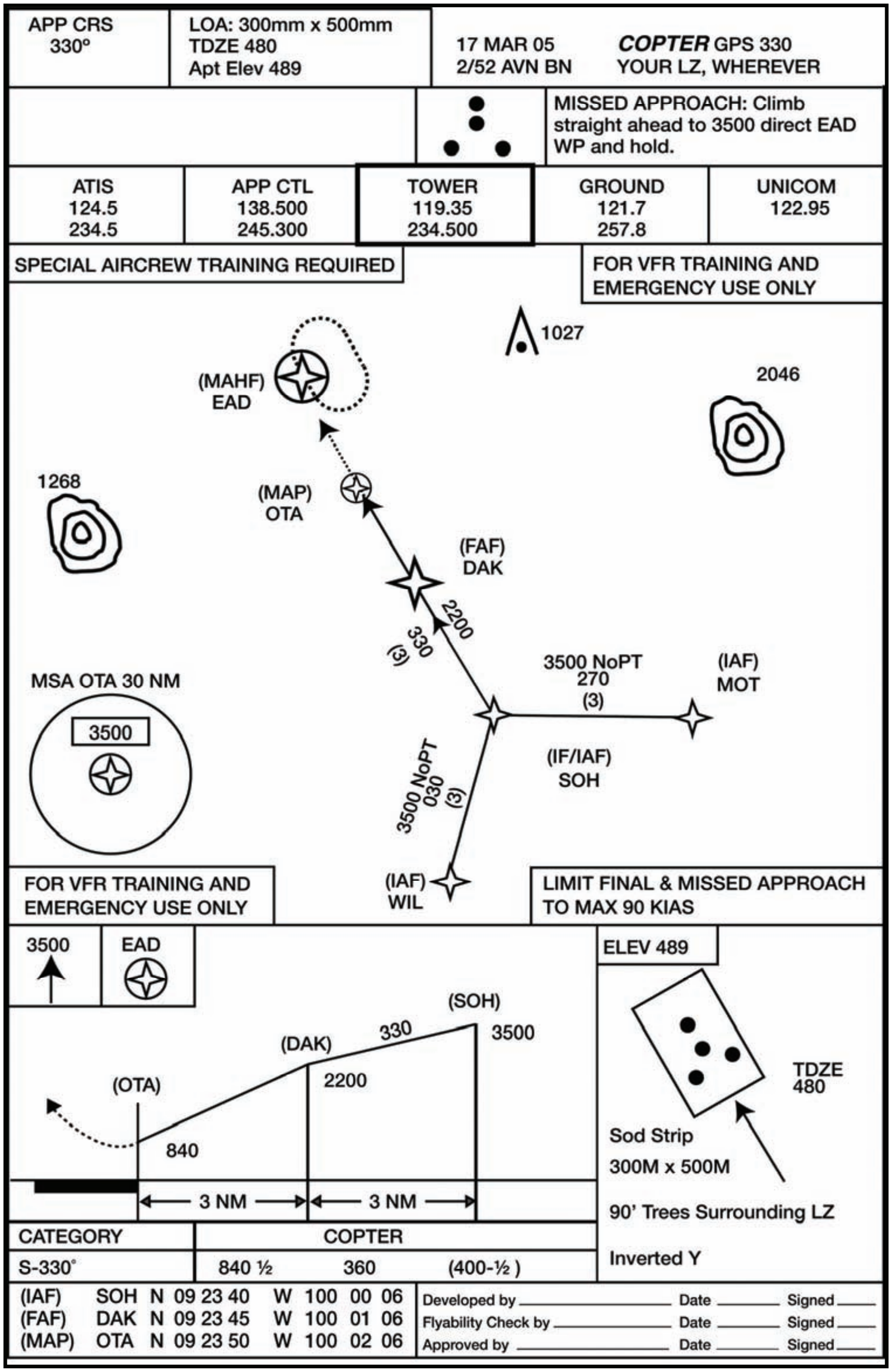

Figure 4-5. Sample of an emergency global positioning system recovery procedure diagram

RECOVERY PROCEDURE DIAGRAM

1. The recovery procedure diagram is a pictorial representation of the procedure to recover the aircraft under VMC using the aircraft navigation system. The procedure is based on crewmember entered coordinates into the aircraft navigation system.

2. The procedure diagram may be computer generated or hand sketched. The diagram need not be as detailed as a DOD-approved chart but must provide all data necessary to execute the procedure.

a. Margin identification:

(1) Top margin includes—approach course, landing area length and touchdown zone elevation, procedure name, landing area name, city and state, landing area lighting, missed approach procedure, and frequencies.

(2) Bottom margin includes—developers printed name, date of development, and signature, check pilots printed name, date of flyability check, and signature, approval authorities printed name and date of approval and signature.

b. Plan view includes—the approach course (degrees magnetic), IAF, IF, FAF, MAP, MAHF holding pattern, obstacles, and MSA. It also includes the terms—

- "FOR VFR TRAINING and EMERGENCY USE ONLY" twice.
- "PPS REQUIRED."
- "LIMIT FINAL & MISSED APPROACH TO MAX 90 KIAS."
- "SPECIAL AIRCREW TRAINING REQUIRED" once.

Note. Precise positioning system (PPS) refers to the GPS precise positioning service. It is DOD policy that military aircraft operate with the PPS mode.

c. Profile view includes—the minimum altitude for prescribed fixes, distance between fixes and the missed approach procedure.

d. Minimums section includes—the minimum descent altitude, visibility, and the height above landing (HAL). Use table 4-3 to compute minimum visibility requirement based on HAL.

Table 4-3. Effect of height above landing surface elevation on visibility minimums

HAL	250 – 475 feet	476 – 712 feet	713 – 950 feet
Visibility Minimum (SM)	½	3/4	1.0

e. Landing area sketch includes—a drawing/diagram of the landing area and the elevation of the highest obstacle within the landing area. It shows the MAP in relation to the available landing area.

3. The space for notes directly below the minimum section will include waypoint names and coordinates.

Note. The unit SOP will address the following topics: training requirements, procedure usage, flyability check, and periodic obstacle/diagram updates.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted academically.
2. Evaluation may be conducted academically.

REFERENCES: Appropriate common references plus the following:

Unit SOP
FM 3-04.240
FAA Handbook 8260.3 (TERPS Manual)
FAA Order 8260.42A (Helicopter GPS Nonprecision Approach Criteria)
FAA Order 7130.3 (Holding)

TASK 2052

PERFORM WATER BUCKET OPERATIONS

WARNING

Never dump water onto ground personnel as the water impact could result in injury.

Minimize hovering or flying slowly over fires. The rotor wash fans the flames which may cause more hazards to ground crews.

When performing this task with cabin doors open, ensure that any personnel in the cabin area are wearing safety harnesses secured to tie-down rings or are seated in seats with seat belts on.

Note. The water bucket, when loaded is a high-density load with favorable flight characteristics. Reduced velocity to never exceed airspeed (Vne) and bank angle limits must be kept in mind. Much of the mission profile is flown at high gross weight and low airspeed. Also, density altitude is greatly increased in the vicinity of a major fire. Performance planning must receive special emphasis.

CONDITIONS: In an H-60 helicopter with an operational cargo hook and water bucket.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Conduct premission planning to determine fuel and bucket cinching requirements. Verify the aircraft will remain within gross weight and center of gravity (CG) limitations for the duration of the flight.
   b. Conduct a thorough crew briefing.
   c. In conjunction with the nonrated crewmembers (NCMs), complete the required checks to ensure proper system operation prior to mission departure.
   d. Operate the water bucket system per manufacture specifications.
   e. Recognize and respond to a water bucket system malfunction.
   f. Use dipping procedures appropriate for the water bucket type.
   g. Hook-up and hover:
      (1) Maintain vertical ascent heading ±10 degrees.
      (2) Maintain altitude of load 5 feet above ground level (AGL), ±1 foot.
      (3) Complete hover power and GO/NO GO checks.
   h. En route: Maintain safe load obstacle clearance (minimum 50 feet above highest obstacle [AHO]).

i. Approach and water release:

(1) Maintain a constant approach angle to ensure load safely clears obstacles.

(2) Maintain ground track alignment with selected approach path.

(3) Execute a smooth and controlled pass or termination over the intended point/area of water drop.

j. Deploy water as directed in proper location, orientation, and length.

2. Nonrated.

a. In conjunction with the rated crewmembers (RCMs), complete required water bucket checks to ensure proper system operation prior to mission departure and attach water bucket to the aircraft.

b. Ensure water bucket is configured for the condition and mode of flight.

c. Recognize and respond to a water bucket system malfunction.

DESCRIPTION:

1. Crew actions.

a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers are familiar with water bucket operations, emergency, and communication procedures The PC will confirm that required power is available by comparing the information from the performance planning card (PPC) to the hover power check.

b. The pilot on the controls (P*) will remain primarily focused primarily outside the aircraft throughout the maneuver. The P* will monitor altitude and avoid obstacles.

c. The pilot not on the controls (P) will monitor the cockpit instruments and assist the P* in clearing the aircraft. The P will set cargo hook switches, as required, and should make all radio calls. When directed by the P* during the approach, the P will place the cargo hook arming switch to the ARMED position. The P will release the water on command from the P* or according to the crew briefing.

d. The P and NCM will assist in clearing the aircraft and will provide adequate warning of obstacles. They will announce when their attention is focused inside and again when attention is reestablished outside.

e. The NCM will remain primarily focused on the bucket. The NCM will guide the P* during the bucket pickup, advise of the bucket condition in flight, provide directions and assistance when to dump the water, and direct the P* when setting down the bucket.

f. The NCM will advise the P* of any water bucket faults or failures.

g. Sling load procedures according to task 2048 will be used for normal sling load techniques and load call outs. The NCM will advise the P* when the water bucket is in the water, filling, full, water deploying, and empty. The NCM will instruct the P* (as necessary) to keep the electrical attachment assembly from entering the water.

2. Procedures.

a. Preflight.

(1) The PC will analyze the mission using mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC) and determine the amount of water required to conduct the mission and the initial profile to be used during the water emplacement.

(2) The NCM(s) will ensure the water bucket is installed, all installation checks are completed according to unit standing operating procedure (SOP) and the water bucket operator's manual.

(3) The crew will conduct the ground checks according to manufacture procedures to confirm the proper operation of the water bucket before takeoff.

b. Hook up and hover. Once the water bucket is placed on the ground beside the aircraft and all associated wiring is installed, place the cargo release switch in the ARM position. Follow verbal signals from the NCM to hover over the water bucket. Apply control movements as necessary to remain vertically clear and centered over the water bucket. Once in this position, smoothly apply collective input until all slack is removed from the suspension cable. Maintain heading with pedals. Apply additional collective to raise the bucket to 5 feet AGL. Monitor aircraft instruments to ensure aircraft limitations are not exceeded.

c. Water pick up. Arrive over water source with minimal forward speed and a bucket height of 10 feet above water level. Slowly reduce collective until the bucket makes contact with the water. Once the bucket has inverted and submerged in the water, follow verbal signals from the NCM to remain centered over the bucket as it fills—applying cyclic, collective, and pedals as necessary. The pilot can vary the bucket's capacity by varying the speed at which it is pulled from the water. A slow lift gives minimum fill. A fast lift gives maximum fill. When the NCM indicates the bucket is ready or full, increase collective until all slack is removed from the suspension cable and the lip of the bucket is clear of the water. Maintain heading with pedals. Apply additional collective to raise the filled bucket clear of the water's surface to a height of 5 feet. Ensure the bucket is holding the water and monitor aircraft instruments to ensure aircraft limitations are not exceeded.

d. Take off. Establish a constant angle of climb that will permit safe obstacle clearance. When above 100 feet AGL or when clear of obstacles, adjust attitude and power as required to establish the desired rate of climb and airspeed. Smoothly adjust flight controls to prevent bucket oscillation.

Note. Ensure that the cargo hook arming switch is in the ARMED position when operating at altitudes below 300 feet AHO and in the SAFE position above 300 feet AHO.

e. En route. Maintain the desired altitude, flight path, and airspeed. Make smooth control applications to prevent bucket oscillation. If a lateral bucket oscillation occurs, reduce airspeed. If a fore-and-aft oscillation occurs, begin a shallow turn while reducing airspeed.

Note. Recommended en route airspeed with loaded or unloaded water bucket is 80 knots indicated airspeed (KIAS).

Note. When flying with the bucket empty, open the bucket to allow streamlining. This prevents the bucket from twisting and pinching the cables.

f. Approach and water release. Altitude and airspeed affect the dump pattern. It is most concentrated at lower altitudes (AGL) and at a hover. The pattern will spread with altitude and speed. (The PC will determine the most appropriate height and speed for the pattern desired or according to the mission briefing.) When the approach angle is intercepted, decrease the collective to establish the descent. When passing below 300 feet AGL, place cargo hook in ARM position. Maintain entry airspeed until apparent ground speed and rate of closure appear to be increasing. Progressively decrease the rate of descent and forward airspeed until a momentary hover is attained with the water bucket between 20 to 50 feet above intended release point. This method is effective for spot fires. For water release on a fire line or large area, maintain water bucket at 20 to 50 feet above intended release point and airspeed between slightly above effective translational lift not to exceed 50 KIAS for more effective coverage. Confirm all water releases with NCM.

Note. The bucket manufacturer does not recommend dumping at airspeeds above 50 KIAS.

Note. There is a delay of appropriately 0.5 to 1.0 second between the activation of the dump switch and the discharge of the water.

Note. If the bucket fails to open, attempt to establish a hover. Lightly "BOUNCE" the bottom of the bucket on the ground and then repeat the water drop release procedure. If the bucket sill does not open, establish a hover. Gently lower the bucket to the ground. With the bucket resting on the ground, move the aircraft laterally to dump the water out of the bucket and repeat the fill-up procedure.

Note. Avoid flight over populated areas.

Note. A go-around should also be initiated if visual contact with the water release area is lost or any crewmember announces "climb, climb, climb." This phrase will only be used when there is not enough time to give detailed instructions to avoid the obstacle.

g. Post mission.

(1) Ensure water bucket is serviceable.

(2) Derig aircraft and water bucket. Ensure all documentation is complete on water bucket usage and inspection.

SAND/DUST/SMOKE CONSIDERATIONS: If during the approach, visual reference with the water release area or obstacles is lost, initiate a go-around or instrument takeoff (ITO) as required, immediately. Be prepared to transition to instruments. Once visual meteorological conditions (VMC) are regained, continue with the go-around. (If required, releasing the water reduces the gross weight (GWT) by 5,000 to 6,000 pounds and minimizes power demand.)

MOUNTAINOUS AREA CONSIDERATIONS: If at any time during an approach, the aircraft does not have sufficient power, and turbulent conditions or wind shift creates an unsafe condition, perform a go-around immediately. (If required, releasing the water reduces the GWT by 5,000 to 6,000 pounds and minimizes power demand.)

OVERWATER CONSIDERATIONS: Overwater flight, at any altitude, is characterized by a lack of visual cues, and, therefore, has the potential of causing visual illusions. Be alert to any unannounced changes in the flight profile and be prepared to take immediate corrective actions. The radar altimeter low bug should be set to assist in altitude control. Operations become increasing more hazardous as references are reduced (open water versus a small lake), water state increases (calm to chop to breaking condition with increasing wave height), and visibility decreases (horizon becomes same color as water, water spray or rain on windshield, sunny midday versus twilight).

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. During water bucket operations, the P*'s attention will be divided between the aircraft instruments (altitude and ground speed) and the outside. It is critical during night vision goggle (NVG) operations that the P's and NCM's focus be primarily outside to provide warning to the P* of obstacles or hazards during the entire operation.

2. Spatial disorientation can be overwhelming during overwater operations at night. Proper scanning techniques are necessary to avoid spatial disorientation. If there are visible lights on the horizon or if the shoreline can be seen, the pilot may opt to approach and hover the aircraft so it is pointed toward these references—if the wind permits. If no other references exist, deploy chemlights to assist in maintaining a stable hover during the water pickup.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

AR 70-62
FM 4-20.197
FM 3-34.210
Water bucket airworthiness release

TASK 2054

PERFORM FAST-ROPE INSERTION AND EXTRACTION SYSTEM OPERATIONS

> **WARNING**
>
> **Ensure that crewmembers in the cabin area are wearing safety harnesses secured to tie-down rings anytime the cabin doors are open. Also ensure that all ropers are on the ground before any ropes are released.**

CONDITIONS: In an H-60 helicopter with fast-rope insertion and extraction system (FRIES) equipment installed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Conduct a thorough crew and passenger briefing.
   b. Maintain entry altitude as directed ±10 feet.
   c. Maintain maximum entry airspeed of 80 knots indicated airspeed (KIAS) ±5 KIAS.
   d. Maintain track aligned with landing direction.
   e. Perform a smooth, controlled termination to a hover over the insertion point. Deceleration attitude not to exceed 30 degrees.
   f. Maintain appropriate hover height ±5 feet (not to exceed rope height).
2. Nonrated. Ensure that the aircraft is configured for FRIES operations per TC 21-24 and the appropriate airworthiness release (AWR).

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will conduct a crew and passenger briefing and ensure personnel are familiar with normal and emergency procedures. The PC will ensure the aircraft is rigged.
   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver and will announce when he or she begins the maneuver. The P* will also announce the intended point of insertion.
   c. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist in clearing the aircraft and will provide adequate warning of obstacles. They will also assist the P* in maintaining a stable hover. The NCM will inspect the rigging to ensure that the aircraft is configured for FRIES operations.

2. Procedures.

   a. To perform a FRIES assault, execute a terrain flight approach to the insertion point. On final, adjust airspeed and altitude during the approach to stop over the insertion point at a predetermined hover height (not to exceed rope length). At a stabilized hover the FRIES operation begins. Remain over the area at a stabilized hover, until all ropers and ropes are clear.

   b. After ropers are clear, crewmembers will pull the ropes back inside the aircraft or release them by pulling the locking device and detaching the rope. Keep the aircraft stationary until the "ropes clear" signal is given.

Note. Task 1038 and task 2036 contain procedures that may be used in performing this task.

Note. A high hover—especially if a 90-foot rope is used—may cause the loss of all normal visual hover cues.

NIGHT OR NVD CONSIDERATIONS: Due to loss of forward references during decelerations, recommend maximum pitch attitude of 15 degrees. Use infrared (IR) bypass band filter searchlight as necessary to maintain position and hover altitude for night vision goggle (NVG) operations. Proper scanning techniques are necessary to detect aircraft drift and to avoid spatial disorientation.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the FRIES airworthiness release.
TC 21-24
USASOC 350-6

TASK 2056

PERFORM RAPPELLING OPERATIONS

> **WARNING**
>
> **Ensure that the rappel master and crew chief are wearing safety harnesses secured to tie-down rings anytime the cabin doors are open. Also ensure that all rappellers are on the ground before any rappel ropes are released.**

CONDITIONS: In an H-60 helicopter with rappelling equipment installed.

STANDARDS: Appropriate common standards plus the following additions/modification:

1. Rated.

   a. Conduct a thorough crew and passenger safety briefing.

   b. Maintain appropriate hover altitude ±5 feet allowing at least 20 feet of rope to remain on the ground.

   c. Do not allow drift to exceed ±5 feet from the intended hover point.

   d. Maintain ropes in continuous contact with the ground.

2. Nonrated. Ensure that the aircraft is configured for rappelling operations per TC 21-24.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will conduct a crew and passenger briefing and ensure personnel understand their responsibilities during rappelling operations, including aircraft safety and actions in the event of an emergency. The PC will ensure the aircraft is rigged. The PC will also emphasize procedural techniques for clearing, recovery, and jettison of ropes.

   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver for aircraft control and obstacle avoidance. The P* will announce the intended point of insertion and remain centered over the target with corrections from the rappel master and nonrated crewmember (NCM) as required.

   c. The pilot not on the controls (P) and NCM will assist in clearing the aircraft and will provide adequate warning of obstacles. They will also assist the P* in maintaining a stable hover by providing the P* with information regarding drift of the aircraft. The P will also monitor cockpit indications.

   d. The NCM will ensure that the aircraft is configured per TC 21-24. The NCM will also ensure that all rappelling ropes are dropped or retrieved and secured in the aircraft before takeoff.

2. Procedures. Make the approach into the wind (if possible) and plan to terminate the approach at an altitude that will clear the highest obstacle. Select an appropriate reference point to maintain heading and position over the ground. Ensure the aircraft is at an altitude that allows approximately 20 feet of the rappelling ropes to be on the ground. During the rappelling operation, use the collective to maintain altitude and be prepared to correct for center of gravity (CG) changes as the rappellers depart the aircraft.

ADVERSE WEATHER/TERRAIN CONDITIONS: Rappel operations will not be conducted under the following conditions:

1. Lightning strikes within 1 nautical mile of rappelling operations.
2. Water or ice on the rope inhibiting the ability of the rappellers to control their descent.
3. The rope is exposed to the elements for a sufficient length of time to freeze—thereby reducing its tensile strength.
4. Blowing particles produced by rotor wash, causing the aircrew or the rappel master to lose visual contact with the ground.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Proper scanning techniques are necessary to avoid spatial disorientation. One chemlight will be attached to the end of the rope and one to the attachment point of the rope. Night vision goggle (NVG) lighting will be according to unit standing operating procedure (SOP) or the tactical environment.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the rappelling airworthiness release.
TC 21-24

TASK 2058

PERFORM SPECIAL PATROL INFILTRATION/EXFILTRATION SYSTEM OPERATIONS

WARNING

Ensure that the SPIES master and crew chief wear safety harnesses secured to tie-down rings anytime cabin doors are open.

CAUTION

Ensure that SPIES rope remains secured to the cargo hook until the aircraft has landed. If recovery of SPIES rope is impossible, execute a roll-on landing to avoid entanglement in the rotor system.

CONDITIONS: In an H-60 helicopter with special patrol infiltration/exfiltration system (SPIES) equipment installed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Conduct a thorough crew and passenger safety briefing.
   b. Maintain obstacle clearance between team members, obstacles, and the ground.
   c. Maintain airspeed ±5 knots. (Maximum airspeed with team members attached is 70 knots indicated speed (KIAS) in moderate climates and 50 KIAS in cold climates.)
   d. Do not let the bank angle exceed 30 degrees.
2. Nonrated. Ensure that the aircraft is prepared for SPIES operations per TC 21-24 and the unit standing operating procedure (SOP).

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers are familiar with SPIES operations, emergency procedures, and communication procedures. The PC will ensure the aircraft is rigged.
   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver for aircraft control and obstacle avoidance. The P* will announce the intended point of extraction and remain centered over the target with corrections from the SPIES master as required.
   c. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist in clearing the aircraft and will provide adequate warning of obstacles. They will assist the P* during the pickup phase of the operation. They will advise the P* when the slack is out of the rope and when the SPIES members are off the ground and above the highest obstacle. During forward

flight, the NCM must constantly monitor the SPIES team members and keep the P* informed of their stability and height above obstacles.

2. Procedures.

   a. Ascend at a rate that will ensure the safety of the SPIES members. To avoid "jerking" the SPIES members off the ground, the slack in the rope must be removed cautiously. Do not start forward flight until all obstacles are cleared.

   b. Maximum en route airspeed will be no faster than 70 KIAS in moderate climates and 50 KIAS in cold climates while team members are attached to the SPIES rope. Maximum aircraft bank angle will be no greater than 30 degrees. During forward flight, the NCM must constantly monitor the SPIES members and keep the P* informed of their stability. It may be necessary to reduce airspeed if SPIES personnel begin to spin or if the cone angle exceeds 30 degrees.

   c. Upon arrival at the dismount area, a transition is made into hovering flight at an altitude of 250 feet above ground level (AGL). A vertical descent is started with the rate not to exceed 100 feet per minute at touchdown. Maintain a stable hover until SPIES team members clear the rope.

WATER EXTRACTION CONSIDERATIONS: The SPIES is suitable for extracting teams from the water. For this procedure, three inflatable life vests or any type of floatation device is tied to the SPIES rope to provide buoyancy for the rope while in the water. Takeoff, en route, and landing are the same as over land. The dismounting procedures differ when landing on a ship. Once onboard, the team members take their orders from personnel in charge of the deck.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. For unaided night flight, the landing light and searchlight should be operational. If a night vision goggle (NVG) filter is installed, it should be removed.
2. Due to the high hover altitude of SPIES operations, it is very difficult to determine altitudes and relative position over the ground. The barometric altimeter is not reliable for this maneuver, but can be used as an aid to help maintain a constant altitude. References—such as treetops, lights, and manmade objects—can be used to help prevent drift by lining up the objects and maintaining their relative position once the aircraft is at a stable altitude.
3. If possible, select an area with good contrast and several reference points at the same or greater height as the SPIES hover altitude. Proper scanning techniques are necessary to avoid spatial disorientation.
4. Spatial disorientation can be overwhelming during overwater operations at night. If there are visible lights on the horizon or if the shoreline can be seen, the pilot may opt to approach the survivor(s) so the aircraft is pointed toward these references, if the wind permits. If no other references exist, deploy chemlights to assist in maintaining a stable hover.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the SPIES airworthiness release.
TC 21-24
USASOC 350-6

TASK 2060

PERFORM RESCUE HOIST OPERATIONS

> **WARNING**
>
> **Ensure that crewmembers in the cabin area are wearing safety harnesses secured to tie-down rings anytime the cabin doors are open. The crewmember riding the hoist will be secured either to the aircraft or to the jungle penetrator.**

CONDITIONS: In an H-60 helicopter equipped with a rescue hoist system.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Perform rescue hoist procedures per the appropriate aircraft operator's manual/CL, FM 4-02.2, FM 3-04.203, and the unit standing operating procedure (SOP).

   b. Maintain appropriate hover altitude ±5 feet.

   c. Do not allow drift to exceed ±5 feet.

   d. Perform post flight procedures per the appropriate aircraft operator's manual/CL.

2. Nonrated.

   a. Prepare the appropriate hoisting equipment for the required mission (overwater, rapid river, jungle, mountain, or desert operations).

   b. Operate the rescue hoist pendant per the appropriate technical manual.

   c. Prepare patient for recovery.

   d. Secure the patient and equipment for departure.

   e. Perform post flight procedures per the appropriate aircraft operator's manual/CL.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers are familiar with rescue hoist operations, emergency procedures, communication procedures, lowering the flight medic, and lifting the patient off the ground using the hoist or aircraft. The PC will also ensure that all crewmembers understand "CUT CABLE" procedures.

   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver for aircraft control and obstacle avoidance. The P* will announce the intended point of hover and remain centered over the target with corrections from the nonrated crewmember (NCM).

   c. The pilot not on the controls (P) and NCM will assist in clearing the aircraft and will provide adequate warning of obstacles. They will also assist the P* in maintaining a stable hover by providing the P* with information regarding the drift of the aircraft. The P will also monitor cockpit indications. The P will be able to operate the control panel for the rescue hoist (if necessary).

d. The NCM will ensure that the hoist is configured and will also ensure that all lifting devices (such as jungle penetrator, sked/stokes litter, and survivor's slings) are secured in the aircraft before takeoff.

e. The NCM will conduct the hoist operation per FM 4-02.2, FM 3-04.203, the appropriate aircraft operator's manual/CL, and the unit SOP. The P* will perform the appropriate steps for the pilot on the controls per the appropriate aircraft operator's manual/CL and initiate the appropriate type of landing.

