TC 1-248

AIRCREW TRAINING MANUAL
OH-58D KIOWA WARRIOR

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AIRCREW TRAINING MANUAL
OH-58D KIOWA WARRIOR

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Preface

The aircrew training manual (ATM) standardizes aircrew training programs and flight evaluation procedures. This manual provides specific guidelines for executing OH-58D aircrew training. It is based on the battle-focused training principles outlined in FM 7-1. It establishes crewmember qualification, refresher, mission, and continuation training and evaluation requirements. This manual applies to all OH-58D crewmembers and their commanders.

This is not a stand-alone document. All of the requirements of AR 600-105, AR 600-106, NGR 95-210, and TC 1-210, must be met. Implementation of this manual conforms to AR 95-1 and TC 1-210.

This manual (in conjunction with the AR 600-105, AR 600-106, NGR 95-210, 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 manual applies to the Active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the U.S. Army Reserve (USAR) unless otherwise stated. The proponent of this publication is U.S. Army Training and Doctrine Command (TRADOC). Send comments and recommendations on DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) through the aviation unit commander to Commander, U.S. Army Aviation Warfighting Center, ATTN: ATZQ-ES (OH-58D Branch), Building 4503, Kingsman Avenue, Fort Rucker, AL 36362-5263. Recommended changes may also be e-mailed to: ruck.atzq-es@conus.army.mil.

This publication implements portions of STANAG 3114 (Edition Seven).

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

This publication has been reviewed for operations security considerations.

Chapter 1
Introduction

This aircrew training manual (ATM) describes training requirements for OH-58D crewmembers. It will be used with AR 95-1, AR 600-105, AR 600-106, 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 the accomplishment of 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 will designate a crew station for each aviator. Aviators will be trained and must maintain proficiency in each of the pilot's stations they are designated to occupy. Aviators designated to fly from both pilot's seats will be evaluated in each seat during readiness level (RL) progression and Annual Proficiency and Readiness Test (APART) evaluations. It is not required to evaluate every task from each pilot station.

1-2. SYMBOL USAGE AND WORD DISTINCTIONS

a. **Symbol Usage.**

(1) The diagonal (/) indicates "or" or "and." For example, IP/SP may mean IP or SP or may mean IP and SP.

(2) P* indicates the pilot on the controls. P indicates the pilot not on the controls.

b. **Word Distinctions.**

(1) Warning, caution, and note. These words emphasize important and critical instructions.

(a) A warning identifies and highlights an essential operating or maintenance procedure, practice, condition, statement, which if not strictly observed, could result in injury to, or death of, personnel or long term health hazards to the person performing that procedure.

(b) A caution identifies and highlights an essential operating procedure or maintenance procedure, practice, condition, statement, which, if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.

(c) A note highlights an essential operating procedure or maintenance procedure, condition, or statement.

(2) Will, must, should, can, and may. These words distinguish between mandatory, preferred, and acceptable methods of accomplishment.

(a) Will or must indicates a mandatory requirement.

(b) Should indicate a preferred, but not mandatory, method of accomplishment.

(c) Can/May indicates an acceptable method of accomplishment.

(3) NVG. This refers only to the night vision goggle imaging system.

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Chapter 2
Training

This chapter describes requirements for qualification, readiness level (RL) progression, and continuation training. Crewmember qualification requirements will be according to AR 95-1, TC 1-210, and this ATM.

2-1. QUALIFICATION TRAINING

a. **Aircraft qualification.** Initial qualification training in the OH-58D(R) is conducted at the United States Army Aviation Warfighting Center (USAAWC) according to an established program of instruction. Units are not authorized to conduct this training.

b. **OH-58D(R) series qualification.** In accordance with appendix A-1.

c. **OH-58D series qualification.** In accordance with appendix A-2.

d. **NVG Qualification.** Initial NVG and aircraft NVG qualification will be per this manual.

(1) Initial NVG Qualification. Initial qualification will be conducted at the U.S. Army Aviation Warfighting Center or DA-approved training site, according to the USAAWC approved Program of Instruction (POI), or locally using the USAAWC NVG ETP. The USAAWC NVG ETP may be obtained by writing to the Commander, U.S. Army Aviation Warfighting Center, ATTN: ATZQ-TDS-O, Fort Rucker, AL 36362-5000.

(2) Aircraft NVG Qualification.

(a) Academic training. The crew member will receive training and demonstrate a working knowledge of the topics of paragraph 3-4b (7). Academic training must be completed prior to flight training.