Note. The P* should be in the right seat, which allows the P in the left seat to visually monitor the entire operation.

2. Procedures.

a. General recovery procedures over land. Crewmembers should be alerted approximately 5 minutes before arriving at pickup site. Crewmembers complete all required checks (such as rescue hoist control panel switches set, hoist circuit breakers set, intercommunication system (ICS) selector switches set, and crewmembers reposition for hoist operations). Make the approach into the wind if possible and plan to terminate the approach at an altitude that will clear the highest obstacle. Select an appropriate reference point to maintain heading and position over the ground. Once stabilized over pickup site, perform hoist operations according to FM 4-02.2, FM 3-04.203, the appropriate aircraft operator's manual /CL, and the unit SOP.

b. Inert patient recovery. General format is the same as over land, except the medical officer (MO) is lowered on the hoist and secures the patient to the recovery device. Prior to deploying, all crewmembers will be briefed on method of recovery (simultaneous or singular recovery of the patient and MO), and a radio communications check should be made between the pilot and MO.

c. General recovery procedures overwater. General format is the same as over land, except a smoke device may be used to determine wind direction and velocity. Terminate the approach at a 100-foot hover—20 feet before reaching the patient. Deploy the recovery device and allow it to contact the water before reaching the patient. All crewmembers will wear floatation devices. Operations become increasingly more hazardous as references are reduced (open water versus a small lake or ship versus small boat), sea state increases (calm to chop to breaking condition with increasing wave height), and visibility decreases (horizon becomes same color as water, water spray or rain on windshield, sunny midday versus. twilight).

Note. The NCM will advise the P* when the person/equipment is in position on the jungle penetrator. The NCM will perform hoist operations using the standard words and phrases according to the unit SOP. The NCM will secure jungle penetrator or stokes litter upon completion of the hoisting operation. Should difficulty in maintaining a stable hover occur, the NCM will extend additional cable as "slack" to preclude inadvertent jerking the cable.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Use proper scanning techniques to avoid spatial disorientation.

1. For unaided night flight, the landing light and searchlight should be operational. If a night vision goggle (NVG) filter is installed, it should be removed.
2. Hovering with minimum drift is difficult and requires proper scanning techniques and crewmember coordination when NVGs are used. If possible, an area with adequate ground contrast and reference points should be used.
3. Visual obstacles (such as shadows) should be treated the same as physical obstacles.

4. Spatial disorientation can be overwhelming during overwater operations at night. If there are visible lights on the horizon or if the shoreline can be seen, the pilot may opt to approach the survivor(s) so the aircraft is pointed toward these references, if the wind permits. If no other references exist, deploy chemlights to assist in maintaining a stable hover.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

FM 4-02.2
FM 4-02.6

TASK 2061

Operate forward looking infrared system

CAUTION

During takeoff, do not rotate forward while on the main landing gear (to preclude contacting the FLIR turret on the ground). During landings, do not make a hard landing (compressing the struts) or heavy braking (to preclude contacting the FLIR turret on the ground).

CONDITIONS: In an H-60.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Operate the installed forward looking infrared (FLIR) per the appropriate aircraft operator's manual.
2. Use the multifunction display (MFD) to view FLIR picture.
3. Select menu for operating FLIR.
4. Select and use the appropriate field of view (FOV) polarity gain and pointing control on the FLIR system.
5. Select the caution advisory screen or pop-up window for run-up or current mission profile.
6. Interpret data between the MFD and central display unit (CDU).

DESCRIPTION:

1. Crew actions.
   a. During run-up, the pilot on the controls (P*) and pilot not on the controls (P) will ensure all procedures per the appropriate aircraft operator's manual are followed to ensure no damage occurs to the FLIR turret.
   b. The P* will focus primarily outside the aircraft and respond to navigation cues given by the P. The P* flies the mission profiles at the appropriate airspeeds, altitudes, and headings as directed by the P.
   c. The P selects desired FLIR menu items to view outside the aircraft.
   d. The P monitors all mission equipment and uses the FLIR and MFD.
   e. The FLIR is stowed and shut down per the appropriate aircraft operator's manual.
2. Procedures. Perform the turn on, test the procedures, and select operational modes per the appropriate technical manual. Select the polarity, FOV and gain to best fit the current mission profile. Know and understand factors and or emergencies adversely affecting the MFDs, which could result in degraded mission performance or the mission being aborted. Know and understand takeoff and landing procedures that could cause damage to the FLIR system turret. The proper shutdown procedures will be performed per the technical manual.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Ensure MFD lighting adjustment is set at an acceptable level for night or night vision goggle (NVG) operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the appropriate manufacturer's references.

TASK 2063

Operate storm scope weather mapping system

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Operate the storm scope weather mapping system per the appropriate technical manual (TM).
2. Select range and sector coverage for desired weather representation.
3. Interpret cell/strike data and adjust mission as appropriate to avoid severe weather.

DESCRIPTION:

1. Crew actions.
   a. The pilot on the controls (P*) will focus primarily outside the aircraft and respond to navigation cues given by the pilot not on the controls (P). The P* flies the mission profiles at the appropriate airspeeds, altitudes, and headings as directed by the P.
   b. The P monitors all mission equipment and uses the storm scope weather mapping system.
   c. The P will direct the P* with heading changes or request route changes from air traffic control (ATC) to avoid hazardous weather conditions.
2. Procedures. Perform the turn-on, and select operational modes per the appropriate technical manual. Understand factors and or weather adversely affecting the aircraft, which could result in degraded mission performance or the mission being changed or aborted.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Ensure multifunction display (MFD) lighting adjustment is set at an acceptable level for night or night vision goggle (NVG) operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 2064

PERFORM PARADROP OPERATIONS

WARNING
Ensure that any personnel in the cabin area not wearing parachutes are wearing safety harnesses secured to tie-down rings or are seated in seats with seat belts on.
If parachutes use automatic rip cord releases, ensure that the automatic release is disconnected before descent is initiated. For an in-flight emergency, if altitude cannot be maintained, notify the jumpmaster immediately so automatic rip cord releases can be disconnected.
Ensure that static lines remain secured to the anchor point until they are recovered or the aircraft has landed. If recovery of static lines is impossible, execute landing with forward speed to avoid entangling deployment bags in the rotor system.

CONDITIONS: In an H-60 helicopter with a jumpmaster.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Conduct a thorough crew and passenger safety briefing.
   b. Maintain briefed airspeed not to exceed a maximum airspeed of 90 knots indicated airspeed (KIAS) during jumper deployment.
   c. Maintain appropriate ground track over the drop zone.
2. Nonrated. Ensure that the aircraft is prepared for paradrop operations per the appropriate aircraft operator's manual, FM 3-05.211, FM 3-21.220, and the unit standing operating procedure (SOP).

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers are familiar with paradrop operations, emergency procedures, and communication procedures. The PC will ensure the aircraft is rigged.
   b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver.
   c. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist in clearing the aircraft and will provide adequate warning of obstacles and traffic.
   d. The P will ensure that the jumpmaster or crew chief retrieves the static lines as soon as the last parachutist has cleared the aircraft.

e. The NCM will ensure that the aircraft is prepared for paradrop operations. The NCM or the jumpmaster will acknowledge all communications from the P* and P. The NCM will inform the P* or P when all parachutists have exited the aircraft and when the deployment bags have been recovered.

2. Procedures. Maintain altitude, airspeed, and ground track as determined during premission planning and jumpmaster's instructions. Perform in-flight procedures per FM 3-05.211 and FM 3-21.220. The crew will conduct the paradrop per the procedures covered in the briefing and the references listed below. The PC will check that the jumpmaster or crew chief (CE) retrieves the static lines as soon as the last parachutist has cleared the aircraft.

Note. If the jumpmaster cannot communicate directly with the P*/P, the jumpmaster will communicate with the CE via hand-and-arm signals. The CE will relay necessary information to the P*/P via the intercom.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

Federal Aviation Regulation (FAR), Part 105
FM 3-21.220
FM 3-05.211

TASK 2065

Operate personnel locater system

CONDITIONS: In an H-60 helicopter with personnel locator system (PLS) installed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Program proper frequencies into the PLS.
2. Insert the proper search code into the PLS.
3. Use the PLS control head.
4. Interpret the course to target information displayed on the instrument panel.

DESCRIPTION:

1. Crew actions. The pilot on the controls (P*) will focus primarily outside the aircraft and respond to navigation cues given by the pilot not on the controls (P). The P* flies the mission profiles at the appropriate airspeeds, altitudes, and headings as directed by the P.
2. Procedures. Load the proper frequencies and the proper search code during the before-starting-engine checks. Use the burst, continuous home switch positions during the tracking procedure, and follow the course indicator on the instrument panel to the downed crewmember location.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the appropriate manufacturer’s references.

TASK 2066

Perform extended range fuel system operations

CONDITIONS: In an H-60 helicopter with an extended range fuel system (ERFS) consisting of the appropriate fuel tanks.

> ***Note.*** ERFS encompasses any authorized extended range fuel system such as auxiliary fuel management system (AFMS), crashworthy external fuel system (CEFS), and internal auxiliary fuel system (Robertson).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Verify that the required amount of fuel is onboard at the time of each takeoff.
   b. Initiate an alternate course of action if the actual fuel consumption varies from the planned value and the flight cannot be completed with the required reserve.
   c. Balance/manage fuel tank levels (if appropriate) to maintain aircraft within center of gravity (CG) limits.
   d. Verify that the aircraft will remain within weight and CG limitations for the duration of the flight.
   e. Operate the auxiliary fuel management panel per the appropriate aircraft operator's manual/checklist (CL).
   f. Recognize and respond to ERFS malfunctions.
   g. Perform or describe appropriate emergency procedures per the appropriate aircraft operator's manual /CL.
2. Nonrated.
   a. Complete all preflight duties per the appropriate aircraft operator's manual /CL and unit standing operating procedure (SOP).
   b. Recognize and alert the pilot not on the controls (P) to ERFS malfunctions.

DESCRIPTION: Monitor the main fuel quantity indicators and the auxiliary fuel management panel to ensure that the system is operating normally. Operate the fuel management system panel in the AUTO or MANUAL mode, as required.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 2068

PERFORM SHIPBOARD OPERATIONS

> **WARNING**
>
> **Do not move the cyclic with the pitch and roll of the ship. Do not allow the rotor to dip down to a low position, as it could be fatal to deck crews and those exiting the aircraft.**

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Comply with arrival and departure and landing signal enlisted (LSE)/controller instructions.

   b. Set the parking brakes before landing.

   c. Ensure a green deck before landing.

   d. Perform a visual meteorological conditions (VMC) approach.

   e. Perform a VMC takeoff.

2. Nonrated.

   a. Ensure tail wheel is cleared on deck.

   b. Ensure aircraft is chained or moored before exiting.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft to provide obstacle clearance throughout the maneuver. The P* will announce when beginning the approach and whether the approach will terminate to a hover or to the surface. The P* also will announce the intended point of landing and any deviation to the approach, to include go-around. The P* will announce his or her intentions to takeoff.

   b. The pilot not on the controls (P) will call out "crossing the wake" and will complete the before-landing check. The P will ensure that the parking brakes are set and the tail wheel is locked. The P will verbally relay the signalman's signals if the P* loses visual contact with the LSE.

   c. The P and nonrated crewmember (NCM) will assist in clearing the aircraft and will provide adequate warning of obstacles, unannounced drift, and changes in altitude. They will announce when their attention is focused inside and again when attention is reestablished outside and will acknowledge all P* directions. They will assist the P* in ensuring that the main wheels are within the landing deck circle before touchdown.

2. Procedures.

Note. The deck landing area may have a perimeter safety net, perimeter markings, and red lights outlining the landing area. Two white lineup lines form an "X" through the landing area. These lines contain white lights, which are only visible when the aircraft is aligned on the approach path. Around the center of the "X" is a white circle with a centered amber light. The landing gear will normally be in the forward portion of this circle, but landing will be as directed by the LSE/controller. Most ships have floodlights to illuminate the landing area for unaided operations but the lights can be turned down or off for night vision goggle (NVG) operations.

a. Before the approach. When cleared to land, adjust airspeed as necessary, descend to 200 feet above ground level (AGL), and enter the landing pattern. (The LSE will expect the pilot in the seat nearest the bow of the ship upon landing to be at the flight controls for the first landing.) Make a standard rate turn or less in the appropriate direction and cross perpendicular to the ships wake, and then begin the turn to final. When the ship is underway, it will be necessary to make lateral corrections to maintain alignment with the landing deck lineup lines. An alternate technique is to lead the ship by initiating the approach to a point forward of the flight deck.

b. During the approach. Cross the deck edge no faster than a brisk walk at an altitude of 5 to 10 feet above the landing surface. (Higher altitudes make it difficult to maintain good visual references.) Keep the LSE in sight. Stop all aircraft movement over the center of the deck and ensure the main landing gear is within the landing circle.

Note. The LSE will assist during the last part of the approach with hand and arm signals.

(1) Hovering. Maintain a hover until the LSE gives the signal to set the aircraft down. Follow the LSE's signal to move left, right, aft, or forward. Control drift using the ship's superstructure and the horizon, if visible, for attitude reference while hovering.

(2) Landing. In rough seas, attempt to land when the ship is at the apex of a pitch up. Watch the LSE and listen to guidance from the ship's tower. Lower the collective and perform a controlled touchdown with the main wheels inside the landing deck circle. When the landing gear is on the deck, smoothly lower the collective to the full down position. Maintain the cyclic centered and ignore aircraft motion. Wait until the wheels are chained or moored before exiting the aircraft.

(3) Takeoff. The P will show his hands during the day or will flash a light at night to indicate to the LSE which aviator is at the controls. When cleared for takeoff, increase power and smoothly ascend to a hover height of 10 feet, keeping the LSE in sight. Slide left or right as directed to clear any obstruction and depart the ship at a 45-degree angle from the bow. The ship can be used for an attitude reference during acceleration. During conditions of reduced visibility, it may be necessary to transition to instruments for most of the takeoff.

Note. Hover out of ground effect (OGE) power may be required for this task.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: At night and during periods of reduced visibility, fly instruments or cross-check the flight instruments while in the holding pattern. The P will advise when he has the lineup line in sight. The P* will transition outside and make flight control adjustments as necessary to lineup on final and to remain aligned with the lineup line. The P will continue to assist by monitoring the flight instruments, calling out airspeed, and calling out altitude as necessary.

OVERWATER CONSIDERATIONS: Overwater flight, at any altitude, is characterized by a lack of visual cues and, therefore, has the potential of causing visual illusions. Be alert to any unannounced changes in the flight profile and be prepared to take immediate corrective actions. The radar altimeter low bug should be set to assist in altitude control. Hazards to terrain flight such as harbor lights, buoys, wires, and birds must also be considered during overwater flight.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:
JP 3-04.1
Shipboard Aviation Facilities Resume

TASK 2070

PERFORM M-139 VOLCANO OPERATIONS

CONDITIONS: In an H-60 helicopter with M-139 Volcano System installed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated

   a. Conduct permission planning to include required load configuration for size of minefield to be emplaced. Verify the aircraft will remain within center of gravity (CG) limitations for the duration of the flight.

   b. In conjunction with the nonrated crewmember(s) (NCMs), complete the required M-139 checks to ensure proper system operation prior to mission departure.

   c. Operate the M-139 Volcano System per the appropriate aircraft operator's manual/checklist (CL) and airworthiness release.

   d. Recognize and respond to a Volcano System malfunction.

   e. Perform or describe appropriate emergency procedures per the appropriate aircraft operator's manual/CL.

   f. Deploy a minefield in the designated location, orientation, and length maintaining ground speed ±5 kilometers per hour (KPH).

   g. Submit scatterable minefield warning (SCATMINWARN) report. (See table 4-4.)

2. Nonrated.

   a. In conjunction with the rated crewmember (s) (RCMs), complete required M-139 checks to ensure proper system operation prior to mission departure.

   b. Load and inventory M87/M87A1/M88 mine canisters.

   c. Set dispenser control unit (DCU) to mission parameters.

   d. Operate the M-139 Volcano System per the appropriate operator's manual/CL.

   e. Recognize and respond to a Volcano System malfunction.

   f. Perform or describe appropriate emergency procedures per the appropriate operator's manual/CL.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft to provide obstacle clearance throughout the maneuver and maintain ground speed ±5 KPH and altitude ±10 feet during the mine-dispensing pass.

   b. The pilot not on the controls (P) will provide adequate warning to avoid obstacles detected in the flight path and will announce when his or her attention is focused inside the cockpit and again when attention is reestablished outside. P will back up the P* with altitude and ground speed calls using the AN/ASN-128 Doppler or AN/ASN 128B Doppler/global positioning system (GPS) ground speed display to match the DCU ground speed setting and the AN/APN-209 radar altimeter for height above the ground. The P will complete and send the SCATMINWARN message.

c. The NCM will operate the DCU and advise the P* and P of DCU settings prior to mine dispensing. In addition, the NCM will advise the P* of any DCU faults or failures.

2. Procedures.

a. Preflight.

(1) The pilot in command (PC) will analyze the mission using mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC) and determine the number of canisters required to conduct the mission and the initial profile to be used during the mine emplacement. The PC will select or have designated one or more of the following control measures during mine emplacement:

- Visual identification—start/stop markers on the ground.
- Time-lapse tables to determine the minefield length.
- Canister countdown.
- Doppler/GPS navigation system—start/stop coordinates.

(2) The NCMs will ensure the Volcano System is installed, all installation checks are completed, and the mine canister pallets are loaded per direction of the PC or standing operating procedure (SOP).

(3) The crew will conduct the ground checks according to the appropriate operator's manual/CL to confirm the proper operation of the Volcano prior to takeoff.

b. Prior to arrival at target area.

(1) T–5 minutes: Turn the DCU power switch "ON" and verify no malfunctions indicated during initial built-in test (BIT).

(2) T–2 minutes: Place the DCU fire circuit switch to ENABLE.

(3) T–1 minute: Place the interface control panel (ICP) arm switch to ARM. Verify the ARMED advisory light is illuminated and no fault codes are displayed on the DCU.

(4) T–30 seconds: Verify no DCU fault codes.

c. At target area.

(1) Initiate the mine-dispensing sequence prior to the start point based on ground speed and altitude to ensure mines impact at the start point and not 10 meters after. P* maintains ground speed ±5 KPH and altitude ±10 feet during the mine-dispensing pass.

(2) Terminate mine dispensing prior to the end point based on ground speed and altitude to ensure mines stop at the designated end point (±10 meters).

d. Postmission.

(1) Place the ICP arm switch to SAFE and verify ARMED advisory light extinguished.

(2) Place DCU fire circuit switch "OFF."

(3) Set DCU power switch (as required).

(4) Prepare and submit SCATMINWARN message (Table 4-4).

Table 4-4. Scatterable minefield warning format	
Alpha	Emplacement system.
Bravo	Antitank (yes/no).
Charlie	Antipersonnel (yes/no).
Delta	Number of aim/corner points.
Echo	Grid coordinates of aim/corner points and size of safety zone.
Foxtrot	Date-time group of life cycle.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: During the mine deployment phase, the P*'s attention will be divided between the aircraft instruments (altitude and ground speed) and the outside. It is critical during night vision goggle (NVG) operations that the P's and NCM's focus be primarily outside to provide warning to the P* of obstacles or hazards during the mine delivery phase.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:
FM 3-34.210
Volcano airworthiness release

TASK 2075

Perform fat hawk operations

CONDITIONS: In an H-60 helicopter with extended range fuel system installed, personnel as outlined in FM 1-113, and enough fuel/armament to conduct the operation.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Conduct permission planning to include required load configuration as briefed. Verify the aircraft will remain within gross weight and center of gravity (CG) limitations for the duration of the flight.
   b. Conduct a thorough crew and support personnel safety briefing.
   c. Ensure the aircraft is configured and fueled for the mission.
   d. Ensure that the passengers and cargo are restrained.
   e. Set up the micro forward area refueling equipment (FARE) system.
2. Nonrated.
   a. Load the aircraft per the load plan, if applicable.
   b. Ensure that floor loading limits are not exceeded.
   c. Secure passengers and cargo.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers and support personnel are familiar with fat hawk operations, emergency procedures, and communication procedures. The PC will confirm that required power is available by comparing the information from the performance planning card (PPC) to the hover power check.
   b. The pilot not on the controls (P) and nonrated crewmember (NCM) will assist refuel/rearm teams in loading and unloading the aircraft. They act as fire safety guards during refuel operations as directed or briefed.
2. Procedures.
   a. Preflight. After receiving a mission briefing, ensure that required fuel and ammunition is on hand. Ensure that it is installed, secured, inventoried, and operational before flight according to the unit standing operating procedure (SOP). Conduct a thorough crew and support team briefing covering as a minimum the following: landing direction, frequencies and call signs, emergency procedures, execution (security, setup, refuel, rearm, recovery), dispersal plan alternate setup location, site layout, and loads.
   b. Arrival. The designated primary rearming/refueling aircraft will set up first. The secondary rearming/refueling aircraft will carry a duplicate two-point FARE for backup. The secondary aircraft will loiter outside the weapon's surface danger area and no closer than 150 feet from the rearm/refuel site. The security team will immediately establish perimeter defense as briefed. The site layout and FARE system setup will be according to FM 3-04.111, FM 1-113, and unit SOP.

Note. Task 1016 contains procedures that may be used in performing this task.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Certain lighting configurations can look like an "inverted Y." Lighting configuration of the H-60s should be briefed to all aircrews prior to conducting operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 2076

PERFORM CAVING LADDER OPERATIONS

CONDITIONS: In an H-60 helicopter with caving ladder equipment installed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.

   a. Conduct a thorough crew briefing.

   b. Ensure maximum airspeed with caving ladder deployed is 40 knots indicated airspeed (KIAS) with personnel attached to the ladder and no faster than a brisk walk with no personnel attached.

   c. Maintain appropriate hover altitude ±5 feet.

   d. Do not allow drift to exceed ±5 feet from the intended hover point.

   e. Deploy light markers as required.

   f. Deploy caving ladder, extract survivor(s), and secure caving ladder equipment.

2. Nonrated.

   a. Ensure that the aircraft is configured for caving ladder operations.

   b. Advise the pilot on the controls (P*) when the survivors are in sight.

   c. Inform the pilots when the ladder is being deployed/recovered.

   d. Direct the P* to a stabilized hover over the survivors.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers are familiar with caving ladder operations, emergency procedures, and communication procedures. The PC will ensure the aircraft is rigged per the SOP.

   b. The P* will remain focused primarily outside the aircraft throughout the maneuver for aircraft control and obstacle avoidance. The P* will announce the intended point of extraction and remain centered over the target with corrections from the P and nonrated crewmember (NCM) as required.

   c. The pilot not on the controls (P) and NCM will assist in clearing the aircraft and will provide adequate warning of obstacles. They will assist the P* during the pickup phase of the operation. They will advise the P* when the ladder is on the ground or in the water. If forward flight is required, the NCM must constantly monitor the survivors and keep the P* informed of their stability.

2. Procedures.

   a. The PC will ensure the ladder is inspected, serviceable, and secured to the aircraft. The NCM will inspect and secure a serviceable ladder to the aircraft cabin floor. Chemlights will be attached to the bottom of the ladder and 10 feet from the bottom for operations conducted at night. Proper flotation will be attached to the ladder as necessary.

   b. The PC will inform the NCM when to deploy the ladder and establish what maximum radar altimeter reading may be achieved with the ladder safely on the ground or in the water.

c. Once personnel in the water are located, plan the approach into the wind as much as possible. The approach should terminate to a hover approximately 20 feet above the personnel. The crewmember in the cabin area will lower the caving ladder when directed to do so by the PC. The crewmember will advise when the caving ladder has been deployed and that it is in the water. The ladder must touch the water BEFORE personnel in the water touch it to avoid electrical static discharge shock. Owing to lack of visual references, it will be difficult to detect drift over the water. Crewmembers must provide assistance to the P* in order to maintain a constant position over the personnel in the water.

d. Personnel to be extracted will grasp the ladder after it has entered the water and comes within reach. Personnel will then climb the ladder into the aircraft. Crewmembers will assist with the entry into the aircraft as much as possible. In the event personnel are injured and cannot climb into the aircraft, they will attach themselves to the ladder with a snap link attached to the front of the survival vest. These personnel will be flown to the nearest landing area, lowered to the ground, and then moved into the aircraft.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS:

1. For night operations, attach one chemlight to the bottom of the ladder. This will aid the crewmembers in identifying when the ladder enters the water. Attach one more chemlight 10 feet up from the bottom of the ladder so the person can still see the ladder when the bottom is in the water.
2. Spatial disorientation can be overwhelming during overwater operations at night. Proper scanning techniques are necessary to avoid spatial disorientation. If there are visible lights on the horizon or if the shoreline can be seen, the pilot may opt to approach the survivor(s) so the aircraft is pointed toward these references, if the wind permits. If no other references exist, deploy chemlights to assist in maintaining a stable hover.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:
Caving ladder airworthiness release
FM 3-05.212

TASK 2078

PERFORM HELOCAST OPERATIONS

> **WARNING**
>
> **Ensure that crewmembers and the helocast master in the cabin area are wearing safety harnesses secured to tie-down rings anytime the cabin doors are open.**

CONDITIONS: In an H-60 helicopter with helocast equipment installed, a helocast team, and a helocast master.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Rated.
   a. Conduct a thorough crew and passenger briefing.
   b. Maintain altitude ±3 feet.
   c. Maintain airspeed ±3 knots.
   d. Maintain heading ±10 degrees.
2. Nonrated.
   a. Ensure aircraft is configured for helocast operations.
   b. Perform crew coordination actions.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will conduct a crew and passenger briefing and ensure personnel are familiar with emergency procedures. The PC will also ensure all participants in the helocast are briefed according to the unit standing operating procedure (SOP).

   b. The pilot on the controls (P*) should make the approach into the wind, if possible. The P* will slow to the desired airspeed and altitude. The maximum airspeed and altitude is 10 knots at 10 feet.

Note. Going faster or higher could result in injury to personnel. The pilot cannot rely on the airspeed indicator below 40 indicated airspeed (IAS); the airspeed should not exceed that of a brisk walk.

   c. The pilot not on the controls (P) will provide the P* with information regarding airspeed and altitude. The P will also monitor the cockpit indications. The P and nonrated crewmember (NCM) will announce when their attention is focused inside the aircraft and again when their attention is reestablished outside.

   d. The NCM will assist the helocast master as necessary.

2. Procedures.

   a. Hover checks will be made prior to beginning helocast operations to verify power available, aircraft controllability, and accuracy of the radar altimeters.

b. The PC will give the helocast master “10 minutes out,” “5 minutes out,” and “1 minute out” alert calls. The PC at “1 minute out” will announce “AT THE READY LINE.” (The helocast master will relay these alert calls to the swimmers.) Upon receiving the command “AT THE READY LINE,” the helocast master will announce “AT THE READY LINE,” at which time all participants will remove the restraint devices and position themselves in the door for the jump.

c. The approach should be made into the wind. Approach speed is 80 knots indicated airspeed (KIAS) maximum from the release point to the area of cast operations. The approach is situational dependent and may be either a visual meteorological condition (VMC) or a terrain flight approach. After arrival at the cast location, slow to the desired airspeed and altitude (5 knots at 5 feet or 10 knots at 10 feet).

d. When the aircraft has established the proper position, airspeed, and altitude, and has arrived at the jump location, the PC will give the helocast master the command “AT THE START LINE.” The helocast master will confirm that the position, airspeed, and altitude are safe, and give the command “GET SET” to the swimmers. At the command “GET SET,” the swimmers will position their legs to hang out the cabin door. The helocast master will then tap each swimmer on the shoulder and give the command “GO.” On the command “GO,” each swimmer will exit the aircraft per the instruction received during the safety briefing. (The helocast master may also jump but must always exit last.) After entering the water, all swimmers will indicate that they are unhurt by raising one arm overhead. The aircraft will not leave the area until all swimmers report no injuries.

OVERWATER CONSIDERATIONS: Overwater flight, at any altitude, is characterized by a lack of visual cues, and therefore has the potential of causing visual illusions. Be alert to any unannounced changes in the flight profile and be prepared to take immediate corrective actions. The radar altimeter low bug should be set to assist in altitude control. Hazards to terrain flight (such as harbor lights, buoys, wires, and birds) must also be considered during overwater flight.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Spatial disorientation can be overwhelming during overwater operations at night. If there are visible lights on the horizon or if the shoreline can be seen, the pilot may opt to approach the cast area so the aircraft is pointed toward these references, if the wind permits. Proper scanning techniques are necessary.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

FM 3-05.211
FM 3-21.220
FM 10-542
FM 20-11
FM 31-20-4
USSOCOM REG 350-6

TASK 2081

OPERATE NIGHT VISION GOGGLES

CONDITIONS: In an H-60 helicopter, given a set of night vision goggles (NVGs).

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Preflight the NVGs.
2. Mount and adjust NVGs.
3. Store unit after use.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for clearing the aircraft and obstacle avoidance.

   b. The pilot not on the controls (P) will announce when his attention is focused inside the cockpit. Upon completing the aviator's night vision imaging system (ANVIS) checks and adjustments, the P will announce the status of his goggles.

2. Procedures. Ensure the NVGs are within inspection dates and check for serviceability. Adjust for proper fit, focus, and diopter setting. After use, ensure batteries are removed. Store the unit.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft only.

REFERENCES: Appropriate common references plus TM 11-5855-263-10.

TASK 2086

Operate aviator night vision imaging system heads-up display

CONDITION: In an H-60 helicopter with aviator’s night vision imaging system heads-up display (ANVIS HUD) installed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Describe and demonstrate correct terminology and usage according to AN/AVS-7 Operator's Manual.
2. Program the ANVIS HUD as desired for mission requirements.

DESCRIPTION: Perform operational procedures for the AN/AVS-7. These include assembly, preparation for use, operating procedures, and equipment shutdown.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus TM 11-5855-300-10.

TASK 2090

PERFORM LANDING AREA RECONNAISSANCE FOR SIMULATED MAXIMUM GROSS WEIGHT

CONDITIONS: In an H-60 helicopter, simulating maximum gross weight for conditions, while using tabular data.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Establish altitude, airspeed, and flight path for conducting a high reconnaissance commensurate with terrain and environmental conditions.
2. Determine approximate wind direction and velocity at touchdown point and identify other pertinent wind characteristics in proximity to landing zone (LZ).
3. Assess the LZ size, axis, surface conditions, and obstacles.
4. Plan ingress and egress routes to include escape routes required above and below effective translational lift (ETL).
5. Confirm the winds and tentative plan formulated in the high reconnaissance by performing a thorough low reconnaissance.

DESCRIPTION:

Crew actions.

1. On approaching the landing area, the crew will identify the LZ and determine its suitability for landing and takeoff. The pilot on the controls (P*) will establish a high reconnaissance pattern appropriate for the terrain and wind. Using tabular data, the pilot not on the controls (P) will determine whether out of ground effect (OGE) capability exists and the maximum power available. The P*/P will assess the wind in and around the LZ using as necessary wind/terrain analysis, visible indications, and cockpit indications. The P*/P will determine suitable ingress and egress routes and select the landing point. The routing should reflect power available, wind conditions, and escape options available for an aircraft at maximum gross weight. When the wind direction and conditions are in doubt, the best escape routes should dictate the approach and departure routes.

   Note. The best possible route is that route requiring the least amount of power for the landing intended—to the ground or a particular hover height—without compromising a viable escape.

   Note. The difference between a go-around and an escape is that a go-around is a proactive maneuver with full control available while an escape is a reactive maneuver used to manage unplanned events. The collective will usually be maintained or reduced during an escape maneuver.

2. The tentative plan for the landing and takeoff is established in the high reconnaissance. The low reconnaissance is performed to confirm or refute information determined in the high reconnaissance. It is performed as low and as slow as good judgment dictates but not below ETL. The P*/P must use cockpit or visual cues to confirm wind predictions, verify the suitability of the landing point, confirm that the escape routes identified are viable, confirm the altitude of the landing point, and verify environmental conditions are the same as those selected in the tabular data. The P* will thoroughly brief the maneuver and crew duties including those duties required if an escape plan is executed.

Note. This is a training maneuver unto itself and should not be rushed or performed haphazardly. Small errors or omissions may result in incorrect power calculations. The pilots must anticipate the aircraft's limits and their own limits. At no time in power management training will pilots knowingly attempt to execute landing or takeoffs at less than actual torque values.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 2092

RESPOND TO NIGHT VISION GOGGLES FAILURE

CONDITIONS: In an H-60 helicopter given an academic or a visual cue that the night vision goggles (NVGs) have failed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Identify or describe indications of impending NVG failure.
2. Perform or describe emergency procedures for NVG failure.

DESCRIPTION: Impending NVG failure may be indicated by one or both tubes flickering or blinking.

1. Crew actions.

    a. The pilot on the controls (P*) will remain focused outside the aircraft. The P* is responsible for clearing the aircraft and obstacle avoidance. If the P*'s NVGs fail or indicate impending failure, the P* will announce "goggle failure." The P* will transfer the controls to the pilot not on the controls (P) if necessary.

    b. If the P's NVGs fail or indicate impending failure, the P will announce "goggle failure" and switch batteries or troubleshoot the goggles. If the NVGs are not restored to operation, make the appropriate report and modify the mission as briefed.

2. Procedures.

    a. During nap of the earth (NOE) or contour flight, the P* will immediately announce "goggle failure" and begin a climb at a rate that will ensure obstacle avoidance. Transfer the flight controls if necessary, and attempt to restore the goggles. If NVGs are restored, continue the mission. If not restored, lock the NVGs in the up position and proceed as briefed.

    b. During low-level flight or flight conducted at higher altitude, the P* will use the procedure described above. A climb is not required.

Note. NVG tube failure is infrequent and usually provides ample warning. Only occasionally will a tube fail completely in a short time. Rarely will both tubes fail at the same time. There is no remedy for in-flight tube failure.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft only.

REFERENCES: Appropriate common references plus TM 11-5855-263-10.

TASK 2093

PERFORM SIMULATED MAXIMUM GROSS WEIGHT APPROACH AND LANDING

CONDITIONS: In an H-60 helicopter with landing area reconnaissance for simulated maximum gross weight complete.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Maintain approach angle sufficient to clear obstacles.
2. Maintain the predetermined rate of horizontal and vertical closure appropriate for conditions.
3. Monitor wind conditions using cockpit indicators (CI).
4. Execute a smooth, controlled termination to the ground or the hover altitude determined in the reconnaissance.
5. Determine wind direction and velocity at the landing point.

DESCRIPTION:

1. Crew actions.

    a. The pilot on the controls (P*) will maintain his primary focus outside the aircraft while conducting a cross-reference of CI to execute the approach. During the approach, the P* will announce any deviation to the briefed approach, particularly any deviation in escape routing. The pilot not on the controls (P) will cross monitor CI and alert the P* when briefed parameters (CI) are being approached or exceeded. The P and crew chief (CE) will assist in clearing the aircraft during the entire maneuver.

    b. Upon completing the approach, the P* will conduct a hover power check in the intended landing direction, over the intended landing point, and at the altitude selected in the reconnaissance. The crew will then verify whether conditions (surface, wind, and temperature/pressure altitude) are the same as they predicted during the reconnaissance.

2. Procedures.

    a. Airspeed compared to ground speed indicates headwind/tailwind or no wind. This is also used to control horizontal closure speed.

    b. Heading compared to ground track indicates crosswind direction.

    c. Torque compared to pedal position (aircraft must be aligned with ground track [below 50 feet], airspeed slightly above effective translational lift, and referencing a known torque/pedal reference setting) indicates crosswind direction.

    d. The vertical speed indicator (VSI) indicates rate of vertical closure and the possibility of inadequate torque applied.

    e. The early or abrupt movement of the airspeed indicator needle to zero indicates a tailwind. Airspeed indicator behavior is referenced against previous no-wind condition.

    f. The duration of the transverse flow shudder and the distance remaining to termination when it ceases also indicates the presence of a headwind or tailwind. The “normal” distance is referenced during no-wind conditions. This is also used to control horizontal closure speed.

    g. The correlation of airspeed, torque and VSI indicates and measures the presence and strength of updrafts and downdrafts.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Using CI will provide the crewmembers with improved control during periods of reduced visual cues and acuity. There are no other special considerations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 2095

PERFORM SIMULATED MAXIMUM GROSS WEIGHT TAKEOFF

CONDITIONS: In an H-60 helicopter, with the maximum torque available known, and aircraft clear.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Determine the type of takeoff that requires the minimum amount of power to clear the obstacles.
2. Estimate the point where the aircraft will enter effective translational lift (ETL) and establish an abort line.
3. Use the minimum power necessary for the type of takeoff being performed.
4. Determine whether sufficient power is available for the maneuver.

DESCRIPTION:

1. Crew actions.

   a. After assessing the landing zone (LZ), wind, and obstacles, the pilot on the controls (P*) will select the type of takeoff—level acceleration (coordinated climb, best angle, best rate), constant angle, or vertical. The P* will then determine the ETL point for the takeoff selected and establish an abort plan.

Note. In having to determine the ETL point, the P* is forced to accurately consider the effects of his control inputs, wind, and surface considerations. Any under or over estimation of the point must be explained in the post-task analysis following the takeoff maneuver. In considering a nap of the earth (NOE) deceleration as part of the abort plan, the P* must consider the amount of power and tail rotor authority available for the abort and the amount of airspeed at the time of the abort. As in the simulated maximum gross weight (SMGW) approach, the amount of power determined necessary for the maneuver would also be the hypothetical limit for establishing the takeoff escape plan. Power used beyond that determined necessary would have to be explained in the takeoff post-task analysis.

   b. The pilot not on the controls (P) and crew chief (CE) will announce when ready for takeoff and will focus their attention primarily outside the aircraft to assist in clearing the obstacles. The P will also cross-monitor torque to note the amount of power used as well as when it was used. The crew will select reference points to assist in maintaining ground track.

Note. If it becomes apparent that the power selected for the maneuver is insufficient for obstacle clearance, the abort will be executed or additional power will be applied as necessary to clear the obstacles.

2. Procedures.

   a. Level acceleration. This is a simulated situation where the power required to hover is the maximum power available. The P* will coordinate cyclic and pedals as necessary to accelerate the aircraft. The first objective is to achieve ETL without allowing the aircraft to settle to the surface. If it becomes apparent that the aircraft will contact the surface, apply sufficient aft cyclic to prevent contact or abort if necessary, and analyze for cause. As the transverse flow shudder develops, increase forward cyclic. As the aircraft enters ETL, make a significant forward cyclic input to prevent blowback. Maintain altitude and allow the aircraft to accelerate until the climb point is reached. Adjust the cyclic as necessary and climb to the necessary height. If using the best angle, ensure ETL is not lost.

Note. Recommendation—Practice this maneuver paralleling barriers rather than into them until proficiency is attained.

b. Constant angle.

(1) In this maneuver, the angle can range from vertical to flat. It demands that more power is available than the power required to hover. The angle is initiated from the point of hover (or ground) to a point in space. The goal is for the P* to accurately predict the amount of power required to clear the obstacle given a particular angle. The P* initiates the takeoff by coordinating all the flight controls to begin a constant angle climb over a predetermined path. Power is used as required, and the P notes the amount as well as when it was used.

(2) Vertical takeoffs are also constant angle takeoffs. As in very steep to vertical approaches, there is a point where there is no discernible difference in power required between vertical takeoffs and those of a lesser angle. In some wind conditions, less power is required to depart vertically than at a lesser angle.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: If sufficient illumination exists to adequately view obstacles, the P* may accomplish the maneuver in the same manner as in daylight; however, additional altitude should be used in the hover height to avoid settling to the surface due to poor visual cues. If insufficient illumination exists, then an altitude over airspeed takeoff should be used. The crew must use proper scanning techniques to avoid spatial disorientation. Visual obstacles such as shadows should be treated the same as physical obstacles.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 2098

Perform aerial radio relay

CONDITIONS: In an H-60 helicopter equipped with a retransmission control panel.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Identify and tune the appropriate frequency.
2. Establish contact with the message sender.
3. Authenticate, if required.
4. Establish contact with the message receiver.
5. Configure the aircraft radios for radio relay.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused primarily outside the aircraft to provide obstacle clearance.

   b. The pilot not on the controls (P) will configure the required radios and establish contact with the desired stations for retransmission.

   c. The P and nonrated crewmember (NCM) will monitor aircraft instruments, assist in clearing the aircraft, and provide adequate warning to avoid traffic and obstacles.

2. Procedures. Set aircraft radio for retransmit (mode selector-RETRANS) or set appropriate receiver-transmitter to the desired retransmit frequency. Set the radio retransmission selector switch to radios used. Establish communication between each relay radio station by using appropriate intercommunication system (ICS) transmit (TRANS) selector. If audio monitoring is desired, adjust audio control for a suitable output. Follow the radio operation procedures outlined in the appropriate aircraft operator’s manual to configure each radio for retransmission. (For additional information, see task 2014.)

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:
Signal operating instructions (SOI)

TASK 2108

Perform auxiliary power unit operations (NCM only)

> **WARNING**
>
> **Aircraft survivability equipment (ASE) systems, when energized, may cause thermal burns or blindness when personnel are too close to an active system. Observe all operators' manual restrictions.**
>
> **Flight controls and stabilator systems may cause damage when aircraft alternating current (AC) power is applied. Ensure flight controls and stabilator systems are clear before applying AC power to the aircraft.**
>
> **Prior to auxiliary power unit (APU) operations, remove the pitot covers, rotor blade tie-downs, and mooring chains and engage the gust lock.**

CONDITIONS: In an H-60 helicopter with a qualified and current APU operator stationed in a pilot seat during APU operations.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Preflight all systems to be operated during APU operations.
2. Operate APU, systems, and equipment according to the appropriate aircraft operator's manual/checklist (CL).
3. Shut down systems, equipment, and APU according to the appropriate aircraft operator's manual /CL.
4. Enter appropriate information (if required) on DA Form 2408-12 (*Army Aviator's Flight Record)*, DA Form 2408-13 (*Aircraft Status Information Record)*, and DA Form 2408-13-1 (*Aircraft Maintenance and Inspection Record)*.

DESCRIPTION:

1. Crew actions.

   a. The nonrated crewmember (NCM) will coordinate with and brief any additional ground support personnel prior to APU start. Perform preflight inspection of the APU. Ensure that the rotor blade tie-downs and mooring chains are removed, and that the gust lock is engaged. The NCM will brief all concerned personnel on procedures to be followed in the event of an emergency. The NCM will direct assistance from any additional ground support personnel to aid in keeping the APU exhaust and stabilator areas clear during the APU start sequence and any subsequent ground checks.

   b. Additional ground support personnel should assist the NCM as directed.

2. Procedures. Brief the additional ground support personnel as necessary. Perform preflight inspection of the APU ensuring exhaust plug, rotor blade tie-downs, mooring chains, fluid levels,

APU accumulator pressure is a minimum of 2,800 pounds, and backup hydraulic pump has been checked or removed as applicable. If an additional cockpit crewmember is available, direct the crewmember's assistance with monitoring the master warning fire light during the APU start sequence. Confirm that the SAS 1 switch and the APU accumulator (ACCUM) LOW advisory lights are OFF. Place the FUEL PUMP switch to the APU BOOST position and note the PRIME BOOST PUMP ON advisory light illuminates. Confirm the APU exhaust area is clear. Place the APU control (CONTR) switch to ON. Maintain positive control of the APU switch throughout the start sequence. After the APU ON advisory light illuminates, release the APU CONTR switch. Verify the stabilator area is clear and brief the additional cockpit crewmember that the engine out audio should sound when the APU generator is engaged. Place the APU generator switch to ON. Verify the APU GEN ON advisory light illuminates. The BACKUP PUMP advisory light should come on in about 4 seconds. Reset the engine out audio using either MASTER CAUTION PRESS TO RESET switch or if external power was used to perform the start, select the EXT PWR switch to OFF. Direct the external power cable to be disconnected and the power generating equipment to be secured at a safe distance outside the rotor disk unless further use is anticipated. The APU ACCUM LOW light should extinguish after either 90 or 180 seconds.

SINGLE CREWMEMBER CONSIDERATIONS:

1. Clearing the APU and stabilator. When performing this task without additional crewmember support, the NCM will just prior to APU start confirm the APU exhaust area and stabilator is clear. During the APU run, the NCM will remain at either pilot station. The NCM will ensure the stabilator area remains clear throughout any stabilator operations.
2. Disabling stabilator auto mode. Because the stabilator area cannot be observed from the cockpit, the NCM may elect to disable the stabilator auto mode for safety. After applying AC power, momentarily engage the cyclic mounted stabilator slew-up switch or the stabilator automatic flight control system (AFCS) panel MAN SLEW switch to the UP position. During aircraft systems troubleshooting, it is important to remember that the stabilator may slew down if AC power is interrupted and then restored.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: During night operations, ensure adequate lighting (anticollision, position lights) is on, and fire guard has a flashlight. This task is prohibited while wearing night vision devices (NVDs).

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 2112

OPERATE ARMAMENT SUBSYSTEM

> **WARNING**
>
> **Observe all safety precautions for uploading ammunition according to TM 9-1095-206-12&P.**
>
> **To prevent accidental firing, do not retract bolt and allow it to go forward if belted ammunition is in feed tray or if a live round is in the chamber. Move cocking handling forward by hand.**

CONDITIONS: In an H-60 helicopter with one or two machine guns installed.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Install and preflight the appropriate weapon according to the appropriate aircraft operator’s manual and the appropriate weapon technical manual.
2. Load and safe the weapon.
3. Acquire and identify target.
4. Estimate range to target.
5. Engage target(s) according to weapon control measures, mission briefing, and rules of engagement (ROE).
6. Apply appropriate firing techniques.
7. Suppress, neutralize, or destroy as applicable.
8. Describe or perform emergency procedures for misfire, hangfire, cook off, runaway gun, ruptured cartridge, and double feeding.
9. Clear and safe the weapon.

DESCRIPTION:

1. Crew actions. The nonrated crewmember (NCM) will coordinate with and brief any additional ground support personnel before installing and loading the weapon system. Perform installation and preflight inspection of the weapon. The NCM will brief all concerned personnel on procedures to be followed in the event of an emergency. The NCM will direct assistance from any additional ground support personnel to aid in installing and loading the weapon. The NCM will ensure that the proper amount of ammunition is loaded onboard the aircraft according to the mission briefing.
2. Procedures. Brief additional ground support personnel as necessary. Perform installation and preflight inspection of the weapon, ensuring that the gun is safetied to the pintle. Ensure that the ejector control bag and ammunition can is installed. During loading of ammunition, observe all safety precautions. After loading the ammunition, ensure the safety button is in (S) position. To initiate the firing sequence, push the safety button to the (F) position, press the trigger fully and hold. Low cycle rate of fire of the machine gun allows firing of single rounds or short bursts. The trigger must be completely released for each shot. Conduct weapons engagement according to the mission briefing, ROE, and crew briefing. After acquiring and identifying the target, estimate

range and ensure that the target is within the weapons field of range and the kill zone is within the weapons effective range. Use correct firing techniques and ballistic corrections to successfully suppress, neutralize, or destroy as applicable the threat. Consideration must be given to the intervisibility of friendly and enemy positions and trying to preclude any undesirable collateral damage or fratricide incidents. Perform any firing malfunctions emergency procedures as required for misfire, hangfire, cook off, runaway gun, ruptured cartridge or double feeding of cartridges. Firing malfunctions and corrective actions must be committed to memory. After target engagement, clear and safe the weapon. Ensure the safety button is in the (S) position. After completing the mission, record any information as required on DA Form 2408-12 (*Army Aviator's Flight Record)*, DA Form 2408-13 (*Aircraft Status Information Record)*, and DA Form 2408-13-1 (*Aircraft Maintenance and Inspection Record)*. Refer to FM 3-04.140 for details on helicopter gunnery qualification.

MULTIHELICOPTER DOOR GUNNER EMPLOYMENT: Aircrews and door gunners in the formation must use effective crew coordination procedures to visually acquire, identify, and engage targets. Both aircraft and passengers are vulnerable to attack during air movement operations and throughout all phases of air assault operations. Therefore, it is imperative that door gunners respond by delivering direct and indirect fires on these targets. The unit must develop standing operating procedures (SOPs) covering the employment of door gunners during formation flights.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: During night or NVG operations, range estimations will be more difficult, which will require using proper scanning techniques. Correct firing techniques and ballistic corrections will be more critical for target suppression or destruction. During firing, while wearing NVGs, target loss may occur momentarily, due to muzzle blast and the brightness of the tracers.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training will be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

DA Form 2408-13-1
FM 3-04.140
FM 3-06
TM 9-1095-206-12&P

TASK 2116

Perform an aerial radiological survey

CONDITION: In an H-60 given a tactical map, atmospheric conditions in the area to be surveyed, DA Form 1971-R (*Radiological Data Sheet Monitoring or Point Technique*) or DA Form 1971-1-R [*Radiological Data Sheet-Route or Course Leg Technique (Ground and Aerial Survey)]*.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Plan and conduct a simplified or detailed aerial survey using a route, course leg, or point technique.
2. Select a specific location for the survey meter in the aircraft to obtain accurate dose-rate readings for determining the air-ground correlation factor.
3. Record and report information determined from the aerial survey.

DESCRIPTION:

1. The two types of aerial surveys used by the crew are simplified and detailed. The techniques used to conduct these surveys are point, route, and course leg.
    a. Point technique. The procedure for using the point technique depends on the situation. When the situation permits, readings are taken by dismounting from the aircraft. When the situation does not permit, the ground dose is estimated by using the air-ground correlation factor and an aerial dose-rate reading.
    b. Route technique. The route technique involves the pilot on the controls (P*) flying between two checkpoints, following a route or a prominent terrain feature such as a road.
    c. Course-leg technique. The course-leg technique involves the P* flying a straight line course between two checkpoints. The procedure for obtaining dose-rate information between two checkpoints is the same for both the route and the course-leg techniques.
2. The crew must select a specific location in the aircraft for the survey meter. All dose-rate readings must be made with the meter in that location. Dose-rate readings are used to determine the air-ground correlation factor. The air-ground correlation factor is the ratio of a ground dose-rate to a reading taken at approximately the same time in an aircraft over the same spot on the ground.
3. Information obtained by using the point technique is recorded on DA Form 1971-R. Information obtained by using the route or course-leg technique is recorded on DA Form 1971-1-R. Information collected during the survey is delivered to the control party by physical drop or electronically.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or academically.
2. Evaluation. Evaluation will be conducted in the aircraft or academically.

REFERENCES: Common standard references plus the following:

DA Form 1971-R
DA Form 1971-1-R

TASK 2120

Perform patient evacuation and treatment

CONDITIONS: In a medical evacuation (MEDEVAC) configured H-60 helicopter, given a medical equipment set (air ambulance), with an actual or simulated patient(s), additional equipment according to local medical treatment protocols.

STANDARDS:

1. Flight Medic.
   a. Perform casualty triage and care.
   b. Brief litter teams and passengers on procedures for approaching, loading and leaving the aircraft.
   c. Load and secure litter and ambulatory patients, equipment and baggage/unload at destination.
   d. Relay essential patient information and estimated time of arrival (ETA) to the medical treatment facility.
   e. Respond to medical control's directives.
2. NCM.
   a. Configure the aircraft for loading patients.
   b. Load and secure litter and ambulatory patients, equipment and baggage/unload at destination.

DESCRIPTION:

1. Patient contact.
   a. Perform triage as necessary and treat injuries and illnesses per local medical treatment protocols in accordance with TC 8-800 (MEDIC) and STP 8-91W15-SM-TG.
   b. Use all medical equipment required for appropriate patient treatment and monitoring per the manufacturer's instructions.
   c. Coordinate loading procedures.
2. Movement to aircraft.
   a. Direct/escort ambulatory patients to seats and ensure they have been briefed. Load and secure litter patients, medical equipment and baggage as required. Advise the PC when prepared for departure.

Note. If aircraft is equipped with extended range fuel system (ERFS) tanks, loading and unloading of patients should be performed from both sides of the aircraft because the litter support unit may need to be places at a 45-degree angle from the load position.

   b. Additional patient restraint: Always try to identify the need to restrain a patient before loading. If possible, have the requesting agency "chemically restrain" the patient. Restraining a patient in flight is difficult and dangerous. Tell the patient gently and repeatedly why the devices are being used—that they are for the patient's safety and to prevent further injury—whether the patient seems able to respond or not. Reassure the patient that someone will always be near to help and care for them. The normal reaction of a confused patient is to resist restriction of movement. Restrain the patient according to current patient treatment protocols.

Note. Physical restraints pose potential risk for injury to the patient in the form of musculoskeletal, vascular and nerve injury by both overzealous application and the patient's resistance to the restraints.

c. Additional Enemy Prisoner of War (EPW) restraint: Be aware of local protocols and requirements (rules of engagement, detainee operations) when using restraints from confinement units or when EPW's are received from units that have field expedient restraints placed on them. Ensure they do not interfere with medical treatment.

3. In-flight care.
   a. Continue treatment and monitoring of all patients.
   b. Relay patient information and ETA using correct radio procedures.
   c. Comply with instructions from medical control and advise them of any pertinent changes in patient(s).
4. Unloading aircraft.
   a. Upon landing, direct/escort ambulatory patients away from the aircraft.
   b. Unload litter patients as required.
   c. Give appropriate documentation and patient information to the receiving medical authorities.

TRAINING AND EVALUATION REQUIREMENTS

1. Training. Training may be conducted in the aircraft or academically.
2. Evaluation. Evaluation of medical requirements must be completed by a 68W FI/SI or other qualified medical personnel.