(b) Flight training. The crewmember will receive training, and demonstrate proficiency, in all base tasks marked with an X in the NVG column of table 2-2. The crewmember will also receive training and demonstrate proficiency in any other base tasks specified for NVG on the task list.

(3) Minimum Flight Hours. There are no minimum flight hour requirements. The qualification is proficiency based determined by the crewmember's ability to satisfactorily accomplish the designated tasks.

2-2. REFRESHER TRAINING. The refresher training program is designed for readiness level (RL) 3 crewmembers. It enables them to regain proficiency in all base tasks. This paragraph lists refresher training requirements and provides guidelines for developing refresher training programs.

a. **Aircraft Refresher Training.**

(1) Academic training. The crewmember will receive training and demonstrate a working knowledge of the applicable topics in paragraph 3-4b, and complete the operator’s manual written examination.

(2) Flight training. Table 2-1 is a guide for developing refresher flight training. The crewmember will receive training and demonstrate proficiency from either crew station in each base task and in the modes marked with an X in the D, Night, and Instr columns of table 2-2. Crewmembers must demonstrate proficiency in required base tasks and be designated RL 2 prior to under going mission training.

(3) Minimum flight hours. There are no minimum flight hour requirements. The training is proficiency based determined by the crewmember's ability to satisfactorily accomplish the designated tasks.

Table 2-1. Refresher flight training guide

Flight Instruction	***Hours***
Local area orientation	2.0
Demonstration and practice of base tasks	6.0
Flight evaluation	2.0
Total hours	**10.0**
Gunnery Instruction	
Flight training as outlined in FM 3-04.140	
Instrument Instruction	***Hours***
Flight training	6.0
Instrument evaluation	2.0
Total hours	**8.0**

b. **NVG Refresher Training.**

(1) Academic training. The crewmember will receive training and demonstrate a working knowledge of the applicable mission topics in paragraph 3-4b. Academic training must be completed prior to flight training.

(2) Flight training. The crewmember will receive training and demonstrate proficiency in all base tasks marked with an X in the NVG column of table 2-2, and any other base tasks specified for NVG on the task list.

(3) Minimum flight hours. There are no minimum flight hour requirements. The training is proficiency based determined by the crewmember's ability to satisfactorily accomplish the designated tasks.

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 should be conducted during actual mission support or collective training.

a. **Training Requirements.**

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

(2) Flight training. The crewmember will receive flight training and demonstrate proficiency in the mission and additional tasks, in each mode, as specified on the task list for the crewmember's position.

b. **NVG Mission Training.** NVG mission training will be per the commander's training program specifying tasks. When commanders determine a requirement for using NVG in mission profiles they must develop a mission training program and specify mission tasks that are to be trained. Before undergoing NVG mission training, the aviator must complete qualification or refresher training and must be NVG current in the OH-58D.

(1) Academic training. The crewmember will receive training and demonstrate a working knowledge of the subject areas designated by the commander.

(2) Flight training. The crewmember will receive flight training and demonstrate proficiency in the mission and additional NVG tasks as specified on the task list for the crewmember's position.

(3) Minimum flight hours. There are no minimum flight hour requirements. The training is proficiency based determined by the crewmember's ability to satisfactorily accomplish the designated tasks.

c. **Maintenance test pilot (MTP) and maintenance test pilot evaluator (ME) training.** The tasks shown in table 2-4 and outlined in chapter 5 are mandatory tasks for aviators designated to perform maintenance test flights; the tasks will be included on the individual's commander's task list. Commanders are not authorized to delete any maintenance test flight (MTF) tasks. Personnel performing as MTPs should be limited to duties in a maximum of two aircraft.

If unit mission dictates performance of maintenance operations during other than daylight hours and if the individual MTP/ME is selected to perform operations during night unaided and night vision goggle (NVG) modes, then familiarization maintenance test flight training of tasks listed in Table 2-4 is required. The tasks listed in Table 2-4 will only be trained under NVG modes of flight upon completion of individual NVG mission training and designation of RL1.

2-4. CONTINUATION TRAINING. This paragraph outlines the tasks and aircraft flight hours that crewmembers must complete to support the unit's METL. TC 1-210 lists the requirements for maintaining RL 1. The required performance standards are specified in chapters 4 and 5 of this manual.

a. **Training Requirements.**

(1) Semiannual flying-hour requirements—aircraft. The minimum requirements for crewmembers are as follows—

(a) FAC 1–70 hours.
(b) FAC 2–50 hours.
(c) FAC 3-not applicable due to the lack of a compatible flight simulator for the OH-58D.
(d) Night Vision Goggles–9 hours.
(e) Hood–3 hours.

Note: The aviator may be required to fly additional hours if directed by the commander.

(2) Annual task and iteration requirements. The minimum requirements are—

(a) One iteration of all base tasks (except as modified in paragraph (e), (f), and (g) below) during the day.

(b) One iteration of mandatory NVG tasks as indicated in table 2-2. (A BOLD "**X**", indicating a performance task, in the NVG column of table 2-2 indicates mandatory NVG tasks for aviators who maintain NVG currency.)

(c) Any iterations of mission tasks listed in table 2-3 as determined by the commander.

(d) Any iterations of additional tasks as determined by the commander.

(e) Two iterations of **TASK 1074, RESPOND TO ENGINE FAILURE AT CRUISE FLIGHT**, semiannually.

(f) An IP/SP flying the OH-58D/OH-58D(R) aircraft is required to perform one iteration of **TASK 1074, RESPOND TO ENGINE FAILURE AT CRUISE FLIGHT,** every 90 days. An IP/SP flying the OH-58D(R) is required to perform one iteration of **TASK 1102, PERFORM MANUAL THROTTLE**

OPERATIONS (FULL AUTHORITY DIGITAL ELECTRONIC CONTROL), every 90 days.

(g) In addition to the required minimum annual tasks and iterations, MPs will perform annually a minimum of four iterations of the MTF tasks listed in table 2-4. MEs will perform two iterations from each flight crew station annually. Each MTF task listed is mandatory for an MTF standardization evaluation. Personnel who are required to perform MTF duties in an additional or alternate aircraft will perform four iterations of the required tasks in each additional or alternate aircraft. If unit mission dictates performance of maintenance operations during other than daylight hours and the MTP/ME has been trained for night unaided and night vision goggle (NVG) maintenance test flights, then one annual iteration of all tasks listed in Table 2-4 is required in the mode of flight that was trained.

Note 1: The requirement to perform instrument tasks in additional aircraft, in category, will be at the discretion of the commander.

b. **Currency requirements.**

(1) Aviators who are qualified in the OH-58D and the OH-58D(R) and who are current in the OH-58D(R) are also considered current in the OH-58D.

(2) Aviators who are qualified in the OH-58D and the OH-58D(R) and who are current in the OH-58D will receive a proficiency evaluation consisting of Task 1102, prior to being considered current in the OH-58D(R).

2-5. TASK LISTS

a. **Base tasks.** Table 2-2 lists the crewmember base tasks. Performance tasks are listed in **UPPER CASE** and **BOLD** throughout this manual and are indicated by a **BOLD "X"** in table 2-2. A **BOLD "X"** under the mode of flight column (D, Night, NVG, or Instr) denotes the task as mandatory for RL progression and annual task iteration requirements in that mode of flight. Technical tasks, which are indicated by lower case font and an unbold "x" may be performed in any mode of flight.

b. **Mission tasks.** Table 2-3 lists the mission tasks. The commander will select mission and any additional tasks that support the unit's METL.

c. **Maintenance test pilot tasks.** Table 2-4 lists the maintenance test pilot tasks.

d. **Task groups.**

(1) Performance task. For the purpose of clarifying mode and conditions, a performance task is differentiated from a technical task. An ATM performance task is defined as a task primarily designed to measure the crewmembers ability to perform, manipulate, and respond to tasks primarily affected by the mode of flight. These tasks are significantly affected by the conditions and the mode of flight; therefore, the mode and condition under which the task must be performed is specified. These tasks are listed in **UPPER CASE** and **BOLD** throughout this manual.

(2) Technical task. Technical tasks may be performed under all conditions regardless of the listed task iteration requirements. Technical tasks are characterized as those tasks that measure the crewmembers ability to 1) plan; 2) preflight; 3) brief; 4) run-up; 5) shutdown; 6) debrief; or 7) operate onboard systems, sensors, avionics, etc., while in flight or on the ground. These tasks are not significantly affected by the mode of flight and may be performed or evaluated in any mode. These tasks are in lower case and plain type throughout this manual.