REFERENCES: Appropriate common references plus the following:
Medical equipment manufacturer's instructions
Medical equipment checklist
FM 4-02.2
JP 4-02
STP 8-91W15-SM-TG

TASK 2122

Operate mission medical interior cabin systems

> **WARNING**
>
> **Serious personal or patient injury can occur if improperly operating or positioning the litter lift**

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Use litter lift system and prepare ambulatory seats for use (if required).
2. Operate all medical control panels and emergency stops.
3. Generate oxygen using the onboard oxygen generation system (OBOGS).
4. Administer oxygen using the oxygen delivery system (ODS).
5. Configure and use the medical suction system.
6. Control interior cabin climate using the environmental control system (ECS).

DESCRIPTION:

1. Crew actions.

   a. The medical officer (MO) determines the condition of the patient-ambulatory or litter. The MO or crewchief (CE) (during and after loading) operates the litter lift system to facilitate the loading and unloading of patients. The CE installs required seating for ambulatory patients.

   b. The MO or CE will operate the medical control panels to raise or lower the litter pans to the height necessary for loading. Crewmembers will know positions of all emergency stops in the aircraft.

   c. The MO or CE will initiate oxygen generation by turning OBOGS on. Determine whether system has a charge. Acknowledge built-in-test (BIT) fault light (if required) and perform appropriate emergency procedure.

   d. MO determines the appropriate amount of oxygen (O2) to be delivered. MO opens desired station sets and verifies flow rate. Place mask on patient and administer O2.

   e. MO installs “T” fitting to keep material out of suction pump if pump becomes contaminated. (See the appropriate aircraft operator’s manual.)

   f. The CE or MO will select the appropriate mode of operation for the environmental control system (ECS).

2. Complete the loading of litter and ambulatory patients. Adjust litter lifts as required to facilitate loading patients. Ensure proper en route care is provided. Select appropriate mode (heat, air conditioning or vent) on the ECS to maintain a comfortable cabin temperature.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following: Medical equipment manufacturer's instructions

TASK 2127

Perform combat maneuvering flight

CONDITIONS: In an H60 helicopter in a simulated or actual tactical environment.

STANDARDS:

1. Establish entry altitude ± 100 feet.
2. Establish entry airspeed ± 10 knots indicated airspeed (KIAS).
3. Maintain aircraft within operating limits and flight envelope.
4. Perform crew coordination actions.

WARNING

Initial training should be conducted at sufficient altitudes to allow for longer recovery times due to uncoordinated flight control inputs and pilot experience. Helicopter flight performance based on the environmental and aircraft conditions must be the determining factor in selecting altitudes that ensure adequate room to recover after maneuvering.

DESCRIPTION:

1. Crew actions.

a. The pilot in command (PC) will brief the crew on the combat flight maneuvers to be performed. The PC must ensure the crew is aware of the effects of the environmental conditions on flight performance and consider the effects of an engine failure during combat maneuvering flight.

Note. If an engine failure occurs above or below single engine airspeeds at low altitudes, power available may not be enough to recover.

b. The pilot on the controls (P*) will announce the type of maneuver to be performed and any deviation from the maneuver. The P* will remain primarily focused outside the aircraft when performing the maneuver. The primary reference during these maneuvers will be the visible horizon. The P* will make smooth and controlled flight control inputs. Pitch and roll angles should be determined by referencing aircraft attitude with the outside horizon and heads-up display (HUD) symbology. The P* will only momentarily scan the instruments to ensure torque, trim, airspeed, and RPM R are maintained. The P* will also announce recovery from the maneuver.

c. The pilot not on the controls (P) will maintain airspace surveillance and monitor instruments to ensure torque, trim, airspeed, RPM R, maneuver parameters, and aircraft limitations are not exceeded. The P will announce when his or her attention is focused inside the cockpit. The P will provide adequate warning to avoid enemy, obstacles, or traffic detected in the flight path and if any deviation is necessary to complete the maneuver.

d. The nonrated crewmember (NCM) will maintain airspace surveillance, offer threat advisories, and engage threat targets as necessary.

2. Procedures.

a. Combat flight maneuvers. Combat flight maneuvers should be employed in concert with task 2042 in order to mask the helicopter or evade enemy threat systems. The maneuvers described are typically initiated at cruise airspeeds greater than 100 knots indicated airspeed (KIAS). During training, the maneuvers should be initiated between the minimum and maximum single engine airspeed. Aircrews must be familiar with aerodynamic factors such as mushing, transient torque, and blade stall before performing these maneuvers. Consider using maximum rate of climb airspeed as much as possible during these maneuvers due to the amount of excess power available and the performance characteristics while maneuvering. The P* will focus his attention outside using the horizon as the primary reference for these maneuvers.

b. Decelerating turn. The decelerating turn is used to rapidly change the direction of the aircraft at low level altitudes while trading airspeed energy to maintain safe operational altitude. The angle of bank, forward airspeed, gross weight, and environmental conditions at the initiation of the maneuver will determine the type/amount of deceleration necessary to slow the aircraft to maintain altitude.

(1) At cruise altitudes, apply aft and directional cyclic to initiate the turn.

(2) At terrain flight altitudes, consider the desired direction and magnitude of the turn before initiating the maneuver. Angles of bank should be lower than those used during cruise flight since sufficient recovery altitude may not be available.

(3) Adjust the flight controls as necessary to maintain the pitch attitude and altitude and to maintain the aircraft in trim.

Note. Recovery is affected by applying opposite cyclic (roll) and forward cyclic when reaching the desired heading and adjusting the collective to obtain the desired airspeed and altitude.

c. Break turn. The break turn is used at terrain and cruise flight altitudes to rapidly change the direction of the helicopter while maintaining or gaining airspeed. As altitude allows, this turn also enables a simultaneous three-axis change of position and direction. This maneuver is effective when performing evasive maneuvers to quickly mask the helicopter against enemy threats.

(1) At cruise altitudes, apply directional cyclic to initiate the turn. As the roll rate and bank angle increase, allow the nose to drop while maintaining the aircraft in trim to take advantage of the descent rate while deploying to cover.

(2) At terrain flight altitudes, consider the desired direction of turn before initiating the maneuver. Angles of bank should be lower than those used during cruise flight because sufficient recovery altitude may not be available.

(3) Adjust cyclic as necessary to maintain the pitch attitude to prevent excessive nose-low attitude and to maintain aircraft in trim.

Note. Recovery is affected by applying opposite cyclic (roll) when reaching the desired heading and adjusting the collective to obtain the desired airspeed and altitude.

d. Cyclic climb to a pushover break. This maneuver is used to rapidly climb over an obstacle and increase altitude to evade an enemy threat followed by a descent to mask the aircraft.

(1) Initiate the maneuver by smoothly applying aft cyclic and collective as necessary to begin an ascent. As airspeed decreases (trading airspeed for altitude), maintain attitude within limits and aircraft in trim. As aircraft reaches the appropriate altitude, apply collective as necessary to maintain RPM R and torque within limits.

(2) Initiate the descent by applying forward cyclic while maintaining torque as necessary, and maintain aircraft in trim.

WARNING

Excessive bank angles may not be sustainable with only the application of power. Airspeed (kinetic energy) or altitude (potential energy) may also not be available to trade for lift. These factors must be evaluated before and during the maneuver. Do not allow high sink rates to develop, as recovery altitude or power may not be available to recover. These conditions are aggravated as helicopter gross weight and density altitude increase.

e. Dive/dive recovery. This maneuver is used at altitudes above terrain flight to rapidly mask from a threat by placing the aircraft in a dive. This maneuver can be employed when necessary to break contact with enemy fire while using suppressive fire. A straight ahead dive is rarely tactically feasible and the maneuver usually incorporates a turn. The pilots must be aware of the tendency for RPM R to build in turns with high rates of descent.

(1) To dive the aircraft as a result of potential enemy contact, apply forward cyclic to obtain the desired dive angle. Adjust the collective to as necessary to facilitate a rapid descent and maintain the aircraft in trim.

(2) If the aircraft has been observed by enemy threat, it may be necessary to turn an angle of approximately 30 to 45 degrees to evade while minimizing the profile of the aircraft and orienting crew served weapons for suppressive fire.

(3) Recover at an altitude that will allow sufficient time to arrest the sink rate after collective and cyclic have been applied to recover from the dive.

Note. During this maneuver, airspeed will increase rapidly. Ensure airspeed does not exceed velocity never exceed (Vne) by initiating a recovery prior to the limit.

Note. If mushing occurs, apply forward cyclic to increase lift on the rotor system.

NIGHT OR NIGHT VISION GOGGLES CONSIDERATIONS:

1. Rapid evasive maneuvers will be more hazardous due to division of attention, limited visibility, and aircraft limitations. Be particularly aware of aircraft altitude and three-dimensional position in relation to threat, obstacles, and terrain. Proper sequence and timing is critical in that the P* must announce intentions prior to initiating maneuvers that might cause spatial disorientation. Select a reference point to maintain orientation on threat or friendly troops to aid in maintaining situational awareness (SA). Reference points may be acquired by selecting a global positioning system (GPS) reference point or prominent terrain feature.

2. As airspeed increases, altitude above the obstacles should also increase. Aircrews will comply with the night vision goggle (NVG) altitude and airspeed limitations of TC 1-210. Bank angles should be commensurate with ambient light and altitude above the terrain. High bank angles will result in an inaccurate readout from the radar altimeter and therefore will be unreliable. Using NVGs without HUD symbology display will require greater crew workload to monitor torque, airspeed, trim, RPM R, and rates of descent.

Note. While performing combat maneuvering flight, visual contact with other aircraft in the formation may be lost because of maneuvering or reduced visibility. If this occurs, the crewmember should announce loss of visual contact and comply with standing operating procedure (SOP) requirements.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the simulator or aircraft.
2. Evaluation. Evaluations will be conducted in the aircraft.

REFERENCES: Appropriate common references plus the following:

The Army Aviator's Handbook for Maneuvering Flight and Power Management
Unit SOP

TASK 2169

Perform aerial observation

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Use correct visual search techniques.
2. Accurately identify the target.
3. Accurately locate the position of the target.
4. Without error, transmit tactical report.

DESCRIPTION:

1. Crew actions. The pilot in command (PC) will complete a thorough crew and mission briefing. The pilot on the controls (P*) will focus attention primarily outside the aircraft and respond to navigation instructions or cues given by the other crewmembers. Crewmembers will assist in clearing the aircraft and provide adequate warning of traffic or obstacles. They also will announce when their attention is focused inside the aircraft.

2. Procedures.

    a. Visual search is the systematic visual coverage of a given area so that all parts of the area are observed. The purpose of visual search is to detect objects or activities on the ground.

    b. During missions involving direct observation, the aircrew is concerned with detection, identification, location, and reporting.

    (1) Detection. Detection requires determining that an object or an activity exists.

    (2) Identification. Major factors in identifying a target are size, shape, and type of armament. Targets are classified as friendly or enemy.

    (3) Location. The exact location of targets is the objective of the mission. Depending on the nature of the targets, the observer may be required to locate the center of mass.

    (4) Reporting. Spot reports provide commanders with critical information while conducting missions. The method of spot reporting is specified by the requesting agency. Reports of no enemy sightings are frequently just as important as actual enemy sightings.

    c. The ability of an observer to search a given area effectively depends on several factors. In addition to the limitations of the human eye itself, the most important of these factors are altitude, airspeed, terrain and meteorological conditions, and visual cues.

    (1) Altitude. Higher altitudes offer greater visibility with less detail. Lower altitudes are usually used because they increase survivability.

    (2) Airspeed. Selection of the airspeed is determined by the altitude, terrain, enemy situation, and meteorological conditions.

    (3) Terrain and meteorological conditions. The type of terrain can vary from dense jungle to barren wasteland and will affect the size and details of the area that can be effectively covered. The prevailing terrain and meteorological conditions often mask objects and allow only a brief exposure period, especially at nap of the earth (NOE) altitudes.

(4) Visual cues. In areas where natural cover and concealment make detection difficult, visual cues may indicate enemy activity. Some of these cues are as follows:

(a) Color. Foliage used to camouflage will differ from the color of natural foliage.

(b) Texture. Smooth surfaces, such as glass windows or canopies, will shine and reflect light. Rough surfaces do not reflect light.

(c) Shapes and shadows. Manmade objects cast distinctive shadows that are characterized by regular shapes and contours as opposed to random patterns that occur naturally.

(d) Trails. Trails leading into an area should be observed for cues as to type, quantity, and recentness of traffic.

(e) Smoke and dust. Smoke should be observed for color, smell, and volume. Dust from moving vehicles can be observed at great distances.

(f) Movement and light. Movements during daylight and light at night are the most easily detectable signs of enemy activity. Movement may include disturbance of foliage, snow, soil, or birds.

(g) Obvious sightings. The enemy is skillful in the art of camouflage. The aircrew must be aware that obvious sightings may be intentional because of high concentrations of antiaircraft weapons.

d. Systematic methods for conducting visual aerial observation include the motive and stationary techniques. The technique used depends on the altitude flown and the terrain encountered.

(1) Motive technique. This technique is used when the aircraft is operating at terrain flight altitudes and generally at airspeeds of 10 knots indicated airspeed (KIAS) or faster. In using the motive technique, the observer looks forward of the aircraft and through the center of the acquisition sector for obvious sightings. The observer then scans through the acquisition sector, gradually working back toward the aircraft. The entire area on either side of the aircraft is divided into two major sectors: the nonobservation sector and the observation work sector.

(a) The nonobservation sector is the area where the aircrew's field of vision is restricted by the physical configuration of the aircraft.

(b) The observation work sector is that portion of the field of vision to which search activity is confined. The observation work sector is subdivided into two smaller sectors: the acquisition sector and the recognition sector.

- The acquisition sector is the forward 90-degree area of the observation work sector. This is the primary search area and is at the approximate 10 to 2 clock position and has no overlap in the center of the aircraft.
- The recognition sector is the remainder of the observation work sector.

(2) Stationary technique. This technique is used at NOE altitudes with the aircraft hovering in a concealed position. When using the stationary technique, the crew makes a quick overall search for sightings, unnatural colors, outlines, or movements. The P* starts scanning from the 12 o'clock position through 90 degrees on his side of the aircraft, searching an area approximately 50 meters in depth. This scan continues outward from the aircraft, increasing the depth of the search area by overlapping 50-meter intervals until the entire search area has been covered. The pilot not on the controls (P) will duplicate the same technique on his side of the aircraft. The crew chief (CE) and other crewmembers, if assigned, will perform as directed by the PC.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft, simulator, or academically.
2. Evaluation. Evaluation will be conducted in the aircraft, simulator, or academically.

REFERENCES: Appropriate common references plus FM 17-95.

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Chapter 5

Maintenance Test Pilot Tasks

This chapter describes the tasks essential for maintaining maintenance crewmember skills. It defines the task title, number, conditions, and standards by which performance is measured. A description of crew actions and training and evaluation requirements is also provided. This chapter contains tasks to be performed by qualified H-60 maintenance test pilots in accordance with AR 95-1. This chapter also contains tasks and procedures to be used by contractor maintenance test pilots in accordance with AR 95-20. If discrepancies are found between this chapter and appropriate TMs and MTF, the appropriate TMs and MTF takes precedence.

5-1. TASK CONTENTS.

a. **Task number**. Each aircrew training manual (ATM) task is identified by a number that corresponds to the maintenance test pilot tasks listed in chapter 2, table 2-8.

b. **Task title**. This identifies a clearly defined and measurable activity. Task titles may be the same in many ATMs, but task content will vary with the airframe.

c. **Conditions**. The conditions specify the common wartime or training/evaluation conditions under which the maintenance test pilot (MP) tasks will be performed.

d. **Standards**. The standards describe the minimum degree of proficiency or standard of performance to which the task must be accomplished. Standards are based on ideal conditions to which the task must be accomplished. The common standards listed in chapter 4 apply to all tasks listed in this section unless specifically stated otherwise. The following common standards apply to all MP tasks.

(1) Perform procedures and checks per applicable MTF manual.

(2) Brief the RCM/NCM on the procedures, applicable warnings, and cautions for the task to be performed.

(3) Perform crew coordination actions per the task description and chapter 6.

(4) Assess and address any malfunctions or discrepancies as they occur and apply appropriate corrective actions or troubleshooting procedures.

(5) Use the oral call out and confirmation method and announce the initiation and completion of each check.

(6) The MP must occupy the left seat for the following tasks: 4200, 4202, 4220, 4228, and 4236. The MP may perform other maintenance tasks from either seat. This restriction does not apply to initial ME training/evaluations.

(7) The MP/ME will guard the collective anytime the engine power control levers are manipulated.

e. **Description**. The description explains how the elements of the task should be done to meet the standards. When specific crew actions are required, the task will be broken down into crew actions and procedures as follows:

(1) Crew actions. Define portions of a task to be performed by each crewmember to ensure safe, efficient, and effective task execution. When required, MP responsibilities are specified. All tasks in this chapter are only to be performed by qualified MPs/MEs, or student maintenance test

pilots undergoing qualification training as outlined in AR 95-1. The MP is the PC in all situations, except when being trained or evaluated by an ME. For all tasks, MP actions and responsibilities are applicable to MEs. When two MEs are conducting training/evaluation together, or two MPs are jointly performing test flight tasks, the mission brief will designate the aviator assuming PC responsibilities. MEs may perform MP/ME evaluations from the cabin provided an aviator with access to the flight controls is briefed as the PC.

(2) Procedures. This section describes the actions that the MP/ME performs or directs the RCM/NCM to perform in order to execute the task to standard.

Note. Tasks 4200, 4202, 4220, 4228, 4236, and 4254 require additional information for the crew. The MP will ensure the crew is familiar with the following:

- Maneuver (RCM/NCM responsibilities).
- Abort criteria.
- Limitations.
- Response to associated emergency procedures.

f. **Considerations**. This section defines training, evaluation, and other considerations for task accomplishment under various conditions.

(1) NVG considerations – General

- Crew selection and aircrew coordination are essential to successful and safe NVG MTFs.
- Tasks may require extra time, altitude, and analysis at night.
- Use of supplemental lighting will aid in identifying switches/position, control positions, and engine power control levers.
- Use additional crew member to record data as required.
- Use proper scanning techniques to minimize the probability of spatial disorientation.

(2) NVG considerations – Hover checks

- Select an area with good visual references and room to maneuver during checks.
- Use landing and search lights as required.

(3) NVG considerations – In-flight checks

- Due to the airspeeds involved while performing several of these checks, select an altitude appropriate for the task.
- Utilize airfields and improved landing environments when available.

g. **Training and evaluation requirements**. Some of the tasks incorporate more than one check from the applicable aircraft MTF manual. For initial MP and readiness level (RL) progressions, all tasks listed in Table 2-8 will be evaluated. For annual proficiency and readiness test (APART), the minimum evaluated tasks will be 4200, 4202, 4220, 4228, 4236, and 4254. Other tasks/checks may be evaluated at the discretion of the ME. Tasks that involve dual systems (such as stability augmentation system [SAS] or engines) require that only one system be evaluated. Training and evaluation requirements define whether the task will be trained or evaluated in the aircraft, simulator, or academic environment. If one or more tasks/checks are not performed to standard, the evaluation will be graded unsatisfactory. However, when reevaluated, only those unsatisfactory checks will be reevaluated. Evaluations may be conducted in aircraft that are MTF status at the discretion of the ME.

h. **References**. The references are sources of information relating to that particular task. In addition to the common references listed in chapter 4 of this ATM, the following references apply to all MP tasks:

(1) Aircraft historical records.

(2) TM 1-1500-328-23.

(3) DA Pam 738-751.

(4) Applicable –23 series manuals.

(5) TM 1-6625-724-13&P.

(6) Applicable airworthiness directives or messages.

5-2. TASK LIST. The following numbered tasks are H-60 maintenance test pilot tasks.

TASK 4000

Perform prior-to maintenance test flight checks

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions/modifications:

1. Perform the preflight inspection according to the appropriate aircraft operator's manual/checklist (CL).
2. Determine the suitability of the aircraft for flight and the mission to be performed.
3. Determine the maneuvers, checks, and tasks required during the test flight.
4. Ensure logbook entries are made according to DA Pam 738-751.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.
   b. The RCM/NCM should assist the MP as directed.
2. Procedures.
   a. Review the aircraft forms and records to determine the necessary checks and tasks to be performed. Use additional publications and references as necessary.
   b. Ensure that a thorough preflight inspection is conducted with special emphasis on areas or systems where maintenance was performed.
   c. Verify all test equipment is installed and secured as required.
   d. The MP will conduct the final walk-around
   e. Conduct a thorough crew briefing.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or academically.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4081

Perform before-starting-engine checks

CONDITION: In an H-60 helicopter

STANDARDS: Appropriate common standards

DESCRIPTION:

1. Crew actions.

   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.

   b. The RCM/NCM should assist the MP as directed.

2. Procedures. Perform the checks according to the applicable maintenance test flight (MTF) manual, with the following additional information.

   a. Central display unit/pilot display unit (CDU/PDU) check.

Note. For H-60A/L check that range markings on the CDU and PDUs match aircraft type.

   b. Cyclic FWD stop check.

Note. To determine collective "mid position," center the pedals and hold slight forward pressure against the cyclic (full forward and centered laterally). Adjust the collective until the cyclic position moves closest to the instrument panel. If during the attempt to determine the mid position point of the collective, the cyclic appears to remain relatively stationary, troubleshoot for improper aircraft rigging.

   c. Stability augmentation system (SAS) engagement/disengagement check.

Note. Position a main rotor blade at 12 o'clock position to allow the ability to visual monitor the 3 or 9 o'clock blade. Have additional outside personnel monitor the tail rotor.

   d. Trim system checks.

Note. Maintain collective at mid position for the duration of these checks.

(1) Cyclic force gradient check. Center the cyclic. Perform the check according to the applicable MTF manual with the following additional information: Without releasing trim, sequentially displace and then release the cyclic forward, aft, left, and right (approximately 2 inches) to verify that a force gradient exists. The trim should remain engaged and no caution or failure advisory lights should illuminate.

(2) Yaw pedal force gradient check. Perform the check according to the applicable MTF manual with the following additional information:

(a) Pedals centered, without disengaging trim, attempt to displace each pedal and confirm that a force gradient exists.

(b) Depress the left pedal trim switch only and displace the pedal. Release the trim switch. Confirm that trim maintains the new reference position by attempting to displace the pedal without releasing trim. Continue checking by re-referencing pedals through full range of travel. Repeat for the right pedal.

(c) Direct the additional cockpit crewmember to re-reference his pedals to different positions to confirm that his pedal trim release switches functions.

e. Stabilator check.

Note. Keep the stabilator area clear throughout the checks. Verbally confirm stabilator positions throughout the check. Have crew acknowledge each reception of a stabilator audio tone.

f. Fuel boost pumps check.

Note. Confirm both ENG FUEL SYS selectors are in DIR. Verify the #1 and #2 FUEL PRESS caution lights are illuminated. If one or both of the fuel pressure caution lights are not illuminated; place the appropriate power control lever to the LOCKOUT position until the appropriate FUEL PRESS light(s) illuminate prior to check.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4088

Perform starting engine checks

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) will direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM), and any ground support personnel as required.
   b. The RCM, NCM, and any ground support personnel should assist the MP as directed.
2. Procedures. Perform these checks according to the applicable maintenance test flight (MTF) manual with the following additional information:
   a. Brief the RCM, NCM, and any additional ground support personnel as follows:
      - 45-second emergency engine shutdown criteria.
      - Monitor the flight controls.
      - Monitor the master warning FIRE light.
      - Noting the engine gas generator speed (Ng) SPEED at the time the ENG OUT light extinguishes.
   b. Prior to checks, confirm the following:
      - Tail wheel is locked.
      - The parking brake set.
      - Other cockpit crewmember has the controls.
      - The rotor disk area is clear.
      - Personnel are clear of the main landing gear.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4090

Perform engine run-up and systems checks

CONDITION: In an H-60 helicopter at 100 percent RPM R

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) will direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.
   b. The RCM, NCM, and any ground support personnel should assist the MP as directed.
2. Procedures. Perform the following checks according to the applicable maintenance test flight (MTF) manual with the following additional information:

Note. Prior to initiating each procedure, confirm the following:

- Tail wheel is locked.
- The parking brake is set.
- Other cockpit crewmember has the controls.
- The rotor disk area is clear.
- Personnel are clear of the main landing gear.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4113

Perform integrated vehicle health monitoring system operations (H-60M)

CONDITION: In an H-60M helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.
    a. The maintenance test pilot (MP) will direct assistance from the rated crewmember/nonrated crewmember (RCM/NCM) as required.
    b. The RCM and NCM will assist the MP as directed.
2. Procedures. Enter the IVHMS screen and configure IVHMS for the required usage:
    - IVHMS main.
    - IVHMS maintenance.
    - IVHMS administration.
    - Mechanical diagnostics.
    - Vibration diagnostics.
    - Rotor tuning.
    - Exceedances.
    - Usage.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 4156

Perform hover checks

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus: maintain torque variance: +10 percent, -0 percent on heading/yaw check(s).

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM and nonrated crewmember (NCM) as necessary.
   b. The RCM and NCM should assist the MP as directed.
2. Procedures. Perform the checks according to the applicable maintenance test flight (MTF) manual.

Note. The hover height may be increased due to terrain or obstacles.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4193

Perform in-flight checks

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.
   b. The RCM and NCM should assist the MP as directed.
2. Procedures. Perform the checks according to the applicable maintenance test flight (MTF) manual.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references**.**

TASK 4200

Perform backup tail rotor servo check

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The maintenance test pilot (MP) should direct assistance from the pilot not on the controls (P) and nonrated crewmember (NCM) as required.

   b. The P and NCM should assist the MP as directed.

2. Procedures.

   a. Perform the check according to the applicable maintenance test flight (MTF) manual.

   b. Direct the P to brace using the overhead hand hold hand and to identify and hold the TAIL SERVO switch with his other hand. Brief the P on the terms "backup," "normal," and "power control levers," and the actions to perform. Ensure the P does not remove his hand from the TAIL SERVO switch unless "power control levers" or "check complete" is announced. Direct the NCM to remain secured and to assist in clearing the aircraft and maintaining obstacle avoidance.

Note. If the aircraft begins an uncommanded turn or the pedals bind during the backup servo check, direct the P to place the tail rotor control switch to “normal.” If tail servo control is not regained, announce “power control levers," perform a hovering autorotation, and do not attempt to fly the aircraft until the deficiency is corrected.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4202

Perform generator underfrequency protection disable/low rotor revolutions per minute checks

CONDITIONS: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus do not allow rotor (RPM R) to decrease below 85 percent.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) will perform pilot not on the controls (P) duties during this check. The MP should direct assistance from the pilot not on the controls (P*)and the nonrated crewmember (NCM) as required.
   b. The P* and NCM should assist the MP as directed.
2. Procedures.
   a. Perform the check according to the applicable maintenance test flight (MTF) manual.
   b. Brief the P* and NCM on the following:
      (1) Maintain a 10-foot hover height.
      (2) Control response during low rotor operation.
      (3) Low rotor RPM audio.
      (4) Landing in the event that underfrequency protection is not disabled.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: The auxiliary power unit (APU) should be on to prevent a blackout condition should the main generators go offline.