Table 2-2. Base Task List

Legend:

D	Day mode of flight	Night	Night unaided mode of flight
NVG	Night vision goggle mode of flight	Instr	Instrument mode of flight
Eval	Mandatory for selected flight evaluations	S	Standardization flight evaluation (mandatory)
NG	NVG annual evaluation (mandatory)	I	Instrument flight evaluation (mandatory)

Task	Title	D	Night	NVG	Instr	Eval
1000	Participate in a crew mission briefing.	X	X	X	X	S
1004	Plan a visual flight rules flight.	X	X	X	X	S
1010	Prepare a performance planning card.	X	X	X	X	S
1012	Verify aircraft weight and balance.	X	X	X	X	S
1013	Operate mission planning system.	X	X	X	X	
1014	Operate aviation life support equipment.	X	X	X	X	S
1022	Perform preflight inspection.	X	X	X	X	S
1024	Perform before starting engine through before leaving helicopter checks.	X	X	X		S
1026	**MAINTAIN AIRSPACE SURVEILLANCE.**	**X**	**X**	**X**	**X**	**S, NG, I***
1028	**PERFORM HOVER POWER CHECK.**	**X**				**S**
1030	**PERFORM HOVER OUT-OF-GROUND EFFECT CHECK.**	**X**		**X**		**S, NG**
1032	Perform radio communications procedures.	X	X	X	X	S, I
1038	**PERFORM HOVERING FLIGHT.**	**X**	**X**	**X**		**S, NG**
1040	**PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF.**	**X**	**X**	**X**		**S, NG**
1044	**NAVIGATE BY PILOTAGE AND DEAD RECKONING.**		**X**	**X**		**NG**
1046	Perform electronically aided navigation.	X	X	X	X	S
1048	Perform fuel management procedures.	X	X	X	X	S, NG
1052	**PERFORM VISUAL METEOROLOGICAL CONDITIONS FLIGHT MANEUVERS.**	**X**		**X**		**S, NG**
1058	**PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH.**	**X**	**X**	**X**		**S, NG**
1062	**PERFORM SLOPE OPERATIONS.**	**X**		**X**		**S, NG**
1066	**PERFORM A RUNNING LANDING.**	**X**				**S**
1070	Respond to emergencies.	X	X	X	X	S, NG, I
1072	**RESPOND TO ENGINE FAILURE AT A HOVER.**	**X**				**S**
1074	**RESPOND TO ENGINE FAILURE AT CRUISE FLIGHT.**	**X**				**S**
1078	**RESPOND TO STABILITY AND CONTROL AUGMENTATION SYSTEM (SCAS) MALFUNCTION.**	**X**				**S**
1082	**PERFORM AUTOROTATION.**	**X**				**S**
1100[3]	**PERFORM ANALOG THROTTLE OPERATIONS.**	**X**				
1102[3]	**PERFORM MANUAL THROTTLE OPERATIONS (FULL AUTHORITY DIGITAL ELECTRONIC CONTROL [FADEC]).**	**X**				**S**

Table 2-2. Base Task List

Legend:			
D	Day mode of flight	Night	Night unaided mode of flight
NVG	Night vision goggle mode of flight	Instr	Instrument mode of flight
Eval	Mandatory for selected flight evaluations	S	Standardization flight evaluation (mandatory)
NG	NVG annual evaluation (mandatory)	I	Instrument flight evaluation (mandatory)

Task	Title	D	Night	NVG	Instr	Eval
1142[3]	Perform digital communication.	X	X	X		S
1155	**NEGOTIATE WIRE OBSTACLES.**	**X**		**X**		**S, NG**
1164	Perform video image cross-link operation (VIXL).	X	X	X		S
1170	**PERFORM INSTRUMENT TAKEOFF.**				**X**	**I**
1176[1]	Perform nonprecision approach (GCA).	X	X		X	I
1178	Perform precision approach (GCA).	X	X		X	I
1180[1]	Perform emergency global positioning system (GPS) recovery procedure.	X	X		X	S, NG, I*
1182	Perform unusual attitude recovery.	X	X	X	X	I
1184	Respond to inadvertent instrument meteorological conditions (IIMC).	X	X	X	X	S, NG, I*
1188	Operate aircraft survivability equipment (ASE)/operate transponder.	X	X	X		S, NG*
1194	Perform refueling / rearming operations.	X	X	X		S
1300	Perform MMS operations.	X	X	X		S
1304	**OPERATE ANVIS DISPLAY SYMBOLOGY SUBSYSTEM (ADSS).**			**X**		**NG**
1402	Conduct tactical flight mission planning.	X	X	X		
1404	Perform electronic counter measures / electronic counter-counter measures.	X	X	X		
1405	Transmit tactical reports.	X	X	X		S
1407	**PERFORM TERRAIN FLIGHT TAKEOFF.**	**X**		**X**		**S, NG**
1408	**PERFORM TERRAIN FLIGHT.**	**X**		**X**		**S, NG**
1409	**PERFORM TERRAIN FLIGHT APPROACH.**	**X**		**X**		**S, NG**
1410	**PERFORM MASKING AND UNMASKING.**	**X**		**X**		**S, NG**
1411	**PERFORM TERRAIN FLIGHT DECELERATION.**	**X**		**X**		**S, NG**
1413	**PERFORM ACTIONS ON CONTACT.**	**X**		**X**		**S, NG**
1416	Perform weapons initialization procedures.	X	X	X		S
1422	**PERFORM FIRING TECHNIQUES.**	**X**		**X**		**S, NG***
1456	Engage target with 50 Cal.	X	X	X		S, NG*
1458	Engage target with the Hellfire.	X	X	X		S, NG*
1462	Engage target with rockets.	X	X	X		S, NG*
1471	Perform target handover.	X	X	X		S
1472	Perform aerial observation.	X	X	X		S, NG

Table 2-2. Base Task List

Legend:

D	Day mode of flight	Night	Night unaided mode of flight
NVG	Night vision goggle mode of flight	Instr	Instrument mode of flight
Eval	Mandatory for selected flight evaluations	S	Standardization flight evaluation (mandatory)
NG	NVG annual evaluation (mandatory)	I	Instrument flight evaluation (mandatory)

Task	Title	D	Night	NVG	Instr	Eval
1473	Call for indirect fire.	X	X	X		
1474	**RESPOND TO NIGHT VISION GOGGLE FAILURE.**			**X**		**NG**

Notes:

* —task may be evaluated on any of the selected flight evaluations.

[1]either task may be performed during the instrument evaluation.

[2]two of the four weapon system tasks must be evaluated during the APART.

[3] perform the appropriate task for the type aircraft.

Table 2-3. Mission task list

Task	Title
2010	**PERFORM MULTIAIRCRAFT OPERATIONS.**
2043	Perform downed aircraft procedures.
2050	Develop an emergency global positioning system (GPS) recovery procedure.
2067	Select landing zone/pickup zone/holding area.
2125	**PERFORM PINNACLE OR RIDGELINE OPERATIONS.**
2127	**PERFORM COMBAT MANEUVERING FLIGHT.**
2128	**PERFORM CLOSE COMBAT ATTACK.**
2129	**PERFORM COMBAT POSITION OPERATIONS.**
2132	**ENGAGE TARGET WITH THE AIR-TO-AIR STINGER.**
2133	**ENGAGE TARGET WITH M4 SERIES CARBINE.**
2164	Call for tactical air strike.

Table 2-4. Maintenance test pilot task list	
Task	**Title**
4000	Perform prior-to-maintenance test-flight checks.
4084	Perform before-starting engine checks.
4088	Perform starting engine checks.
4090	Perform engine runup checks.
4094	Perform system checks.
4126	Perform before-takeoff checks.
4132	Perform takeoff to hover checks.
4140	Perform power assurance check.
4142	Perform hover power check.
4156	Perform hovering control rigging check.
4166	Perform stability and control augmentation system check.
4168	Perform heading hold check.
4170	Perform power cylinder check.
4172	Perform engine response check.
4176	Perform throttle warning message check.
4178	Perform manual throttle operations check (full authority digital electronic control).
4186	Perform hover/ hover bob up check.
4210	Perform takeoff and climb checks.
4232	Perform control rigging check.
4236	Perform autorotation revolutions per minute check.
4244	Perform hydraulics off check.
4250	Perform collective anticipator check.
4252	Perform vibration analysis checks.
4272	Perform communication checks.
4276	Perform special/detailed procedures.
4280	Perform before landing checks.
4282	Perform after landing checks.
4284	Perform engine shutdown checks.

2-6. CURRENCY REQUIREMENTS

a. **Aircraft Currency.** Aircraft currency will be per AR 95-1 and this paragraph. A crewmember whose currency has lapsed must complete a proficiency flight evaluation given in the aircraft by an IP/SP. The commander will designate the tasks for this evaluation.

b. **NVG Currency.**

(1) To be considered NVG current, an aviator must have taken part in at least a one-hour flight in the aircraft while wearing NVGs within the last 60 consecutive days.