REFERENCES: Appropriate common references.

TASK 4204

Perform compasses, turn rate, and vertical gyros checks (A/L)

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember NCM) as required.

   b. The RCM and NCM should assist the MP as directed.

2. Procedures. Perform the check according to the maintenance test flight (MTF) manual with the following additional information: Brief the RCM on the conduct of the maneuver. Direct the RCM to assist with gyro mode selection switch functions and to confirm instrument indications as necessary. Direct the NCM to remain secured, assist with clearing the aircraft, and maintain obstacle avoidance.

   a. Note and compare the standby magnetic compass heading with horizontal situation indicator (HSI) heading indications at both the pilot and copilot stations.

   b. Direct the RCM to set MODE SEL TURN RATE and VERT GYRO switches at the pilot's station to ALTR and note that the legend lights indicate appropriately. Perform pedal turn to the left of the initial heading until both turn rate indicators indicate full deflection. Stop turn and stabilize hover at the new heading. Note and compare headings again. Repeat to the right. Check the HSI compass cards and the standby magnetic compass for smooth operation and heading comparison. Confirm both turn rate indicators indicate full deflection during turns in either direction. Smoothly displace the cyclic to induce 5 degree in pitch, and 10 degree in roll indications. Confirm both vertical situation indicators (VSIs) indicate appropriately. Direct RCM to switch TURN RATE and VERT GYRO switches to NORM on the pilot's MODE SEL panel and note the legend lights indicate appropriately.

   c. Have the RCM guard the collective control. The MP will set copilot station MODE SEL TURN RATE and VERT GYRO switches to ALTR and note that the legend lights indicate appropriately.

   d. Perform brief pedal turns to the left and right of the initial heading and confirm both turn rate indicators indicate full deflection during turns in either direction. Smoothly displace the cyclic to induce 5 degree in pitch and 10 degree in roll indications. Confirm both VSIs indicate appropriately. Have pilot not on the controls (P) guard the collective control. Reset copilot's station switches to NORM.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 4220

Perform maximum power check

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus these additions/modifications: Verbally confirm all bleed air is turned OFF prior to start of the task.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as required.
   b. The RCM and NCM should assist the MP as directed.
2. Procedures. Perform the check according to the applicable maintenance test flight (MTF) manual.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references

TASK 4228

Perform vibration absorber check and tuning (A/L)

CONDITIONS: In an H-60A/L helicopter, aviation vibration analyzer (AVA) installed (if required by maintenance).

STANDARDS: Appropriate common standards plus these additions/modifications: Verbally confirm all bleed air OFF prior to start of task.

DESCRIPTION:

1. Crew actions.
    a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.
    b. The RCM and NCM should assist the MP as directed.
2. Procedures. Perform the check according to the maintenance test flight (MTF) manual.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft or simulator.

REFERENCES: Appropriate common references.

TASK 4236

Perform autorotation revolutions per minute check

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus the following additions:

1. Ensure autorotation descent at 80 knots indicated airspeed (KIAS) ±5 on the pilot's side, in trim, with collective full down.
2. Calculate target rotor (RPM-R) and necessary adjustment.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.
   b. The RCM and NCM should assist the MP as directed.
2. Procedures.
   a. Perform the autorotation check according to the applicable maintenance test flight (MTF) manual.
   b. If the predicted RPM R is less than 100 percent, the MP must ensure the RPM R fully decouples from engine (ENG) RPM NP during the optional procedures listed below:
      (1) (Option 1) Maneuver will be conducted according to the MTF manual, <u>excluding</u> moving the engine power control lever(s) to idle. Continue the maneuver in accordance with the MTF.
      (2) (Option 2) Maneuver will be conducted according to the MTF manual, <u>excluding</u> moving the engine power control lever(s) to idle. The MP may use the INCR/DECR switch to decrease percentage revolutions per minute (RPM) 1&2 to 96 percent prior to the (P*) entering the autorotation. After ensuring the rotor system has fully decoupled, the MP will increase percentage RPM 1&2 to 100 percent using the INCR/DECR switch prior to power recovery. Continue the maneuver in accordance with the MTF.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

NIGHT OR NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: The optional procedures are preferred to minimize engine power control lever(s) movements during flight.

REFERENCES: Appropriate common references.

TASK 4254

Perform Vh check

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards plus these additions/modifications: Verbally confirm all bleed air OFF prior to start of task.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.
   b. The RCM and NCM should assist the MP as directed.
2. Procedures. Perform the check according to the maintenance test flight (MTF) manual.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4284

Perform engine shutdown checks

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM) as necessary.
   b. The RCM and NCM should assist the MP as directed.
2. Procedures. Perform the check according to the maintenance test flight (MTF) manual.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 4288

Perform gust lock/rotor brake operations

CONDITION: In an H-60 helicopter.

STANDARDS: Appropriate common standards

DESCRIPTION:

1. Crew actions.
   a. The maintenance test pilot (MP) should direct assistance from the rated crewmember (RCM) and nonrated crewmember (NCM), and any ground support personnel as necessary.
   b. The RCM and NCM should assist the MP as directed.
2. Procedures
   a. For aircraft equipped with rotor brake, perform this task according to the applicable maintenance test flight (MTF) manual.
   b. For aircraft equipped with gust lock only. Brief NCM/support personnel on the following:

- Movement around aircraft.
- Fire guard procedures.
- Gust lock failure.
- Intercommunication system (ICS) failure

WARNING

Only one engine at a time will be operated against the gust lock, and at no time shall the engine power control lever of the running engine be advanced beyond the IDLE detent.

Do not operate the engine against the gust lock under conditions where main rotor blade safety clearance is inadequate from other aircraft, vehicles, equipment, or other structures.

Do not operate the engine against the gust lock to dry out the engine following an engine flush procedure.

Note 1. Prior to engine start visually confirm the GUST LOCK is engaged and the caution capsule is illuminated before initiating the engine start.

Note 2. Confirm the location of any crewmembers or support personnel not visible from the cockpit before engine start.

SOLO MP CONSIDERATIONS: At least one individual must be present and briefed to perform fireguard duties.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Training may be conducted in the aircraft or simulator.
2. Evaluation. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

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Chapter 6

Crew Coordination

This chapter describes the background of crew coordination development. It also describes the crew coordination elements, basic qualities, and objectives as found in the Army Aircrew Coordination Enhancement Training Program.

> ***Note.*** Digitization of the crew compartments has expanded and redefined the lines of responsibility for each crewmember. The ability for either crewmember to perform most aircraft/system functions from his crew station breaks down the standard delineation of duties and has added capabilities in training and in combat. This could mean that during an unforeseen event, one crewmember may attempt to resolve the situation himself rather than seek assistance from the other crewmember. It is essential for the PC to brief specific duties before stepping into the aircraft. Effective sharing of tasks relies on good crew coordination and information management.

6-1. CREW COORDINATION BACKGROUND. An analysis of U.S. Army aviation accidents revealed that a significant percentage of these accidents resulted from one or more crew coordination errors committed before or during the mission flight. Often an accident was the result of a sequence of undetected crew errors that combined to produce a catastrophic result. Additional research showed that even when accidents are avoided, these same errors can result in degraded mission performance. A systematic analysis of these error patterns identified specific areas where crew-level training could reduce the occurrence of such errors and break the error chains leading to accidents and poor mission performance.

6-2. CREW COORDINATION ELEMENTS. Broadly defined, aircrew coordination is the interaction between crewmembers necessary for the safe, efficient, and effective performance of tasks. The essential elements of crew coordination are described below.

a. **Communicate positively.** Communication is positive when the sender directs, requests, announces, or offers. The receiver acknowledges and the sender confirms (based on received acknowledgment) or correct action. Communications should be quick and clearly understood using limited vocabulary of explicit terms and phrases so actions can be made in a timely manner.

b. **Direct assistance.** Crewmembers will direct assistance when unable to maintain aircraft control or unable to troubleshoot aircraft systems without assistance. Pilot on the controls will divert his attention from outside to inside for momentary cross-check of aircraft systems.

c. **Announce actions.** To ensure effective and well-coordinated actions in the aircraft, all crewmembers must be aware of the expected movements and unexpected individual actions. Each crewmember will announce any action that affects the actions of the other crewmembers.

d. **Offer assistance.** Offer assistance for the following:

(1) When the pilot on the controls demonstrates difficulty in aircraft control or deviates from normal or expected actions.

(2) Anytime information or assistance is requested.

(3) Anytime a crewmember sees or recognizes anything that poses a hazard to flight.

e. **Acknowledge actions.** Similar to positive communication, this must include supportive feedback to ensure crewmembers correctly understand. The preferred method of acknowledgment is to repeat critical parts of the message.

f. **Be explicit.** Crewmembers should use clear terms and phrases and positively acknowledge critical information. They must avoid using terms that have multiple meanings—such as, “Right,” “Back up,” or “I have it.” Crewmembers must also avoid using indefinite modifiers such as, “Do you see that tree?” or “You are coming in a little fast.”

g. **Provide aircraft control and obstacle advisories.** Although the pilot on the controls (P*) is responsible for aircraft control, the other crewmembers may need to provide aircraft control information regarding altitude, airspeed, and heading. Hazard identification and avoidance is the responsibility of all crewmembers.

h. **Coordinate action sequence and timing.** The proper sequencing, timing, and interaction of machine, crew, and environment helps ensure that the actions of one crewmember mesh with the actions of the other crewmembers to successfully execute a task or mission.

6-3. CREW COORDINATION BASIC QUALITIES. The crew coordination elements are further broken down into a set of 13 basic qualities. Each basic quality is defined in terms of observable behaviors. The paragraphs below summarize these basic qualities.

a. **Flight team leadership and crew climate are established and maintained.** This quality addresses the relationships among the crew and the overall climate of the flight deck. Aircrews are teams with a designated leader and clear lines of authority and responsibility. The pilot in command (PC) sets the tone for the crew and maintains the working environment. Effective leaders use their authority but do not operate without the participation of other crewmembers. When crewmembers disagree on a course of action, they must be effective in resolving the disagreement. Specific goals include the following:

(1) The PC actively establishes an open climate where crewmembers freely talk and ask questions.

(2) Crewmembers value each other for their expertise and judgment. They do not allow differences in rank and experience to influence their willingness to speak up.

(3) Alternative viewpoints are a normal and occasional part of crew interaction. Crewmembers handle disagreements in a professional manner—avoiding personal attacks or defensive posturing.

(4) The PC actively monitors the attitudes of crewmembers and offers feedback when necessary. Each crewmember displays the proper concern for balancing safety with mission accomplishment.

b. **Premission planning and rehearsal are accomplished.** Premission planning includes all preparatory tasks associated with planning the mission. These tasks include planning for visual flight rules (VFR), instrument flight rules (IFR), and terrain flight. They also include assigning crewmember responsibilities and conducting all required briefings and brief backs. Premission rehearsal involves the crew's collectively visualizing, and discussing expected and potential unexpected events for the entire mission. Through this process, all crewmembers think through contingencies and actions for difficult segments or unusual events associated with the mission and develop strategies to cope with contingencies. Specific goals include the following:

(1) The PC ensures that all actions, duties, and mission responsibilities are partitioned and clearly assigned to specific crewmembers. Each crewmember actively participates in the mission planning process to ensure a common understanding of mission intent and operational sequence. The PC prioritizes planning activities so that critical items are addressed within the available planning time.

(2) The crew identifies alternate courses of action in anticipation of potential changes in mission, enemy, terrain and weather, troops and support available, time available (METT-T) and is fully prepared to implement contingency plans as necessary. Crewmembers mentally rehearse the entire mission by visualizing and discussing potential problems, contingencies, and responsibilities.

(3) The PC ensures that crewmembers take advantage of periods of low workload to rehearse upcoming flight segments. Crewmembers continuously review remaining flight segments to identify required adjustments. Their planning is consistently ahead of critical lead times.

c. **Appropriate decision-making techniques are applied.** Decision making is the act of rendering a solution to a problem and defining a plan of action. It must involve risk assessment. The quality of decision making and problem solving throughout the planning and execution phases of the mission depends on the information available, time constraints, and level of involvement and information exchange among crewmembers. The crew's ability to apply appropriate decision-making techniques based on these criteria has a major impact on the choice and quality of their resultant actions. Although the entire crew should be involved in the decision making and problem-solving process, the PC is the key decision maker. Specific goals include the following:

(1) Under high-time stress, crewmembers rely on a pattern-recognition decision process to produce timely responses. They minimize deliberation consistent with the available decision time. Crewmembers focus on the most critical factors influencing their choice of responses. They efficiently prioritize their specific information needs within the available decision time.

(2) Under moderate- to low-time stress, crewmembers rely on an analytical decision process to produce high-quality decisions. They encourage deliberation when time permits. To arrive at the most unbiased decision possible, crewmembers consider all important factors influencing their choice of action. They consistently seek all available information relative to the factors being considered.

d. **Actions are prioritized and workload is equitably distributed.** This quality addresses the effectiveness of time and workload management. It assesses the extent to which the crew, as a team, avoids distractions from essential activities, distributes and manages workload, and avoids individual task overload. Specific goals include the following.

(1) Crewmembers are always able to identify and prioritize competing mission tasks. They never ignore flight safety and other high-priority tasks. They appropriately delay low-priority tasks until those tasks do not compete with more critical tasks. Crewmembers consistently avoid nonessential distractions so that these distractions do not impact on task performance.

(2) The PC actively manages the distribution of mission tasks to prevent overloading any crewmember, especially during critical phases of flight. Crewmembers watch for workload buildup on others and react quickly to adjust the distribution of task responsibilities.

e. **Unexpected events are managed effectively.** This quality addresses the crew's performance under unusual circumstances that may involve high levels of stress. Both the technical and managerial aspects of coping with the situation are important. Specific goals include the following.

(1) Crew actions reflect extensive rehearsal of emergency procedures in prior training and premission planning and rehearsal. Crewmembers coordinate their actions and exchange information with minimal verbal direction from the PC. They respond to the unexpected event in a composed, professional manner.

(2) Each crewmember appropriately or voluntarily adjusts individual workload and task priorities with minimal verbal direction from the PC. The PC ensures that each crewmember is used effectively when responding to the emergency and that the workload is efficiently distributed.

f. **Statements and directives are clear, timely, relevant, complete, and verified.** This quality refers to the completeness, timeliness, and quality of information transfer. It includes the crew's use of standard terminology and feedback techniques to verify information transfer. Emphasis is on the quality of instructions and statements associated with navigation, obstacle clearance, and instrument readouts. Specific goals include the following.

(1) Crewmembers consistently make the required call outs. Their statements and directives are always timely.

(2) Crewmembers use standard terminology in all communications. Their statements and directives are clear and concise.

(3) Crewmembers actively seek feedback when they do not receive acknowledgment from another crewmember. They always acknowledge understanding of intent and request clarification when necessary.

g. **Mission situational awareness is maintained.** This quality considers the extent to which crewmembers keep each other informed about the status of the aircraft and the mission. Information reporting helps the aircrew maintain a high level of situational awareness. The information reported includes aircraft position and orientation, equipment and personnel status, environmental and battlefield conditions, and changes to mission objectives. Awareness of the situation by the entire crew is essential to safe flight and effective crew performance. Specific goals include the following.

(1) Crewmembers routinely update each other and highlight and acknowledge changes. They take personal responsibility for scanning the entire flight environment, considering their assigned workload and areas of scanning.

(2) Crewmembers actively discuss conditions and situations that can compromise situational awareness. These include, but are not limited to, stress, boredom, fatigue, and anger.

h. **Decisions and actions are communicated and acknowledged.** This quality addresses the extent to which crewmembers are kept informed of decisions made and actions taken by another crewmember. Crewmembers should respond verbally or by appropriately adjusting their behaviors, actions, or control inputs to clearly indicate that they understand when a decision has been made and what it is. Failure to do so may confuse crews and lead to uncoordinated operations. Specific goals include the following.

(1) Crewmembers announce decisions and actions, stating their rationale and intentions as time permits. The pilot not on the controls (P) verbally coordinates the transfer of or inputs to controls before action.

(2) Crewmembers always acknowledge announced decisions or actions and provide feedback on how these decisions or actions will affect other crew tasks. If necessary, they promptly request clarification of decisions or actions.

i. **Supporting information and actions are sought from the crew.** This quality addresses the extent to which supporting information and actions are sought from the crew by another crewmember, usually the PC. Crewmembers should feel free to raise questions during the flight regarding plans, revisions to plans, actions to be taken, and the status of key mission information. Specific goals include the following:

(1) The PC encourages crewmembers to raise issues or offer information about safety or the mission. Crewmembers anticipate impending decisions and actions and offer information as appropriate.

(2) Crewmembers always request assistance from others before they become overloaded with tasks or before they must divert their attention from a critical task.

j. **Crewmember actions are mutually cross-monitored.** This quality addresses the extent to which a crew uses cross monitoring as a mechanism for breaking error chains that lead to accidents or degraded mission performance. Crewmembers must be capable of detecting each other's errors. Such redundancy is particularly important when crews are tired or overly focused on critical task elements and thus more prone to make errors. Specific goals include the following.

(1) Crewmembers acknowledge that crew error is a common occurrence and the active involvement of the entire crew is required to detect and break the error chains that lead to accidents. They constantly watch for crew errors affecting flight safety or mission performance. They monitor their own performance as well as that of others. When they note an error, they quickly and professionally inform and assist the crewmember committing the error.

(2) The crew thoroughly discusses the two-challenge rule before executing the mission. When required, they effectively implement the two-challenge rule with minimal compromise to flight safety.

Note. The two-challenge rule allows one crewmember to automatically assume the duties of another crewmember who fails to respond to two consecutive challenges. For example, the P* becomes fixated, confused, task overloaded, or otherwise allows the aircraft to enter an unsafe position or attitude. The P first asks the P* if he is aware of the aircraft position or attitude. If the P* does not acknowledge this challenge, the P issues a second challenge. If the P* fails to acknowledge the second challenge, the P assumes control of the aircraft.

k. **Supporting information and actions are offered by the crew.** This quality addresses the extent to which crewmembers anticipate and offer supporting information and actions to the decision maker—usually the PC—when apparently a decision must be made or an action taken. Specific goals include the following.

(1) Crewmembers anticipate the need to provide information or warnings to the PC or P* during critical phases of the flight. They provide the required information and warnings in a timely manner.

(2) Crewmembers anticipate the need to assist the PC or P* during critical phases of flight. They provide the required assistance when needed.

l. **Advocacy and assertion are practiced.** This quality concerns the extent to which crewmembers are proactive in advocating a course of action they consider best—even when others may disagree. Specific goals include the following.

(1) While maintaining a professional atmosphere, crewmembers state the rationale for their recommended plans and courses of action when time permits. They request feedback to make sure others have correctly understood their statements or rationale. Time permitting, other crewmembers practice good listening habits; they wait for the rationale before commenting on the recommended plans or courses of action.

(2) The PC actively promotes objectivity in the cockpit by encouraging other crewmembers to speak up despite their rank or experience. Junior crewmembers do not hesitate to speak up when they disagree with senior members; they understand that more experienced aviators can sometimes commit errors or lose situational awareness. Every member of the crew displays a sense of responsibility for adhering to flight regulations, operating procedures, and safety standards.

m. **Crew-level after action reviews are conducted.** This quality addresses the extent to which crewmembers review and critique their actions during or after a mission segment, during periods of low workload, or during the mission debriefing. Specific goals include the following:

(1) The crew critiques major decisions and actions. They identify options and factors that should have been discussed and outline ways to improve crew performance in future missions.

(2) The critique of crew decisions and actions is professional. "Finger-pointing" is avoided; the emphasis is on education and improvement of crew performance.

6-4. CREW COORDINATION OBJECTIVES. The crew coordination elements and basic qualities are measured to determine if the objectives of the crew coordination program have been met. The objectives of the program have been defined by five crew coordination objectives. The five objectives are as follows.

a. **Establish and maintain team relationships.** Establish a positive working relationship that allows the crew to communicate openly and freely and to operate in a concerted manner.

b. **Plan mission and rehearse.** Explore, in concert, all aspects of the assigned mission and analyze each segment for potential difficulties and possible reactions in terms of the commander's intent.

c. **Establish and maintain workloads.** Manage and execute the mission workload in an effective and efficient manner with the redistribution of task responsibilities as the mission situation changes.

d. **Exchange mission information.** Establish intracrew communications using effective patterns and techniques that allow for the flow of essential data between crewmembers.

e. **Cross monitor performance.** Cross monitor each other's actions and decisions to reduce the likelihood of errors impacting mission performance and safety.

6-5. STANDARD CREW TERMINOLOGY. To enhance communication and crew coordination, crews should use words or phrases that are understood by all participants. They must use clear, concise terms that can be easily understood and complied with in an environment full of distractions. Multiple terms with the same meaning should be avoided. Department of Defense flight information publication (DOD FLIP) contains standard terminology for radio communications. Operator's manuals contain standard terminology for items of equipment. The following is a list of other standard words and phrases that crewmembers may use.

- Abort–terminate a preplanned aircraft maneuver.
- Affirmative–yes.
- Bandit–an identified enemy aircraft.
- Blocking–announcement made by the crewmember who intends to block the pedals.
- Bogey–an unidentified aircraft assumed to be an enemy.
- Braking–announcement made by the rated crewmember (RCM) who intends to apply brake pressure.
- Break–immediate action command to perform a maneuver to deviate from the present ground track (will be followed by "right" or "left.")
- Call out–command by the P* for a specified procedure to be read from the checklist by another crewmember.
- Cease fire–command to stop firing but continue to track.
- Clear–no obstacle present to impede aircraft movement along the intended ground track. Will be preceded by the word "nose," "tail," or "aircraft" and followed by a direction (for example, "right" or "slide left"). Also indicates that ground personnel are clear to approach the aircraft.
- Come up/down–command to change altitude up or down.
- Contact–establish communication with… (followed by the name of the element).
- Controls–refers to the aircraft flight controls.
- Correct–confirms a statement as being accurate or right. Do not use the word "right" to indicate correct.
- Drifting–an alert of the unannounced movement of the aircraft (will be followed by direction).
- Egress–immediate action command to get out of the aircraft.
- Execute–initiate an action.

- Expect–anticipate further instructions or guidance.
- Fire light–announcement of illumination of the master fire warning light.
- Firing–announcement that a specific weapon is to be fired.
- Go ahead–proceed with your message.
- Go plain/red–command to discontinue secure operations.
- Go secure/green–command to activate secure operations.
- Hold–command to maintain present position.
- I have the controls—used as a command or announcement by the RCM assuming control of the flight controls.
- Inside–primary focus of attention is inside the aircraft.
- In sight–preceded by the word "traffic," "target," "obstacle," or descriptive term. Used to confirm the traffic, target, or obstacle is positively seen or identified.
- Jettison–command for emergency release of a sling load or stores; when followed by "door," indicates the requirement to perform emergency door removal.
- Maintain–command to keep or continue the same.
- Mask–command to conceal aircraft.
- Mickey–have quick time synchronized signal.
- Move forward/backward—command to hover the aircraft forward or backward (followed by distance). Also used to announce intended forward or backward movement.
- Negative–incorrect or permission not granted.
- Negative contact–unable to establish communication with… (followed by the name of the element).
- No joy–target traffic or obstacle not positively seen or identified.
- Now–indicates that an immediate action is required.
- Outside–the primary focus is outside the aircraft.
- Put me up–command to place a frequency in a specific radio.
- Release–command for the planned release of a sling load.
- Report–command to notify.
- Right–used to indicate a direction only, not to be used in place of "correct."
- Roger–message received and understood.
- Say again–repeat your transmission.
- Slide left/right–command to hover the aircraft left or right (will be followed by distance). Also used to announce intended left or right movement.
- Slow down–command to decrease ground speed.
- Speed up–command to increase ground speed.
- Stand by–wait; duties of a higher priority are being performed and the request cannot be complied with at this time.
- Stop–command to go no further; halt present action.
- Strobe–indicates that the AN/APR-39 has detected a radar threat (will be followed by a clock position).
- Talley–target traffic or obstacle positively seen or identified (will be followed by a repeat of the word target traffic or obstacle and the clock position).
- Target–an alert that a ground target has been spotted.
- Traffic–refers to any friendly aircraft that presents a collision hazard (followed by a clock position, distance, and reference to altitude).

- Troops on/off–command for troops to enter/exit the aircraft.
- Turn–command to deviate from the current heading (will be followed by the word "right" or "left" and a specific heading or rally term).
- Unable–indicates the inability to comply with a specific instruction or request.
- Unmask–command to position the aircraft above terrain features.
- Up on–indicates the radio selected (will be followed by the position number on the intercommunication system (ICS) panel; for example, "Up on 3.")
- Weapons hot/cold/off–indicates weapon switches are in the ARMED, SAFE, or OFF position.
- Wilco–I have received your message and I understand and will comply.
- You have the controls–used as a command or announcement by the RCM relinquishing the flight controls.

Appendix A
Nonrated Crewmember Training

SECTION I – CREW CHIEF TRAINING

A-1. This section describes training requirements for crew chief (CE) crewmembers.

A-2. CE AIRCRAFT QUALIFICATION TRAINING. Crew chiefs must complete the aircraft qualification training listed below. At the crewmembers next closeout, aircraft qualification will be documented in Part V, remarks section, of the crewmember's DA Form 759 (*Individual Flight Record and Flight Certificate—Army*).

a. **Academic qualification training.** The crew chief must receive sufficient instruction to be knowledgeable in all applicable topics of chapter 3 and the following list of academic training subjects. The subjects may be completed in any order. Commanders will develop a 50-question written examination covering all applicable topics listed in chapter 3 (paragraph 3-4b) and the following list in addition to the operator's manual examination. Crewmembers must pass each examination with a grade of at least 70 percent. Training will be documented according to TC 1-210, chapter 3. The following academic training will be included in the commander's written examination:

- Aircrew training program introduction.
- Aircrew coordination training (academic training will be conducted according to current United States Army Aviation Warfighting Center training support package [USAAWC TSP]).
- CE qualification written examination.
- Operator's manual written examination.

b. **Flight training.** The CE will be required to demonstrate proficiency in all performance-based tasks listed in the DAY and NIGHT column with an "X" in chapter 2, table 2-5 (page 2-100) and demonstrate crew coordination and airspace surveillance proficiency in all other tasks listed in the DAY and NIGHT column of chapter 2, table 2-4 (page 2-78). Technical tasks listed in chapter 2, table 2-4 and table 2-5 will be completed regardless of flight mode. Flight training consists of 10 flight hours. This must consist of at least 1 hour of night unaided flight time. The evaluation may be a continual evaluation. The commander may reduce the total flight time to no less than 6.0 hours based on a recommendation from the standardization instructor pilot (SP), instructor pilot (IP), standardization instructor (SI), or nonrated crewmember instructor (FI) concerning the crewmember's proficiency. This recommendation will be annotated in the remarks section of the crewmembers DA Form 7122-R (*Crewmember Training Record*). If the commander has selected chemical, biological, radiological, nuclear (CBRN) requirements as part of the unit's mission essential task list (METL), all tasks with an "X" marked under the CBRN column will also be trained/evaluated as required.

SECTION II – FLIGHT MEDIC TRAINING

A-3. This section describes training requirements for 68W flight medic crewmembers.

A-4. MO AIRCRAFT QUALIFICATION TRAINING. Flight medics must complete the aircraft qualification training listed below. At the crewmembers next closeout, aircraft qualification will be documented in Part V, remarks section, of the crewmember's DA Form 759.

a. **Academic qualification training.** The medical officer (MO) must receive sufficient instruction to be knowledgeable in all applicable topics of chapter 3 and the following list. The subjects may be completed in any order. Commanders will develop a 50-question written examination covering all applicable topics listed in chapter 3 (paragraph 3-4b) and the following list in addition to the operator's manual examination. Crewmembers must pass each examination with a grade of at least 70 percent. Training will be documented according to TC 1-210, chapter 3. Flight medic academic training subjects include the following:

- Maintenance forms and records.
- MO qualification written examination.
- Aircrew training program introduction.
- Patient care reporting procedures.
- Aircrew coordination training.
- Operator's manual written examination.
- Medical protocols.

b. **Flight training.** The MO will be required to demonstrate proficiency in all performance-based tasks listed in the DAY and NIGHT column with an "X" in chapter 2, table 2-5 (page 2-10) and demonstrate crew coordination and airspace surveillance proficiency in all other tasks listed in the DAY and NIGHT column of chapter 2, table 2-4 (page 2-7). Technical tasks listed in chapter 2, table 2-4 and table 2-6 will be completed regardless of flight mode. Flight training consists of 10 flight hours. This must consist of at least 1 hour of night unaided flight time. The evaluation may be a continual evaluation. The commander may reduce the total flight time to no less than 6.0 hours based on a recommendation from the SP, IP, SI, or FI concerning the crewmember's proficiency. This recommendation will be annotated in the remarks section of the crewmembers DA Form 7122-R. If the commander has selected CBRN requirements as part of the unit's METL, all tasks with an "X" marked under the CBRN column will also be trained/evaluated as required.

SECTION III – NONRATED CREWMEMBER INSTRUCTOR AND STANDARDIZATION INSTRUCTOR TRAINING

A-5. This section describes qualification training requirements for FI and SI training.

A-6. QUALIFICATION TRAINING. The unit commander is responsible for conducting FI and SI qualification training according to AR 95-1, TC 1-210, and this aircrew training manual (ATM). The crewmembers must complete academic and flight training and pass a written and flight evaluation administered by an IP, SP or SI. At the crewmembers next closeout, instructor qualification will be documented in Part V, remarks section, of the crewmember's DA Form 759.

a. **FI qualification.**

(1) Academic training. The crewmember must receive sufficient instruction to conduct training and evaluations in the applicable subjects listed in table A-1 and all applicable topics in chapter 3, paragraph 3-4b. The subjects may be completed in any order. Commanders will develop a 50-question written examination covering the subject areas in table A-1. The crewmember must pass the examination with a grade of at least 70 percent. The crewmember must also conduct a minimum of one oral presentation to include a lesson plan of a topic selected by the evaluator from the academic subjects listed below. The commander is responsible for developing lesson plans that

sufficiently cover the training topics below. The hour requirement shown is a recommendation on class length of subject areas listed.

Table A-1. Nonrated crewmember instructor academic subjects

System Subjects	**Hours**	**Night and Night Vision Goggle Subjects**	**Hours**
H-60 introduction	1.0	Night operations	2.5
Flight control system	0.5	AN/AVS-6 operations	0.5
Hydraulic system	1.0	Night vision techniques	0.5
Rotor system	0.5	NVG ETP review	2.0
Fuel system	0.5	**Total Hours**	**5.5**
Power plants	1.0		
Auxiliary power plant	1.0	**Academic Subjects**	**Hours**
Power train system	0.5	NCM aircrew training program	8.0
Environmental systems	0.5	In-flight duties	1.0
Utility hydraulic system	0.5	Aeromedical factors	4.0
Landing gear system	0.5	Regulation and publications	1.0
Electrical system	1.0	Aviation life support equipment	1.0
Malfunction analysis	1.0	Aircrew coordination instructor training	7.0
Internal load operations	0.5	Operating limitations and restrictions	0.5
External load operations	0.5	Refueling operations	0.5
Total hours	**10.5**	**Total hours**	**23.0**
Fundamentals of Instruction Subjects	**Hours**	**MO Subjects**	**Hours**
Instructor fundamentals	2.0	Medical protocols	2.0
Planning Instructional activity	1.0	Medical equipment deployment	2.0
Flight Instructor characteristics and responsibilities	1.0	Patient care documentation	1.0
Total hours	**4.0**	**Total hours**	**5.0**
		FI qualification written examination	**2.0**
Total academic hours	**50.0**		

(2) Flight training. The crewmember will be required to demonstrate method of instruction (MOI) proficiency in all tasks listed in chapter 2, table 2-5 (page 2-100) or table 2-6 (page 2-111), as appropriate, and any commander selected mission/additional tasks. The crewmember acting as an FI must conduct one NCM aircrew flight evaluation as a minimum during his training and complete aircrew coordination instructor qualification according to the current USAAWC TSP. Flight training consists of 14 hours in the aircraft. Training and evaluation will be conducted in all modes designated on the crewmembers DA Form 7120-R (*Commander's Task List*).

b. **SI qualification.**

(1) Academic training. The SI must receive sufficient instruction to be able to conduct training and evaluate FIs and other SIs. They must be able to assist the unit SP with the supervision and maintenance of the standardization program.

(2) Flight training. Flight training will emphasize the SIs ability to conduct training and evaluations of other FIs and SIs. His ability to use role reversal is a key element in his training and evaluation process. There is no designated flight training hour requirement; however, all modes of flight will be trained and evaluated.

Appendix B
Aircraft Series Qualification

B-1. ADDITIONAL AIRCRAFT SERIES QUALIFICATION. Additional aircraft series qualifications will be done according to an approved USAAWC POI/TSP and this ATM. A qualified SP, IP, SI, or FI will conduct all qualifications. An entry will be made on the DA Form 7122 upon the completion of the training. At the crewmember's next closeout, the qualification will be documented in Part V remarks section of the DA Form 759.

B-2. UH-60L SERIES QUALIFICATION. Initial UH-60L series qualification may be conducted locally. UH-60L qualification will consist of the following training. NCMs do not have additional academic and flight requirements for UH60L qualification. (NCMs are considered qualified at the same time UH60A qualification occurs.)

a. **Academic training.** The RCM will receive training and demonstrate a working knowledge of the RCM academic training topics (UH-60L) listed below. TM 1-1520-237-10 is the reference for the following academic training topics:

- Performance planning.
- Operating limitations.
- Emergency procedures.
- T700-GE-701C/D engines.
- Improved durability gearbox.
- Miscellaneous aircraft improvements.

b. **Flight training.** The RCM will receive 1 hour of flight training in the aircraft. As a minimum, he will perform the tasks in table B-1.

Table B-1. Rated crewmember flight tasks for UH-60L series qualification

Task	Task Title
1010	Prepare a performance planning card
1022	Perform preflight inspection
1024	Perform before-starting-engine through before-leaving-helicopter checks
1070	Respond to emergencies (ENG failure at altitude and ECU/DECU lockout as a minimum)

Flight Instruction	Hours
Qualification training	1.0

B-3. UH-60L SERIES MP/ME QUALIFICATION. Initial UH-60L series MP/ME qualification may be conducted locally by a qualified ME. UH-60L MP/ME qualification will consist of the following training.

a. **Academic Training.** The MP/ME will receive training and demonstrate a working knowledge of the topics listed below. TM 1-1520-237-10 and TM 1-1520-237-MTF are the references for the following MP/ME academic training topics (UH-60L):

- Starting engine checks.
- Engine run-up and system checks.
- Maximum power check.

b. **Flight Training.** The MP/ME will receive 1 hour of flight training in the aircraft. As a minimum, he will perform the tasks listed in table B-2.

c. Flight time listed in table B-2 will not be combined with flight time required by table B-1.

Table B-2. Flight tasks for UH-60L series maintenance test pilot/maintenance test pilot evaluator qualification

Task	Task Title
4088	Perform starting engine checks
4090	Perform engine run-up and systems checks
4220	Perform maximum power check

Flight Instruction	Hours
Qualification training	1.0

B-4. HH-60A/L/M SERIES QUALIFICATION. Initial HH-60A/L series qualification may be conducted locally by a SP, IP SI, or FI qualified in the HH-60A/L, as appropriate. (HH-60M RCMs must be previously UH-60M qualified under the approved USAAWC POI). The RCM and NCM qualification will consist of the following training.

a. **Academic training (RCM).** The RCM will receive training and demonstrate a working knowledge of the topics listed below. The appropriate operator's manual is the reference for the following academic RCM training topics (HH-60A/L).

- UH-60L academics (if not previously UH-60L) in accordance with B-2.
- Mission medical interior cabin systems.
- HH-60A/L/M avionics systems.
- Computer based trainer.

b. **Academic training (NCM).** The NCM will receive training and demonstrate a working knowledge of the topics listed below. The appropriate aircraft operator's manual is the reference for the following NCM academic training topics (HH-60A/L/M).

- Mission medical interior cabin systems.
- Operating limitations, restrictions and capabilities.
- Emergency procedures.

c. **Ground training (RCM).** Prior to flight training in a HH-60A/L, the RCM will receive static ground training in the aircraft performing tasks 1253 and 1254.

d. **Flight training (RCM).** The RCM will receive 2 hours of flight training in the aircraft. As a minimum, the RCM will perform the tasks listed in table B-3.

Table B-3. Rated crewmember flight tasks for HH-60A/L series qualification		
Task	**Task Title**	
1010	Prepare a performance planning card	
1022	Perform preflight inspection	
1024	Perform before-starting-engine through before-leaving-helicopter checks	
1032	Perform radio communication procedures	
1016	Perform internal load operations	
1062	Perform slope operations	
1070	Respond to emergencies (ENG failure at altitude and ECU/DECU lockout as a minimum)	
1162	Perform emergency egress	
1168	Perform command instrument system procedures	
1253	Operate flight management system/central display unit	
1254	Operate multifunction display	
		Hours
Flight Instruction		
Qualification training		2.0
Total hours		2.0

d. **Flight training (NCM).** The NCM will receive 2 hours of flight training in the aircraft As a minimum, the NCM will perform the tasks listed in table B-4.

Table B-4. Nonrated crewmember flight tasks for HH-60A/L series qualification		
Task	**Task Title**	
1016	Perform internal load operations	
1020	Prepare aircraft for mission	
1022	Perform preflight inspection	
1024	Perform before-starting-engine through before-leaving-helicopter checks	
1032	Perform radio communication procedures	
1026	Perform airspace surveillance	
1162	Perform emergency egress	
Flight Instruction		**Hours**
Qualification training		2.0
Total hours		2.0

B-5 HH-60A/L/M SERIES MP/ME QUALIFICATION. Initial HH-60A/L series MP/ME qualification may be conducted locally by a qualified ME. If the aviator is a previously qualified MP/ME in a UH60A/L then upon completing HH-60 qualification in accordance with table B-3 the MP/ME will be an HH-60A/L MP/ME. RCMs qualified in the UH60M are qualified in the HH60M.

Note. In the absence of a HH-60A/L/M aircraft or qualified ME during the annual MP/ME evaluation or for MP/ME RL progression , the commander may authorize the maintenance task training and evaluation in a UH-60 A/L/M to complete the requirements.

B-6. H-60M SERIES QUALIFICATION. Initial H-60M series qualification for RCMs is conducted under an approved USAAWC POI. NCM qualification is conducted locally by a SP, IP SI, or FI qualified in the H-60M, as appropriate. H-60M qualification for NCMs will consist of the following training.

a. **Academic training.** The NCM will receive training and demonstrate a working knowledge of the academic training topics listed below. The aircraft operator's manual is the reference for the following academic training topics:

- Aircraft improvements and differences from UH60A/L
- Operating limitations, restrictions and capabilities.
- Emergency procedures.

b. **Flight training.** The NCM will receive 2 hour of flight training in the aircraft. As a minimum, the NCM will perform the tasks in table B-5.

Table B-5. Flight tasks for UH-60M nonrated crewmember series qualification

Task	Task Title
1016	Perform internal load operations
1020	Prepare aircraft for mission
1022	Perform preflight inspection
1024	Perform before-starting-engine through before-leaving-helicopter checks
1032	Perform radio communication procedures
1162	Perform emergency egress

Flight Instruction	Hours
Qualification training	2.0
Total hours	2.0

Appendix C

Aviator's Night Vision Imaging System Heads-Up Display

ANVIS HEADS-UP DISPLAY QUALIFICATION TRAINING. Qualification training will provide the aviators with the knowledge, skills, and techniques required to integrate heads-up display (HUD) operations into NVG flight. Training in the aircraft will be with the aviator at a station with access to the flight controls and wearing ANVIS with HUD attached. A HUD-qualified IP, SP, or UT will be at the other station with access to the flight controls. HUD qualification training may be conducted concurrently with NVG refresher and mission training.

Note 1. The academic training and all training flights (except the last one) may be conducted by a HUD-qualified NVG UT, providing the RCM receiving the training is designated NVG RL 2. A HUD-qualified NVG IP/SP must conduct the last flight.

Note 2. Once qualified, the RCM has no currency or evaluation requirements for HUD operations, unless specified by the commander. Also, the HUD display is considered supplemental information. Therefore, one RCM may fly with the HUD and the other without. There is no requirement for both RCMs to fly with the HUD, unless specified by the commander. Academic training must be completed before flight training starts.

a. **Academic training**. Using either the HUD computer based trainer (CBT) or other training aids, the trainee will receive instruction in the following subject areas:

- AN/AVS-7 HUD system components.
- HUD symbology.
- HUD system operations (programming, adjusting, and operating).

Note. After completing the academic training, the trainee will receive an evaluation on HUD symbology and HUD operations. This evaluation may be either a written evaluation or a practical exercise evaluation using the CBT or a HUD-modified synthetic flight training systems (SFTS).

b. **HUD flight training.** There are two flight training programs available depending on access to a HUD-modified SFTS. These programs outline the minimum flight requirements for HUD qualification. Some RCMs may require additional flight periods to achieve a satisfactory level of proficiency with the ANVIS HUD. ANVIS HUD training requires the RCM to develop new scanning habits. Time must be allowed to absorb this new information and develop the new scan patterns. Therefore, training days will not be combined. Each aircraft training day will be completed in sequence on a separate night.

(1) HUD qualification. Units using a HUD-modified SFTS will use the training program in table C-1.

Table C-1. Heads-up display qualification using synthetic flight training systems			
Training day	***1***	***2***	***3***
Aircraft		1.2	1.2
SFTS	(1.5)*		
Cumulative	(1.5)*	1.2	2.4
*(1.5) indicates 1.5 hours of time logged in a HUD-modified SFTS. This must be done before the first aircraft flight if the SFTS program is used to conduct qualification.			

(2) HUD qualification. Units not using a HUD-modified SFTS will use the training program in table C-2.

Table C-2. Heads-up display qualification without using synthetic flight training systems			
Training Day	***1***	***2***	***3***
Aircraft	(1.0)*	1.5	1.5
Cumulative	(1.0)*	1.5	3.0
*(1.0) indicates 1 hour of static aircraft training in HUD programming and operations. This must be completed before the first flight. This may be reduced to 0.5 hour if the trainee has demonstrated proficiency in HUD programming and operations with the CBT. ***Note.*** As an option, units may conduct the flight training as three 1-hour flights. The first flight may be performed immediately following the static aircraft training period.			

Appendix D
Aircraft System/Equipment Qualification

D-1. ADDITIONAL SYSTEM QUALIFICATIONS. During system qualifications, RL status will not be affected. Additional systems qualifications will be conducted according to the appropriate TSP, new equipment training (NET), interim statement of airworthiness qualification, or AWR, as applicable. If a TSP is applicable, it may be obtained by writing to Commander, U.S. Army Aviation Center, ATTN: ATZQ-TDS-T, Fort Rucker, Alabama 36362-5000. As new equipment is fielded, the level of training required will be determined by Commander, U.S. Army Aviation Center, Fort Rucker, Alabama. A qualified SP, IP, SI or FI will conduct all qualifications. Document additional qualifications on Part V, remarks section of DA Form 759 (*Individual Flight Record and Flight Certificate—Army*) closeout and DA Form 7122-R (*Crew Member Training Record)*.

D-2. EXTENDED RANGE FUEL SYSTEM QUALIFICATION TRAINING. The ERFS TSP outlines procedures that units will use for initial ERFS qualification. The TSP may be obtained by writing to Commander, U.S. Army Aviation Center, ATTN: ATZQ-TDS-T, Fort Rucker, Alabama 36362-5000. ERFS qualification will consist of the following training.

a. **Academic training.** The crewmember will receive training and demonstrate a working knowledge of the topics in table D-1.

Table D-1. Extended range fuel system academic training for crewmembers

ESSS/ERFS Academic Instruction	Hours
ESSS/ERFS familiarization	1.0
ESSS/ERFS preflight, system test, and operation	2.0
ERFS fault analysis	1.0
ERFS airworthiness, limitations, handling qualities	2.0
ERFS emergency procedures	1.0
ERFS performance planning and weight and balance*	1.0
Total Hours	**8.0**

*This applies to RCMs only.

b. **Flight training.** The crewmember will receive a minimum of 1 hour of flight training in the aircraft. As a minimum, the crewmember will perform the tasks listed in table D-2. Flight training will be conducted with the appropriate amount of fuel in the main and external fuel tanks to demonstrate the performance and handling qualities of the aircraft.

Table D-2. Flight tasks for initial external stores support system qualification	
Tasks	**Task Titles**
1010	Prepare a performance planning card*
1012	Verify aircraft weight and balance*
1020	Prepare aircraft for mission
1022	Perform preflight inspection
1024	Perform before-starting-engine through before-leaving-helicopter checks
1028	Perform hover power check*
1034	Perform ground taxi*
1038	Perform hovering flight*
1040	Perform VMC takeoff*
1048	Perform fuel management procedures
1052	Perform VMC flight maneuvers*
1058	Perform VMC approach*
1062	Perform slope operations
1064	Perform a roll-on landing*
1070	Respond to emergencies
1114	Perform a rolling takeoff*
2066	Perform extended range fuel system operations*
Total hours: 1.0	
*These tasks are performed by RCMs only.	

D-3. VOLCANO QUALIFICATION TRAINING. The Volcano TSP outlines procedures that units will use for initial volcano qualification. The TSP may be obtained by writing to Commander, U.S. Army Aviation Center, ATTN: ATZQ-TDS-T, Fort Rucker, Alabama 36362-5000. This training provides the crewmember with the knowledge, skills, and techniques required for installation, loading, preflight, in-flight system operations, emergency procedures, and basic employment considerations associated with Volcano. Volcano qualification will consist of the following training.

a. **Academic training.** Crewmembers will receive training and demonstrate a working knowledge of the topics in table D-3.

Table D-3. Volcano academic training	
Volcano Academic Training	**Hours**
Volcano introduction and familiarization	2.0
Fault analysis/emergency procedures and limitations	1.0
Preflight	1.0
Performance planning, drag, and weight and balance*	2.0
Employment doctrine/plan scenario*	1.0
Pre-installation requirements	0.5
Installation procedures	2.5
Loading and unloading	0.5
Programming the system	1.0
Total Hours	11.5
*These apply to RCMs only.	

b. **Fight Training.** The crewmember will receive 2 hours of flight training followed by a 1 hour evaluation flight in the aircraft. As a minimum, the crewmember will perform the tasks listed in table D-4.

Table D-4. Volcano flight training

Task	Task Title	
1010	Prepare a performance planning card*	
1012	Verify aircraft weight and balance*	
1020	Prepare aircraft for mission	
1022	Perform preflight inspection	
1024	Perform before-starting-engine through before-leaving-helicopter checks	
1028	Perform hover power check*	
1034	Perform ground taxi*	
1038	Perform hovering flight*	
1040	Perform VMC takeoff*	
1048	Perform fuel management procedures	
1052	Perform VMC flight maneuvers*	
1058	Perform VMC approach*	
1062	Perform slope operations*	
1064	Perform roll-on landing*	
1070	Respond to emergencies*	
1114	Perform a rolling takeoff*	
2070	Perform M-139 Volcano operations	
Flight Instruction		2.0
Evaluation		1.0
Total Hours		3.0

*These tasks are performed by RCMs only.

Note. Evaluation may be continuous.

Note. One hour will be conducted under NVGs, if designated to fly NVGs on DA Form 7120-R.

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Appendix E

Instructions for Manual Computation of DA Form 5701-60-R

1. DEPARTURE DATA

Item 1—PA. Record forecast maximum pressure altitude (PA) for the mission location and current PA for time and location of departure.

Item 2—FAT. Record forecast maximum free air temperature (FAT) for the mission location and FAT for time and location of departure.

> ***Note.*** Maximum PA and temperature will be used when computing all items in the departure section, except for PREDICTED HOVER TORQUE, item 12, and GO/NO GO TORQUE OGE/IGE, item 10, which will be computed using forecast FAT and PA at time and location of departure.

Item 3—AIRCRAFT GWT. Record the total planned aircraft gross weight (GWT) at takeoff. This includes the aircraft basic weight, crew, internal load, internal fuel, and when applicable, external stores support system (ESSS) stores and sling load. Several times throughout the PPC, this weight will be used for computations. Use the actual weight of the aircraft and all additions for these computations.

Item 4—STORES WEIGHT. Record the planned weight of any stores weight.

> ***Note.*** External stores are defined as a sling load, ESSS wing stores, Volcano, or other jettisonable items.

Item 5—FUEL WEIGHT. Record total planned fuel weight (internal and external) at takeoff.

Item 6—ATF/ETF. Record the aircraft torque factor (ATF) and engine torque factors (ETFs) in the appropriate blocks.

Item 7—TORQUE RATIO. Use the aircraft TORQUE FACTOR chart to compute torque ratios (TRs) as described below.

Step 1: Enter the appropriate aircraft TORQUE FACTOR chart on the left at the appropriate temperature. Move right to the ATF or ETF.

Step 2: Move straight down to the bottom of the chart, note the torque ratio (~ TR). Record the TORQUE RATIO.

Item 8—MAX TORQUE AVAILABLE. Use the appropriate MAXIMUM TORQUE AVAILABLE chart to compute engine specification torque available as described in the steps below. (T700 engines will use the 30 MIN LIMIT chart for computations. T701 will use 10–MINUTE -LIMIT for dual-engine computations and 2.5–MINUTE LIMIT for single-engine computations). Mission requirements may dictate using tabular data to update maximum torque available.

> ***Note 1***. The maximum torque available is also referred to as intermediate rated power (IRP)—30-minute limit (T700 and T701)—or maximum rated power (MRP)—10-minute limit (T701). The maximum torque available—2.5-minute limit (T701)—is also referred to as SINGLE ENGINE CONTINGENCY POWER—2.5-MINUTE LIMIT or one engine inoperative (OEI).

Note 2. Certain temperature and PA combinations will exceed the aircraft operator's manual, chapter 5 torque limitations. This item represents actual maximum torque available values. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations, shall not be exceeded.

Step 1: Enter the MAXIMUM TORQUE AVAILABLE chart at the appropriate temperature, and then move right to the appropriate PRESSURE ALTITUDE ~ 1,000 FT.

Step 2: Move down and read the SPECIFICATION TORQUE AVAILABLE PER ENGINE % (T700), or TORQUE AVAILABLE PER ENGINE ~ % (T701).

Step 3: If the ATF or an ETF is less than 1.0, multiply the SPECIFICATION TORQUE AVAILABLE PER ENGINE % from step 2 above, by the torque ratio, item 7 (T700), to obtain maximum torque available. An alternate method is to continue down to the TORQUE RATIO, item 7. Move left to read the maximum TORQUE AVAILABLE ~ % per engine. Record MAX TORQUE AVAILABLE. For T701, enter the TORQUE CONVERSION chart at the TORQUE AVAILABLE PER ENGINE (SPECIFICATION TORQUE) ~ % scale with the TORQUE AVAILABLE PER ENGINE ~ % from step 2 above. Move up to the TORQUE RATIO from item 7.

Step 4: Move left and read ACTUAL TORQUE AVAILABLE ~ %. Record MAX TORQUE AVAILABLE.

Note 1. If the ETF is different for each engine, compute maximum torque available (single-engine) for each engine using the torque ratio derived from the respective engine's ETF.

Note 2. Adjust the maximum torque available as required for planned use of engine anti-ice and cockpit heater according to the operator's manual.

Note 3. If the blade erosion kit is installed, adjust the maximum torque available according to the aircraft operator's manual.

Item 9—MAX ALLOWABLE GWT OGE/IGE. Use the appropriate HOVER chart to complete MAXIMUM ALLOWABLE GROSS WEIGHT for out of ground effect/in-ground effect (OGE/IGE) as described below. Annotate the computed maximum allowable gross weight OGE/IGE or the maximum gross weight per the operator's manual, chapter 5—whichever is less.

Note 1. If OGE capability does not exist, the MAX HOVER HEIGHT IGE, item 11, must be computed.

Note 2. If the blade erosion kit is installed, adjust the maximum allowable GWT according to the aircraft operator's manual.

Note 2. Tab data values represent a 100-foot hover height OGE and 10-foot hover height IGE.

MAX ALLOWABLE GWT OGE

Step 1: Enter the HOVER chart at the TORQUE PER ENGINE ~ % (OGE) at the dual engine MAX TORQUE AVAILABLE, item 8, then move right to the GROSS WEIGHT ~ 1,000 LB chart. If the dual engine maximum torque available exceeds transmission torque limits, use the DUAL ENGINE TRANS LIMIT line to compute the maximum allowable gross weight OGE.

Step 2: Reenter the HOVER chart at the appropriate FREE AIR TEMP ~ °C and move right to the appropriate PRESSURE ALTITUDE ~ 1,000 FT, then move down to the GROSS WEIGHT ~ 1,000 LB chart. Read the maximum allowable gross weight OGE at the intersection of this step and step 1 above. Record the MAX ALLOWABLE GWT OGE.

MAX ALLOWABLE GWT IGE.

Step 1: Enter the HOVER chart at the TORQUE PER ENGINE ~ % (IGE) at the dual engine MAX TORQUE AVAILABLE, item 8, then move up to the desired IGE WHEEL HEIGHT ~ FT (normally the 10-foot line), then move right to the GROSS WEIGHT ~ 1,000 LB chart. If the dual engine maximum torque available exceeds transmission torque limits, use the DUAL ENGINE TRANS LIMIT line to compute the maximum allowable gross weight IGE.

Step 2: Reenter the HOVER chart at the appropriate FREE AIR TEMP ~ °C and move right to the appropriate PRESSURE ALTITUDE ~ 1,000 FT then move down to the GROSS WEIGHT ~ 1,000 LB chart. Read the maximum allowable gross weight IGE at the intersection of this step and step 1 above. Record the MAX ALLOWABLE GWT IGE.

Item 10—GO/NO GO TORQUE OGE/IGE. Use the appropriate HOVER chart as described below.
OGE. Use maximum allowable gross weight OGE, item 9.
IGE. Use maximum allowable gross weight IGE, item 9.

Note. GO/NO GO is computed using forecast FAT and PA at the time and location of departure.

Step 1: Enter the chart at the appropriate FREE AIR TEMP ~ °C.

Step 2: Move right to the appropriate PRESSURE ALTITUDE ~ 1,000 FT.

Step 3: Move down to the maximum allowable gross weight(s) OGE or IGE.

Step 4: Move left to the 10-foot hover line (or appropriate WHEEL HEIGHT ~ FT that will be used to check the GO/NO GO).

Step 5: Move down to read the GO/NO GO torque value(s). Record the GO/NO GO TORQUE OGE/IGE.

Note 1. MAXIMUM ALLOWABLE GWT OGE/IGE was determined in item 9 using maximum PA and temperature. When the departure temperature is less than maximum, the torque required to hover at a given gross weight is less. During the hover power check, exceeding the GO/NO GO torque value prior to the WHEEL HEIGHT ~ FT used in step 4 above indicates the aircraft is heavier than the MAXIMUM ALLOWABLE GWT OGE/IGE (as applicable) determined in item 9 and will be incapable of OGE/IGE operations (as applicable) when maximum PA and FAT conditions are encountered.

Note 2. If MAXIMUM ALLOWABLE GWT OGE/IGE, item 9, was limited by the maximum gross weight per the aircraft operator's manual, chapter 5, exceeding this torque value prior to the WHEEL HEIGHT ~ FT used in step 4 above indicates the aircraft is above the maximum structural weight limit.

Item 11—MAX HOVER HEIGHT IGE. If OGE capability does not exist, use the appropriate HOVER chart to compute the MAX HOVER HEIGHT IGE, as described below.

Step 1: Enter the HOVER chart at the appropriate FREE AIR TEMP ~ °C and move right to the appropriate PRESSURE ALTITUDE ~ 1,000 FT, then move down to the AIRCRAFT GWT ~ 1,000 LB, item 3, then move left to the WHEEL HEIGHT ~ FT lines.

Step 2: Reenter the bottom of the HOVER chart at the TORQUE PER ENGINE ~ % (IGE) at the dual engine MAX TORQUE AVAILABLE, item 8, then up to the intersection from step 1 above. Interpolate hover height as required. Record the MAX HOVER HEIGHT IGE.

Note. If OGE capability does exist, place OGE in this block.

<u>Item 12—PREDICTED HOVER TORQUE</u>. Use the appropriate HOVER chart as described below for torque required to hover. Use AIRCRAFT GWT, item 3, current PA, item 1, and FAT, item 2.

> ***Note.*** If the blade erosion kit is installed, adjust the torque required according to the aircraft operator's manual.
>
> PREDICTED HOVER TORQUE (DUAL ENGINE). Compute the torque the same as for item 10 above using the AIRCRAFT GWT, item 3, instead of the MAX ALLOWABLE GWT. Record dual engine PREDICTED HOVER TORQUE.
>
> PREDICTED HOVER TORQUE (SINGLE ENGINE). Double the PREDICTED HOVER TORQUE value that was computed in the step above. Record single engine PREDICTED HOVER TORQUE.
>
> ***Note 1.*** At the time of departure, maximum torque available may be higher than what is listed in MAX TORQUE AVAILABLE, item 8, due to item 8 being computed using maximum FAT for the mission.
>
> ***Note 2*** At the time of departure, engine performance may be increased due to a lower FAT. If this is the case, the aircraft may be able to sustain hover capability, single engine even though MAX TORQUE AVAILABLE, item 8, may be less than PREDICTED HOVER TORQUE – SINGLE ENGINE.
>
> ***Note 3.*** PREDICTED HOVER TORQUE (SINGLE ENGINE) is computed using a specific wheel height. If the hover torque exceeds the MAX TORQUE AVAILABLE the aircraft may still be capable of sustaining single-engine hover at a lower wheel height.

<u>Item 13—MIN SE AIRSPEED - IAS - WO / W STORES</u>. Use the appropriate CRUISE chart for departure conditions to compute the minimum single-engine airspeed with external stores and without external stores as described below.

> ***Note.*** If the aircraft will be operating without external stores, record NA in the w/stores block.
>
> Step 1: Using the SE ~ 30-MIN (T700) or SE ~ 2.5-MIN (T701) line enter the bottom of the CRUISE chart at the lowest ETF.
>
> Step 2: Follow the slant of the line up to the first intersection of aircraft gross weight (subtract STORES WEIGHT**,** item 4 from AIRCRAFT GWT**,** item 3). Read left or right for the IAS ~ KTS. Record MIN SE AIRSPEED– IAS – W/O STORES. If aircraft will be operating with external stores, proceed with step 3 below.
>
> Step 3: Continue with the slant of the line to the first intersection of GW ~ 1,000 LB at the AIRCRAFT GWT, item 3. Read left or right for the IAS ~ KTS. Record MIN SE AIRSPEED – IAS – W/STORES.
>
> ***Note.*** The torque change to compensate for drag (alternative or external load configuration) at minimum indicated airspeed is often negligible and not computed.

<u>Item 14—ZERO FUEL WEIGHT:</u> Use the appropriate DD Form 365-4 from the aircraft logbook to record ZERO FUEL WEIGHT.

> ***Note 1.*** The zero fuel weight on the DD Form 365-4 is computed using standard, average, or estimated weight for personnel, equipment, and fuel. Actual mission weight could vary from that on the DD Form 365-4. The method to determine adjusted zero fuel weight is described below. If the load configuration is different than that on the 365-4, the PC has two methods available to determine aircraft ZERO FUEL WEIGHT.
>
> Method 1: Use the appropriate DD Form 365-4 from the aircraft logbook and add additional weights of cargo and personnel, then subtract indicating fuel. Record the ZERO FUEL WEIGHT.

Method 2: This method is completed in the aircraft and described below.

Note 2. The PC must adjust for certain hover conditions such as wind and surface condition.

Note 3. The zero fuel weight on the DD Form 365-4 is computed using standard, average, or estimated weight for personnel, equipment, and fuel. Actual weights may vary greatly from those on the DD Form 365-4. Special consideration must be given to the actual weights of any items placed on the helicopter. If the PC feels that an accurate weight cannot be estimated, compute an adjusted ZERO FUEL WEIGHT. The method to determine adjusted zero fuel weight is described below.

Note 4. Use the HOVER chart from the CL to compute the adjusted ZERO FUEL WEIGHT.

Step 1: Note FAT, PA, and total indicated fuel weight.

Step 2: While at a hover, note wheel height and hover torque.

Step 3: Enter the HOVER chart at the noted FREE AIR TEMP ~ °C. Move down to the noted PRESSURE ALTITUDE ~ 1,000 FT, then left to the GROSS WEIGHT ~ 1,000 LB chart.

Step 4: Reenter the HOVER chart at the TORQUE PER ENGINE ~ % (IGE) at the noted hover torque. Move right to the WHEEL HEIGHT ~ FT to the noted hover height then move down to the intersection of step 3 above. Note aircraft gross weight.

Step 5: Subtract the noted total indicated (internal and external) fuel weight from the gross weight computed in step 4 above. Record the ZERO FUEL WEIGHT.

Note 5. Although data needed to compute ZERO FUEL WEIGHT is noted at a hover, the calculation should be made when practical.

Item 15—REMARKS: Record appropriate mission information. Examples of these may include drag factors, fuel requirements for the mission, GO/NO GO for sling loads, and EMER SE-IAS.

Note 1. The EMER SE-IAS is the emergency single-engine airspeed based on the mission and briefed to the crew for the purpose of crew coordination. This airspeed is selected from the MIN/MAX-IAS range computed in item 14, CRUISE data, and is used immediately following an emergency that requires adjustment to a single-engine airspeed. When an aircraft does not have single-engine capability, the MAX ENDURANCE - IAS, item 9, or the OPTIMUM IAS AT MAX ALLOWABLE GWT, item 19, as appropriate, should be briefed as the emergency single-engine airspeed.

Note 2. Normally only one EMER SE - IAS is selected. However, when the MIN/MAX–IAS range, item 14, is wide, the crew may select two emergency single-engine airspeeds, one slow and one fast based on mission profile, modes of flight, environmental conditions or other factors.

Note 3. There is no power margin available when operating single-engine at the MIN/MAX-IAS, item 14. These airspeeds are computed using the maximum torque available single-engine for the lowest ETF engine. It is not recommended that the aircraft be flown at airspeeds that require maximum power for continued single-engine flight.

Note 4. The GO/NO GO TORQUE for sling loads is determined by using the same process as item 10 above, using the MAX ALLOWABLE GWT OGE and a wheel height that suspends the load approximately 10 feet above ground level (AGL).

2. CRUISE DATA

The maximum continuous power (~ MCP) lines on the CRUISE charts are used to define power levels that an engine can produce continuously and remain out of time limited engine operating limitations (30-minute, 10-minute or 2.5-minute TGT values). The maximum torque available is also referred maximum rated power (MRP)—10-minute limit (T701). The TORQUE AVAILABLE ~ 30-MIN lines (T700 and T701) and the TORQUE AVAILABLE ~ 10-MIN lines for T701 are used to define a power level that will be limited and only used for a defined period of time. The SE ~ 30-MIN lines (T700) and SE ~ 2.5-MIN lines (T701) represents maximum single engine power OEI and are used to define single engine flight performance. The CRUISE charts define DUAL ENGINE aircraft performance and SINGLE ENGINE MAX TORQUE AVAILABLE.

Note. When using the CRUISE charts, adjust torques for ETF and ATF values that are less than 1.0, and interpolate values as required.

Item 1 - PA. Record planned cruise PA.

Item 2 - FAT. Record forecast FAT at the planned cruise PA.

Item 3 – MIN / MAX – IAS. (DUAL ENGINE). Use the appropriate CRUISE chart to compute the minimum/maximum indicated airspeeds as described below.
Clean and high drag configuration:

Step 1: Enter the bottom of the CRUISE chart at the ATF or transmission torque limit, whichever is less.

Step 2: Follow the slant of the TORQUE AVAILABLE ~30-MIN (T700) or ~10-MIN (T701) line up to the first intersection of GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data). Read left or right for minimum IAS ~ KTS. Record the MIN–IAS (DUAL ENGINE). If the maximum torque available line is right of the gross weight line, record 0 for the MIN–IAS.

Step 3: Continue up to the second intersection of GW ~ 1,000 LB at the AIRCRAFT GWT (item 3 departure data). Read left or right for maximum IAS ~ KTS. Record the MAX–IAS (DUAL ENGINE).

Note 1. If the maximum torque available line is to the left of (does not intersect) the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data), the aircraft cannot maintain dual engine level flight for the conditions.
Alternative or external load configuration

Note 2. For alternative or external load configurations, refer to the operator's manual, chapter 7/7A, section VI, DRAG. Determine and add together the appropriate drag multiplying factors.

Note 3. The torque change to compensate for drag (alternative or external load configuration) at minimum indicated airspeed is often negligible and not computed. The dual-engine maximum indicated airspeed is adjusted for alternate or external load configuration as follows:

Step 1: Enter the CRUISE chart at DUAL ENGINE MAX–IAS, (step 3 above), then move left or right to the curved dashed line, then move up to read-ΔTRQ ~ % FOR DRAG AREA OF 10 SQ FT of ΔF.

Step 2: Multiply the ΔTRQ times the drag multiplying factor. Subtract the result from the maximum torque available used initially step 1 above (clean and high drag configuration).

Step 3 Reenter the bottom of the CRUISE chart at the adjusted torque value, follow the slant of the TORQUE AVAILABLE ~30-MIN (T700) or ~10-MIN (T701) line and move up to the second intersection of GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data). Read left or right for MAX-IAS (DUAL ENGINE). Record the adjusted DUAL ENGINE MAX IAS (DUAL ENGINE).

Note. If the adjusted maximum torque available line is to the left of (does not intersect) the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data), the aircraft cannot maintain dual engine level flight for the conditions.

Item 4—CRUISE SPEED - IAS/TAS (DUAL ENGINE). Select an IAS that falls within the range of MIN/MAX–IAS (IAS ~ KTS scale). Record CRUISE SPEED-IAS (DUAL ENGINE). Enter the CRUISE chart at cruise IAS and move laterally to the TRUE AIRSPEED ~ KTS scale. Record CRUISE SPEED-TAS (DUAL ENGINE).

Item 5—MAX TORQUE AVAILABLE (DUAL ENGINE). Maximum torque available (dual engine) is derived from the CRUISE chart by referencing the TORQUE AVAILABLE ~ 30-MIN (T700) or 10-MIN (T701) ATF 1.0 line. If the ATF is between 1.0 and 0.9, interpolation is required to determine actual maximum torque available.

Note 1. The maximum torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations, shall not be exceeded.

Note 2. Maximum torque available is derived from the cruise charts and takes into account the effect of ram-air on engine performance at a selected airspeed. Torque values may vary when flying at airspeeds other than the planned cruise airspeed.

Step 1: Enter the bottom of the CRUISE chart at the TORQUE AVAILABLE ~ 30-MIN line (T700) or TORQUE AVAILABLE ~ 10-MIN (T701) line adjusted for the ATF and follow the slant of the line up to item 4 CRUISE SPEED-IAS (DUAL ENGINE) CRUISE).

Step 2: Move straight down (do not follow the slant of the line) to the TORQUE PER ENGINE ~ % to read the MAX TORQUE AVAILABLE. Record the MAX TORQUE AVAILABLE (DUAL ENGINE).

Note 1. Adjust as required for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

Note 2. The maximum torque available ~ 30 MIN for the (T700) engine (figure 1) and ~ 10 MIN limit for the (T701) (figure 6) can also be derived from the CL for maximum torques available up to 100 and 120 percent respectively. If the ATF is between 1.0 and 0.9, interpolation is required.

Item 6—CRUISE TORQUE/CONT TORQUE AVAILABLE (DUAL ENGINE). Use the appropriate Cruise chart to compute the torque required to cruise as described below.
Clean and high drag configuration.

Step 1: Enter the CRUISE chart at the selected cruise speed IAS in item 4 above. Move left or right as appropriate to the GW ~ 1,000 LB at the AIRCRAFT GWT ~ 1,000 LB (item 3, departure data).

Step 2: Move down (do not follow the slant of the line) to the TORQUE PER ENGINE ~ % line to read the CRUISE torque. Record the CRUISE TORQUE (DUAL ENGINE).

Note. The continuous torque available is also referred to as MAXIMUM CONTINUOUS POWER (MCP).

Step 3: Enter the CRUISE chart at the selected cruise speed-IAS in item 4 above. Move left or right as appropriate to the TORQUE AVAILABLE ~ MCP line; adjusted for the ETF of the weakest engine.

Step 4: Move straight down (do not follow the slant of the line) to the TORQUE PER ENGINE ~ % to read the CONT TORQUE. Record the CONT TORQUE AVAILABLE (DUAL ENGINE).

Note 1. Compare the CRUISE TORQUE in step 2 with the CONT TORQUE from step 4 to determine whether the aircraft will be operating in a time limited condition (above maximum continuous power) for this IAS.

Note 2. The continuous torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations, shall not be exceeded.

Note 3. Adjust CONT TORQUE for planned use of engine anti-ice and heater according to the aircraft operator's manual.

Note 4 For alternative or external load configurations, refer to the operator's manual, chapter 7/7A, section VI, DRAG. Determine and add together the appropriate drag multiplying factors.

Alternative or external load configuration.

Step 1: Enter the appropriate cruise chart at the cruise speed-IAS in item 4 above.

Step 2: Move left or right as appropriate to the ΔTRQ ~ % FOR DRAG AREA OF 10 SQ FT OF ΔF (dashed) line, and then up to find the change in torque percent for each 10 square feet of drag.

Step 3: Multiply the ΔTRQ ~ % times the drag multiplying factor.

Step 4: Add or subtract the value in step 2 to/from the uncorrected clean or high drag cruise torque value recorded in step 2 above. Do not exceed the dual engine transmission torque limit. Record adjusted CRUISE TORQUE (DUAL ENGINE).

Note 1. If the new torque value exceeds the dual engine transmission torque limit, the planned cruise airspeed must be reduced.

Note 2. The adjusted cruise torque reflects the power required to overcome the added drag.

Item 7—CRUISE FUEL FLOW (DUAL ENGINE).

Cruise chart method. Use the appropriate CRUISE chart.

Step 1: Enter the bottom of the chart at the cruise torque value computed in item 6 above.

Step 2: Move up to TOTAL FUEL FLOW ~ 100 LB/HR and read cruise fuel flow. Record the CRUISE FUEL FLOW (DUAL ENGINE).

Note. Adjust as required for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

Engine fuel flow chart method. Use the SINGLE/DUAL– ENGINE FUEL FLOW chart.

Step 1: Enter the chart at the INDICATED TORQUE PER ENGINE ~ % for the cruise torque value computed in item 6 above.

Step 2: Move right to the cruise PRESSURE ALTITUDE ~ 1,000 FT.

Step 3: Move up to the DUAL– ENGINE FUEL FLOW ~ LB/HR line and read cruise fuel flow. Record the CRUISE FUEL FLOW (DUAL ENGINE).

Note. Adjust as required for FAT and planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

Item 8—MAX RANGE–IAS/TORQUE (DUAL ENGINE). Use the appropriate cruise chart to compute the maximum range indicated airspeed as described below.
Clean and high drag configuration.

Step 1: Find the intersection of the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data) and the MAX RANGE line.

Step 2: Move left or right to find the MAX RANGE-IAS. Record MAX RANGE-IAS (DUAL ENGINE).

Step 3: At the intersection of the GW ~ 1,000 LB at the AIRCRAFT GWT, (item 3, departure data), and the MAX RANGE line move down to the TORQUE PER ENGINE ~ % line, then read torque for the maximum range indicated airspeed. Record MAX RANGE-TORQUE (DUAL ENGINE).

Alternative or external load configuration.

Step 1: Insert the change in square feet of drag into the formula found in the operator's manual, chapter 7/7A: (6 KTS/10FT^2 X ΔF).

Step 2: Subtract the airspeed change from the results of the formula in step 1 above from the clean or high drag configuration MAX RANGE-IAS (DUAL ENGINE).

Example: You are flying with both cargo doors open. The change in flat plate drag area (ΔF) from the operator's manual, chapter 7 (DRAG) is 6.0 square feet. The equation using the "-10" method would be as follows:

6 KTS/10 FT^2 X 6FT^2 drag = 3.6 KTS. Reduce maximum range airspeed by approximately 4 knots

Item 9—MAX ENDURANCE-IAS/TORQUE (DUAL ENGINE). Use the appropriate CRUISE chart to compute maximum endurance indicated airspeed and torque as described below.
Clean and high drag configuration.

Step 1: Enter the bottom of the appropriate cruise chart at GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data). Move up along the arc of the gross weight line to the intersection of the MAX END AND R/C line. Move left or right as required to the IAS ~ KTS value then read maximum endurance indicated airspeed. Record MAX ENDURANCE–IAS.

Step 2: At the intersection of the GW ~ 1,000 LB line and the MAX END AND R/C line, read straight down and find the torque value associated with MAX END–IAS. Record MAX ENDURANCE ~ TORQUE (DUAL ENGINE).

Note. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is often negligible and not computed.

Item 10—CRITICAL TORQUE (DUAL ENGINE).

Note. Critical torque (CT) is the dual engine torque value, which when exceeded, may not allow the aircraft to maintain % RPM R within normal limits under single-engine operations in the same flight conditions.

Step 1: Enter the bottom of the CRUISE chart at the lowest ETF engine and follow the SE 30-MIN line (T700) or SE 2.5-MIN line (T701) to the selected dual engine cruise speed-IAS (item 4).

Step 2: Read straight down (do not follow slant of line) and record CRITICAL TORQUE (DUAL ENGINE).

WARNING

During dual engine flight, conditions that require torque settings greater than the critical torque indicate the pilot is operating outside the aircraft low ETF single-engine capability. If operating dual engine above the CT and an engine fails, malfunctions, or must be shut down, the pilot must immediately adjust torque, airspeed, and/or gross weight to achieve single-engine capability.

Item 11—ALLOWABLE GWT and OPTIMUM IAS AT MAX ALLOWABLE GWT (DUAL ENGINE). Use the appropriate CRUISE chart to compute the MAX ALLOWABLE GWT, as described below.

Clean and high drag configuration.

Step 1: Enter the bottom of the CRUISE chart at the TORQUE AVAILABLE, ~30-MIN (T700) or ~10-MIN (T701) line adjusted for the ATF.

Step 2: Follow the slant of the line up to the intersection of the MAXIMUM END and R/C line, and read maximum gross weight. If the maximum torque available line is to the right of the GW ~ 1,000 LB lines, enter the maximum gross weight according to the operator's manual, chapter 5 limits. Record MAX ALLOWABLE GWT (DUAL ENGINE).

Step 3: Re-enter the cruise chart at the intersection of the MAX ALLOWABLE GWT (DUAL ENGINE) line, as determined in step 2 above, and the MAXIMUM END and R/C line. Read right or left as required to the IAS~KTS scale for OPTIMUM IAS AT MAX ALLOWABLE GWT. Record OPTIMUM IAS AT MAX ALLOWABLE GWT (DUAL ENGINE).

Note. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is often negligible and not computed.

Alternative or sling load configuration.

Step 1: Enter the CRUISE chart at the OPTIMUM IAS AT MAX ALLOWABLE GWT, step 3 above. Read left or right to the curved dashed line then move up to read Δ TRQ ~ % FOR DRAG AREA OF 10 SQ FT of ΔF.

Step 2: Multiply the Δ TRQ- % by the drag multiplying factor. Subtract the result from the uncorrected clean or high drag configuration maximum torque available noted in step 2 above.

Step 3: Reenter the bottom of the CRUISE chart at the adjusted torque value from step 2, then move up to the intersection of MAX END AND R/C line and read maximum allowable gross weight. Record the MAX ALLOWABLE GWT (DUAL ENGINE). Read left or right for optimum IAS ~ KTS at maximum allowable gross weight. Record the OPTIMUM IAS AT MAX GWT (DUAL ENGINE). If the maximum torque available line is right of the GW ~ 1,000 LB line enter MAX ALLOWABLE GWT according to the appropriate aircraft operator's manual, chapter 5, and then read left or right from the respective value for OPTIMUM IAS AT MAX ALLOWABLE GWT (DUAL ENGINE).

Item 12—MAX R/C– IAS/TORQUE (DUAL ENGINE). Use the appropriate CRUISE chart to compute maximum rate of climb indicated airspeed and torque as described below.

Clean and high drag configuration.

Step 1: Enter the cruise chart at the intersection of the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data), and the MAX END AND R/C line. Move right to intersect the TORQUE AVAILABLE ~ 30-MIN line (T700) or ~ 10-MIN line (T701) or transmission torque limit, whichever is less. Read straight down to determine maximum torque available at maximum endurance airspeed. If the maximum torque available is greater than the dual engine transmission torque limit from the operator's manual, chapter 5, use the transmission torque limit. Record MAX R/C–Torque (DUAL ENGINE).

Step 2: Subtract the torque value found in item 9, step 2 above, from the MAX R/C-Torque (step 1 above) to find the TORQUE INCREASE PER ENGINE ~ % TRQ. Note the TORQUE INCREASE PER ENGINE.

Step 3: Use the CLIMB/DESCENT charts in the aircraft operator's manual, chapter 7/7A, section VII. Enter the bottom of the CLIMB/DESCENT chart for clean or high drag, as appropriate, at the TORQUE INCREASE PER ENGINE ~ % TRQ (step 2 above).

Step 4: Move up to the GROSS WEIGHT ~ 1,000 LB line at the AIRCRAFT GWT (item 3, departure data), then move left to read the RATE OF CLIMB ~ FT/MIN. Note the rate of climb.

Step 5: Use the AIRSPEED SYSTEM CORRECTIONS charts in the aircraft operator's manual, chapter 7/7A, section IX. Enter the appropriate AIRSPEED SYSTEM CORRECTION chart for clean or high drag at the MAX END–IAS from item 9, step 4 above. Move up to the appropriate segmented line for the rate of climb value derived from step 4 above (R/C greater or less than 1,400 ft/min).

Step 6: Move left to read the CORRECTION TO ADD ~ KNOTS. Add or subtract this value to/from the MAX END–IAS from item 9, step 1 above. Record the resultant MAX R/C–IAS (DUAL ENGINE).

Alternative or sling load configuration.

Note. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is often negligible and not computed.

Item 13—MAX ALTITUDE–MSL/MAX ENDURANCE–IAS (DUAL ENGINE). Compute MAX ALTITUDE–MSL based on MAX END–IAS.

Note. Several different cruise charts may have to be referenced when computing the MAX ALTITUDE–MSL. It is recommended to start with the 10,000 FT CRUISE chart and forecast temperature.

Step 1: Enter the CRUISE chart at the MAX END AND R/C line. Move left or right along the line to the AIRCRAFT GWT (item 3, departure data).

Step 2: If the intersection of MAX END AND R/C line and AIRCRAFT GWT (item 3, departure data) is to the left of the TORQUE AVAILABLE ~ 30 MIN (T700) or 10 MIN (T701) adjusted for ATF (flight is still possible at MAX END–IAS), move to the next higher CRUISE chart and repeat steps 1 and 2. If the intersection of MAX END AND R/C and AIRCRAFT GWT (item 3, departure data) is to the right of the TORQUE AVAILABLE ~ 30-MIN (T700) or 10-MIN (T701) line corresponding to the ATF (flight is no longer possible at MAX END–IAS), move to the next lower CRUISE chart and repeat steps 1 and 2.

Step 3: Record the MAX ALTITUDE–MSL (DUAL ENGINE) and MAX ENDURANCE–IAS that will allow flight at the AIRCRAFT GWT (item 3, departure data). Interpolation between the charts is authorized.

Note 1. Ensure FAT is adjusted for pressure altitude in the CRUISE charts.

Note 2. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is negligible and not computed.

Item 14—MIN / MAX–IAS (SINGLE ENGINE).Use the appropriate CRUISE chart to compute the minimum/maximum indicated airspeeds as described below.

Clean and high drag configuration.

Step 1: Enter the bottom of the CRUISE chart at the SE ~ 30-MIN (T700) or SE ~ 2.5-MIN (T701) line adjusted to the ETF of the weakest engine, but no more than one-half of transmission torque limit single engine.

Step 2: Follow the slant of the line to the first intersection of the GW ~ 1,000 LB at the AIRCRAFT GWT, (item 3, departure data), then read left or right for minimum–IAS ~ KTS. Record the MIN–IAS (SINGLE-ENGINE).

Step 3: Continue up to the second intersection of the GW ~ 1,000 LB at the AIRCRAFT GWT, (item 3, departure data), then read left or right for maximum–IAS. Record the MAX–IAS (SINGLE ENGINE).

Note. If the maximum torque available line is to the left of (does not intersect) the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data), the aircraft cannot maintain single engine level flight for the conditions. As fuel is consumed, single-engine capability may become possible.

Alternative or external load configuration.

Note 1. The torque change to compensate for drag (alternative or external load configuration) at minimum indicated airspeed is often negligible and not computed.

Note 2. The maximum indicated airspeed, single engine, is adjusted for alternate or external load configuration as follows:

Step 1: Enter the CRUISE chart at MAX–IAS (SINGLE-ENGINE) in step 3, above, then move left or right to the curved dashed line. Move up to read ΔTRQ ~ % FOR DRAG AREA OF 10 SQ FT ΔF

Step 2: Multiply the ΔTRQ times the drag multiplying factor. Subtract one-half the result from the maximum torque available value used initially in step 1 above.

Step 3: Reenter the bottom of the CRUISE chart at the adjusted torque value and follow the slant of the line up to the second intersection of the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data). Read left or right for MAX–IAS (SINGLE ENGINE). Record the adjusted MAX–IAS (SINGLE ENGINE) .

Note. If the adjusted torque value is to the left of (does not intersect) the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data), the aircraft cannot maintain single engine level flight for the conditions. As fuel is consumed, single-engine capability may become possible.

Item 15—CRUISE SPEED-IAS (SINGLE ENGINE). Select a CRUISE SPEED-IAS that falls within the range of MIN/MAX – IAS (SINGLE ENGINE), item 14 above. Record CRUISE SPEED-

IAS (SINGLE ENGINE). Enter the CRUISE chart at cruise speed-IAS (SINGLE ENGINE) and move laterally to the TRUE AIRSPEED ~ KTS scale. Record CRUISE SPEED-TAS (SINGLE ENGINE).

Item 16—MAX TORQUE AVAILABLE (SINGLE ENGINE). Maximum torque available (single engine) is derived from the CRUISE chart by referencing the TORQUE AVAILABLE ~ 30-MIN (T700) or ~ 10-MIN (T701) ETF 1.0 line. If the ETF is between 1.0 and 0.85, interpolation is required to determine actual maximum torque available.

> ***Note 1.*** The maximum torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations, shall not be exceeded.
>
> ***Note 2.*** Max torque is derived from the cruise charts and takes into account the effect of ram-air on engine performance at a selected airspeed. Torque values may vary when flying at airspeeds other than the planned cruise airspeed.

Step 1: Enter the CRUISE chart at the selected IAS in item 15 above. Move left or right as appropriate to the TORQUE AVAILABLE ~ 30-MIN (T700) or ~ 10-MIN (T701) line and adjust for ETF. Enter the bottom of the CRUISE chart at the ETF for engine #1 and follow the slant of the line to the intersection of the planned CRUISE-IAS (SINGLE ENGINE) (item 15).

Step 2: Read straight down (do not follow the slant of the line) and determine the MAX TORQUE AVAILABLE (SINGLE ENGINE).

Step 3: Repeat Steps 1-3 for the other engine if the ETFs differ.

> ***Note 1.*** The maximum torque available ~ 30-minute limit (T700) engine and the ~ 10-minute limit (T701) can also be derived from the tabular data in the CL. If the ATF is between 1.0 and 0.9, interpolation is required.
>
> ***Note 2.*** Adjust as required for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

Item 17 –CRUISE TORQUE/CONT TORQUE AVAILABLE (SINGLE ENGINE).
Use the appropriate CRUISE chart to compute the cruise torque and the continuous torque available as described below.

Clean and high drag configuration

Step 1: Enter the CRUISE chart at the selected cruise IAS in item 15 above. Move left or right as appropriate to the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data).

Step 2: Move straight down (do not follow slant of line) to the TORQUE PER ENGINE~% and double the value. Record the CRUISE TORQUE (SINGLE ENGINE).

Step 3: Enter the CRUISE chart at the selected IAS in item 15 above. Move left or right as appropriate to the MCP line and adjust for the ETF of the weakest engine.

Step 4: Move straight down (do not follow the slant of the line) to the TORQUE PER ENGINE ~ % to read the CONT TORQUE. Record the CONT TORQUE AVAILABLE (SINGLE ENGINE).

> ***Note 1.*** Compare the cruise torque to the CONT TORQUE AVAILABLE to determine whether the aircraft will be operating in a time limited condition (above maximum continuous power) for this IAS.
>
> ***Note 2.*** The continuous torque available may exceed the transmission torque limit. During normal aircraft operations, the aircraft operator's manual, chapter 5, torque limitations, shall not be exceeded.

Note 3. Adjust CONT TORQUE for planned use of engine anti-ice and heater according to the aircraft operator's manual.

Note 4. For alternative or external load configurations, refer to the operator's manual, chapter 7/7A, section VI, DRAG. Determine and add together the appropriate drag multiplying factors.

Alternative or sling load configuration.

Step 1: Enter the appropriate cruise chart at the selected single engine cruise IAS in item 15 above, then move left or right to the curved dashed line. Move up to read the Δ TRQ ~ % FOR DRAG AREA OF 10 SQ FT OF ΔF.

Step 2: Multiply the Δ TRQ ~ % by the drag multiplying factor and then double.

Step 3: Add or subtract the value in step 2 to/from the uncorrected clean or high drag cruise torque value recorded in step 2 above (do not exceed the single-engine transmission torque limit). Record the adjusted single engine CRUISE TORQUE.

Step 4: Enter the CRUISE chart at the selected IAS in item 15 above. Move left or right as appropriate to the MCP line and adjust for the ETF of the weakest engine.

Step 5: Move straight down (do not follow the slant of the line) to the TORQUE PER ENGINE ~ % to read the CONT TORQUE. Record the CONT TORQUE AVAILABLE (SINGLE ENGINE).

Item 18—CRUISE FUEL FLOW (SINGLE ENGINE).

Cruise chart method. Use the appropriate CRUISE chart.

Step 1: Enter the bottom of the chart at the torque value computed in item 17 above CRUISE TORQUE (SINGLE ENGINE).

Step 2: Move up to TOTAL FUEL FLOW ~ 100 LB/HR and read the cruise fuel flow. Divide the cruise fuel flow value in half. Record the CRUISE FUEL FLOW (SINGLE ENGINE).

Note. Adjust as required for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

Engine fuel flow chart method. Use the SINGLE/DUAL– ENGINE FUEL FLOW chart.

Step 1: Enter the chart at the INDICATED TORQUE PER ENGINE ~ % for the cruise torque value computed in item 17 above, CRUISE TORQUE (SINGLE-ENGINE).

Step 2: Move right to the cruise PRESSURE ALTITUDE ~ 1,000 FT.

Step 3: Move down to the SINGLE– ENGINE FUEL FLOW ~ LB/HR line and read fuel flow value. Record the single engine CRUISE FUEL FLOW (SINGLE ENGINE).

Note. Adjust as required for FAT and/or planned use of engine anti-ice and for cockpit heater according to the aircraft operator's manual.

Item 19—MAX ALLOWABLE GWT and OPTIMUM IAS AT MAX ALLOWABLE GWT (SINGLE ENGINE). Use the appropriate CRUISE chart to compute the MAX ALLOWABLE GWT, and OPTIMUM IAS AT MAX ALLOWABLE GWT (SINGLE ENGINE), as described below.

Clean and high drag configuration.

Step 1: Enter the bottom of the CRUISE chart at the TORQUE AVAILABLE SE ~ 30-MIN (T700) or ~ 2.5-MIN (T701) line adjusted for the ETF of the lowest engine.

Step 2: Follow the slant of the line up to the intersection of MAX END AND R/C line, then read the maximum allowable gross weight. Record the MAX ALLOWABLE GWT (SINGLE ENGINE). Read left or right for optimum IAS ~ KTS at maximum allowable gross weight. Record the OPTIMUM IAS AT MAX ALLOWABLE GWT (SINGLE ENGINE). If the maximum torque available line is right of the GW ~ 1,000 LB line note the maximum torque available and enter MAX ALLOWABLE GWT (SINGLE ENGINE) according to the aircraft operator's manual, chapter 5. Read left or right from the respective value and record OPTIMUM IAS AT MAX ALLOWABLE GWT (SINGLE ENGINE).

Note. If the MAX ALLOWABLE GWT is less than the AIRCRAFT GWT, then the aircraft cannot maintain single engine level flight for the conditions. As fuel is consumed, single engine capability may become possible.

Alternative or sling load configuration.

Note. The single engine maximum allowable gross weight and optimum indicated airspeed at maximum allowable gross weight are adjusted for alternate or sling load configuration as follows:

Step 1: Enter the CRUISE chart at the optimum indicated airspeed at maximum allowable GWT, step 2 above. Read left or right to the curved dashed line then move up to read Δ TRQ ~ % FOR DRAG AREA OF 10 SQ FT of ΔF.

Step 2: Multiply the Δ TRQ by the drag multiplying factor. Subtract one-half the result from the uncorrected clean or high drag configuration maximum torque available noted in step 2 above.

Step 3: Reenter the bottom of the CRUISE chart at the adjusted torque value from step 2, then move up to the intersection of MAX END AND R/C line and read maximum allowable gross weight. Record the MAX ALLOWABLE GWT (SINGLE ENGINE). Read left or right for optimum IAS ~ KTS at maximum allowable gross weight. Record the OPTIMUM IAS AT MAX ALLOWABLE GWT (SINGLE ENGINE). If the maximum torque available line is right of the GW ~ 1,000 LB line enter MAX ALLOWABLE GWT according to the aircraft operator's manual, chapter 5, and then read left or right from the respective value for OPTIMUM IAS AT MAX ALLOWABLE GWT(SINGLE ENGINE).

Note. If the adjusted torque value does not intersect the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data), the aircraft cannot maintain single-engine level flight for the conditions. As fuel is consumed, single engine capability may become possible.

Item 20—MAX ALTITUDE–MSL/MAX ENDURANCE–IAS (SINGLE ENGINE). Use the appropriate CRUISE chart for the single engine MAX ALTITUDE–MSL calculation as described below. The lowest ETF for your aircraft will be used for this computation.

Note 1. When the capability to maintain level flight after an engine failure or malfunction is not possible, continued flight may be possible by adjusting to MAX END–IAS and adjusting collective to the MAXIMUM TORQUE AVAILABLE to attain minimum rate of descent while descending to a lower PA (where level flight may be possible) or jettisoning the external stores (if no allowable altitude/temperature combination cruise charts yield a GWT greater than or equal to the AIRCRAFT GWT, item 3, departure data).

Note 2. The torque change to compensate for drag (alternative or sling load configuration) at MAX END–IAS is often negligible and not computed.

Step 1: Enter the appropriate CRUISE chart at the MAX END AND R/C line. Move left or right along that line until you intercept the GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data).

Step 2: If the intersection of MAX END AND R/C line and GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data) is to the left of TORQUE AVAILABLE SE ~ 30-MIN (T700) or SE ~ 2.5-MIN (T701) line adjusted for the lowest ETF engine (flight is still possible at MAX END–IAS), move to the next higher CRUISE chart and repeat steps 1 and 2. If the intersection of MAX END AND R/C and GW ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data) is to the right of the value of TORQUE AVAILABLE SE ~ 30-MIN (T700) or SE ~ 2.5-MIN (T701) line adjusted for lowest ETF engine (flight is no longer possible at MAX END–IAS), move to the next lower CRUISE chart and repeat steps 1 and 2.

Step 3: Record the MAX ALTITUDE–MSL SE and MAX END–IAS that will allow flight at the AIRCRAFT GWT (item 3, departure data). Interpolation between the charts is authorized.

Note 1. Ensure FAT is adjusted for pressure altitude in the CRUISE charts.

Note 2. If aircraft is equipped with stores and no CRUISE chart will yield a MAX ALLOWABLE GWT–(SINGLE ENGINE) that is greater than or equal to the AIRCRAFT GWT, level flight is not possible. Subtract the weight of the stores and adjust the AIRCRAFT GWT to reflect the new AIRCRAFT GWT (without stores) and recompute the MAX ALTITUDE–MSL (SINGLE ENGINE).

Note 3. If level flight cannot be maintained either with or without stores, record NA in MAX ALTITUDE–MSL (SINGLE ENGINE) block.

Item 21—MAX ANGLE. Use the AIRSPEED FOR ONSET OF BLADE STALL chart in the aircraft operator's manual, chapter 5, to compute the maximum bank angle for the planned cruise IAS as described below.

Step 1: Enter the chart at the cruise PRESSURE ALTITUDE ~ 1,000 FT (item 1, cruise data). Move right to the cruise temperature FAT ~ °C (item 2, cruise data).

Step 2: Move down to the GROSS WEIGHT ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data), then move left to the ANGLE OF BANK ~ DEG chart.

Step 3: Reenter the chart at the INDICATED AIRSPEED ~ KTS at the planned cruise airspeed (item 4, cruise data), then move up to the ANGLE OF BANK ~ DEG chart. Record derived MAX ANGLE or 60 degrees, , whichever is less.

Item 22—Vne-IAS. Use the AIRSPEED OPERATING LIMITATIONS chart in the aircraft operator's manual, chapter 5, to compute the Vne as described below.

Step 1: Enter the chart at the cruise FREE AIR TEMPERATURE ~ °C (item 2, cruise data). Move right to the cruise PRESSURE ALTITUDE ~ 1,000 FT (item 1, cruise data).

Step 2: Move down to the GROSS WEIGHT ~ 1,000 LB at the AIRCRAFT GWT (item 3, departure data). If the COMPRESSIBILITY LIMITS ~ FAT or the MACH LIMIT dashed temperature line (-10 to -50 °C) is reached prior to the aircraft GROSS WEIGHT ~ 1,000 LB,, stop there.

Step 3: Move left to the MAXIMUM INDICATED AIRSPEED (VNE) ~ KNOTS line for the Vne value. Record Vne-IAS.

3. ARRIVAL DATA.

Only complete this section if arrival conditions at destination have **increased** from departure data in any of the following by the minimum amount: 5 degrees Celsius, 1,000 feet PA, or 500 pounds.

Note. If mission requirements dictate the need for additional arrival information, complete the second arrival section as described below using applicable PA, FAT and/or landing gross weight data. Additional copies of page 2 may be added for multiple arrivals.

Item 1—PA. Record forecast PA for time of arrival.

Item 2—FAT. Record forecast FAT for time of arrival. If unavailable, use maximum forecast FAT for the mission.

Item 3—LANDING GWT. Record the estimated gross weight for arrival.

Item 4—TORQUE RATIO. Compute the torque ratios for dual and single engine the same as item 7, (departure data), using arrival FAT.

Item 5—MAX TORQUE AVAILABLE. Compute maximum torque available for dual and single engine the same as item 8, (departure data), using arrival forecast PA and FAT.

Note 1. Adjust as required for planned use of engine anti-ice and cockpit heater according to the aircraft operator's manual.

Note 2. Dual engine information may also be derived from the tabular performance data in the aircraft operator's CL.

Item 6—PREDICTED HOVER TORQUE. Compute the predicted hover torque the same as item 12 (departure data), using arrival forecast PA and FAT.

Item 7—MAX ALLOWABLE GWT OGE/IGE. Compute the maximum allowable gross weight the same as item 9 (departure data), using arrival forecast PA and FAT.

Item 8— MAX HOVER HEIGHT IGE. Compute the maximum hover height the same as item 11 (departure data), using arrival forecast PA and FAT.

Item 9—MIN SE AIRSPEED IAS – WO/W STORES. Compute the minimum single-engine airspeed the same as item 13 (departure data) using arrival forecast PA and FAT.

4. IN-FLIGHT UPDATES

Note. Updates—Care should be taken to monitor performance requirements in the accomplishment of the mission. The PPC should be updated in flight or on the ground as the mission progresses if the requirements below are met. Updates are required when there is intent to land or takeoff and operating within 3,000 pounds of the MAX ALLOWABLE GWT (OGE) and there is an increase of 1,000 feet pressure altitude and/or 10 degrees Celsius from the planned PPC.

5. TABULAR PERFORMANCE DATA.

See Task 1011 for an example of performance data presented in the operator's and crewmembers CL.

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Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

AC	alternating current
ACCUM	Accumulator
ADF	automatic direction finder
ADMIN	Administrative
AFCS	automatic flight control system
AFMS	auxiliary fuel management system
AGL	above ground level
AHO	above highest obstacle
AIM	aeronautical information manual
ALSE	aviation life support equipment
ALT	altitude, altimeter
AMC	air mission commander
AMCOM	aviation and missile command
AMP	amplifier
ANVIS	aviator's night vision imaging system
APART	annual proficiency and readiness test
APU	auxiliary power unit
ARNG	Army national guard
ASE	aircraft survivability equipment
ASR	airport surveillance radar
ATC	air traffic control
ATF	aircraft torque factor
ATIS	automatic terminal information service
ATM	aircrew training manual
ATP	aircrew training program
AUTO	Automatic
AVA	aviation vibration analyzer
AWR	airworthiness release
BATT	Battery
BIT	built-in test
C	Celsius
CBAT	computer based ASE trainer
CBRN	chemical, biological, radiological, nuclear

CBT	computer based trainer
CDU	central display unit
CE	crew chief
CEFS	crashworthy external fuel system
CG	center of gravity
CHUM	chart updating manual
CI	cockpit indicators
CIS	command instrument system
CL	checklist
CLC	calculator
CMWS	Common Missile Warning System
COM	communication
COMSEC	communication security
CONTR	control
CT	critical torque
CTL	commander's task list
DA	Department of the Army
DAC	Department of the Army civilian
DAT	data
DC	direct current
DCU	dispenser control unit
DD	Department of Defense
DECR	decrease
DECU	digital electronic control unit
DEG	degree
DF	direction finder
DGNS	Doppler global positioning system navigation system
DA	density altitude, decision altitude
DH	decision height
DIR	direct
DME	distance measuring equipment
DOD	Department of Defense
DOT	Department of Transportation
DSP	droop stop pounding
DTAC	Digital Training Access Center
DTD	data transfer device
DTG	date-time group
DTS	data transfer system

DTU	data transfer unit
EAT	external air transportability
ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
ECS	environmental control system
ECU	electronic control unit
EDM	electronic data module
EGI	embedded global positioning system/inertial navigation system
EICAS	engine instrument caution advisory system
ELA	en route low altitude
ENG	engine
EPW	enemy prisoner of war
ERFS	extended range fuel system
ESSS	external stores support system
ETA	estimated time of arrival
ETE	estimated time en route
ETF	engine torque factor
ETL	effective translational lift
FAA	Federal Aviation Administration
FAC	flight activity category
FAF	final approach fix
FAR	Federal Aviation regulation
FARE	forward area refueling equipment
FARP	forward arming and refueling point
FAT	free air temperature
FD	flight director
FD/DCP	flight director/display control panel
FH	frequency hopping
FI	nonrated crewmember instructor
FIH	flight information handbook
FLIP	flight information publication
FLIR	forward looking infrared
FM	field manual
FMS	flight management system
FOV	field of view
FPN	flight plan
FPS	flight path stabilization

FRIES	fast-rope insertion and extraction system
GEN	generator
GPS	global positioning system
GWT	gross weight
HAL	height above landing
HIT	health indicator test
HMMWV	high-mobility multipurpose wheeled vehicle
HP	pressure altitude (height pressure)
HQ	Headquarters
HR	hour
HSI	horizontal situation indicator
HVR	hover
HVR VHLD	Hover velocity hold
HUD	heads-up display
IAF	initial approach fix
IAS	indicated airspeed
IATF	individual aircrew training folder
ICP	interface control panel
ICS	intercommunication system
IE	instrument examiner
IF	intermediate fix
IFF	identification, friend or foe
IFR	instrument flight rules
IGE	in ground effect
IIMC	inadvertent instrument meteorological condition
ILS	instrument landing system
IMC	instrument meteorological condition
INI	initialization
IP	instructor pilot
IR	infrared
IRP	intermediate rated power
ITO	instrument takeoff
IVHMS	integrated vehicle health monitoring system
JOG	joint operations graphic
JSIR	joint spectrum interference resolution (JP1-02)
KIAS	knots indicated airspeed
km	kilometer
KPH	kilometers per hour

kts	knots
LAT	latitude
LONG	longitude
LSE	landing signal enlisted
LZ	landing zone
MAHF	missed approach holding fix
MAP	missed approach point
MAX	maximum
MCP	maximum continuous power
MDA	minimum descent altitude
ME	maintenance test pilot evaluator
MEDEVAC	medical evacuation
MEDIC	medical education and demonstration of individual competence
MEF	maximum elevation figures
METL	mission essential task list
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, civil considerations
MFD	multifunction display
MFSC	multifunction slew controller
MIJI	meaconing, interference, jamming, and intrusion
MIN	minimum
MISC	Miscellaneous
MO	medical officer (flight)
MOI	method of instruction
MOPP	mission-oriented protective posture
MOS	military occupational specialty
MP	maintenance test pilot
MSA	minimum safe altitude
MSL	mean sea level
MTF	maintenance test flight
MRP	maximum rated power
NA	not applicable
NAV	navigation
NAVAID	navigational aids
NCM	nonrated crewmember
NDB	nondirectional beacon
NET	new equipment training

Ng	engine gas generator speed
NGR	National Guard regulation
NM	nautical mile
NOE	nap of the earth
NOTAM	notice to airmen
NVD	night vision device
NVG	night vision goggle
NVS	night vision system
O2	oxygen
OBOGS	onboard oxygen generation system
ODS	oxygen delivery system
OEI	one engine inoperative
OGE	out of ground effect
OR	observer
OROCA	off route obstruction clearance altitude–continental United States
ORTCA	off route terrain clearance altitude–outside the continental United States
P	pilot not on the controls
P*	pilot on the controls
PA	pressure altitude
PAR	precision approach radar
PC	pilot in command
PDU	pilot display unit
PFD	primary flight display
PFE	proficiency flight evaluation
PI	pilot
PLGR	precision lightweight global positioning system receiver
PLS	personnel locater system
POI	program of instruction
PPC	performance planning card
PPS	precise positioning system
PWR	power
PZ	pickup zone
QTY	quantity
R/C	rate of climb
RCM	rated crewmember

RETRAN	retransmission
RL	readiness level
ROC	required obstacle clearance
ROE	rules of engagement
RPG	rocket-propelled grenade
RPM	revolutions per minute
RPM R	revolutions per minute rotor
SA	situational awareness
SAS	stability augmentation system
SCATMINWARN	scatterable minefield warning
SE	single engine
SEL	select
SFTS	synthetic flight training systems
SI	nonrated crewmember standardization instructor
SM	statute mile
SMGW	simulated maximum gross weight
SOI	signal operating instructions
SOP	standing operating procedure
SP	standardization instructor pilot
SPIES	special patrol infiltration/exfiltration system
SQ FT	square feet
STS	status
TACAN	tactical air navigation
TAS	true airspeed
TC	training circular
TDH	time distance heading
TEMP	temperature
TERPS	terminal instrument procedures
TGT	turbine gas temperature
TM	technical manual
TR	torque ratio
TRANS	transmit
TRQ	torque
TSP	training support package
U.S.	United States
USAASA	United States Army Aeronautical Services Agency
USAASD-E	United States Army Aeronautical Services Agency Detachment-Europe

USAAWC	United States Army Aviation Warfighting Center
USAR	United States Army Reserve
UT	unit trainer
VFR	visual flight rules
VMC	visual meteorological conditions
Vne	velocity never exceed (airspeed limit)
VOR	VHF omnidirectional range radio beacon
VREF	velocity reference
VSI	vertical situation indicator
XFD	crossfeed

SECTION II – TERMS

ΔF	Change in flat plate drag area
ΔTRQ	Change in torque
DRAG	Force of aerodynamic resistance caused by the violent currents behind the shock front (JP1-02)
MACH	The ratio of an aircraft's true speed as compared to the local speed of sound at a given time or place
Np	Power turbine speed
Nr	Rotor speed
ram-air	Any air system which uses the air pressure created by vehicle motion to increase the air pressure inside of the engine.
Vh	Maximum airspeed in level flight with maximum continuous power being applied

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NIMA: Digital Aeronautical Flight Information File: http://164.214.2.62/products/digitalaero/index.html

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READINGS RECOMMENDED

These readings contain relevant supplemental information.

None

Index

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H-60 PERFORMANCE PLANNING CARD

For use of this form, see TC 1-237; the proponent agency is TRADOC.

DEPARTURE

AIRCRAFT GWT: lb	PA: ft / ft	FAT: °C/ °C
STORES WEIGHT: lb		
FUEL WEIGHT: lb		
ZERO FUEL WEIGHT: lb		

	DUAL ENGINE		SINGLE ENGINE # 1	SINGLE ENGINE # 2
	ATF:		ETF:	ETF:
TORQUE RATIO				
MAX TORQUE AVAILABLE	%		%	%
MAX ALLOWABLE GWT OGE/ IGE	lb	lb		
GO/NO GO TORQUE OGE/ IGE	%	%		
MAX HOVER HEIGHT IGE	ft			
PREDICTED HOVER TORQUE	%		%	%
MIN SE AIRSPEED - IAS- WO/W STORES			kts	kts

REMARKS:

EMER SE IAS:

CRUISE

PA: ft	FAT: °C	MAX ANGLE: °	Vne-IAS: kts

	DUAL ENGINE		SINGLE ENGINE # 1	SINGLE ENGINE # 2
MAX TORQUE AVAILABLE	%		%	%
MIN / MAX - IAS	kts	kts	kts	kts
CRUISE SPEED - IAS / TAS	kts	kts	kts	kts
CRUISE TORQUE / CONT TORQUE AVAILABLE	%	%	%	%
CRUISE FUEL FLOW	pph		pph	
MAX RANGE - IAS / TORQUE	kts	%		
MAX ENDURANCE - IAS / TORQUE	kts	%		
CRITICAL TORQUE	%			
MAX ALLOWABLE GWT	lb		lb	
OPTIMUM IAS AT MAX ALLOWABLE GWT	kts		kts	
MAX R/C - IAS / TORQUE	kts	%		
MAX ALTITUDE - MSL/MAX ENDURANCE-IAS	ft	kts	ft	kts

ARRIVAL

LANDING GWT: lb	PA: ft		FAT: °C	
	DUAL ENGINE		**SINGLE ENGINE**	
			# 1	**# 2**
TORQUE RATIO				
MAX TORQUE AVAILABLE	%		%	%
PREDICTED HOVER TORQUE	%		%	%
MAX ALLOWABLE GWT OGE/ IGE	lb	lb		
MAX HOVER HEIGHT IGE	ft			
MIN SE AIRSPEED - IAS-WO/W STORES			kts	kts

ARRIVAL

LANDING GWT: lb	PA: ft		FAT: °C	
	DUAL ENGINE		**SINGLE ENGINE**	
			# 1	**# 2**
TORQUE RATIO				
MAX TORQUE AVAILABLE	%		%	%
PREDICTED HOVER TORQUE	%		%	%
MAX ALLOWABLE GWT OGE/ IGE	lb	lb		
MAX HOVER HEIGHT IGE	ft			
MIN SE AIRSPEED - IAS-WO/W STORES			kts	kts

REMARKS:

TC 1-237
12 October 2007

By order of the Secretary of the Army:

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General, United States Army
Chief of Staff

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