(2) A crewmember whose currency has lapsed must complete, as a minimum, a 1-hour NVG proficiency evaluation given at night in the aircraft by an NVG IP or SP. Minimum tasks to be evaluated are listed below. To reestablish currency, an NVG IP may evaluate an NVG IP or SP. An IP may not evaluate an IP or SP for annual proficiency and readiness test (APART) purposes.

(a) Task 1024, Perform Before Starting Engine Through Before Leaving Helicopter Checks.

(b) **TASK 1030, PERFORM HOVER OUT-OF-GROUND EFFECT CHECK.**

(c) **TASK 1038, PERFORM HOVERING FLIGHT.**

(d) **TASK 1040, PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF.**

(e) **TASK 1058, PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH.**

(f) **TASK 1062, PERFORM SLOPE OPERATIONS.**

(g) **TASK 1407, PERFORM TERRAIN FLIGHT TAKEOFF.**

(h) **TASK 1408, PERFORM TERRAIN FLIGHT.**

(i) **TASK 1409, PERFORM TERRAIN FLIGHT APPROACH.**

(j) **TASK 1411, PERFORM TERRAIN FLIGHT DECELERATION.**

(k) **TASK 1474, RESPOND TO NIGHT VISION GOGGLE FAILURE.**

c. **Iteration Currency.**

(1) In order to maintain currency in Task 1102, **PERFORM MANUAL THROTTLE OPERATIONS (FULL AUTHORITY DIGITAL ELECTRONIC CONTROL [FADEC])**, IPs/SPs must perform both a running landing and a VMC approach, every 90 days, in accordance with step 4, appendix B, paragraph B-5 of this manual. If more than 90 days have passed, the IP/SP must demonstrate proficiency, in both approaches, to an IP/SP who meets the requirements of paragraph 2-4(h). To reestablish currency, an IP may evaluate an IP or SP. An IP may not evaluate an IP or SP for annual proficiency and readiness test (APART) purposes.

(2) In order to maintain currency in Task 1074, **RESPOND TO ENGINE FAILURE AT CRUISE FLIGHT,** IPs/SPs must perform one iteration of Task 1074 every 90 days. To reestablish currency, an IP may evaluate an IP or SP. An IP may not evaluate an IP or SP for annual proficiency and readiness test (APART) purposes.

2-7. CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR TRAINING. The commander evaluates the unit mission and determines if chemical, biological, radiological, and nuclear (CBRN) training is required. If he determines that the unit requires CBRN training, he will train all FAC 1 and selected FAC 2 aviators. Crewmembers must wear full MOPP gear (MOPP level 4) during CBRN training.

a. **Crewmembers will receive CBRN training in the base tasks listed below and will perform at least one iteration annually.** The commander selects mission/additional tasks based on the unit's mission. One iteration of any two weapon system tasks must be performed annually.

(1) Task 1022, Perform preflight inspection.

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

(3) **TASK 1030, PERFORM HOVER OUT-OF-GROUND EFFECT CHECK.**

(4) Task 1032, Perform radio communication procedures.

(5) Task 1046, Perform electronically aided navigation.

(6) **TASK 1407, PERFORM TERRAIN FLIGHT TAKEOFF.**

(7) **TASK 1408, PERFORM TERRAIN FLIGHT.**

(8) **TASK 1409, PERFORM TERRAIN FLIGHT APPROACH.**

(9) **TASK 1411, PERFORM TERRAIN FLIGHT DECELERATION.**

(10) Task 1456, Engage target with 50-caliber.

(11) Task 1458, Engage target with Hellfire.

(12) Task 1462, Engage target with rockets.

b. **While conducting CBRN training, the commander will ensure that—**

(1) Aircrews use extra care when performing flight duties or training in aircraft cockpits when the wet bulb globe temperature is above 75 degrees Fahrenheit.

(2) Aircrews will not receive emergency procedures training in flight while wearing MOPP gear. (They will complete this training in static aircraft.)

(3) CBRN training is coordinated closely with the local flight surgeon.

2-8. NIGHT UNAIDED TRAINING REQUIREMENTS. Annual night unaided training is mandatory for all crewmembers. The following tasks will be evaluated during RL progression and a minimum of one iteration of each task will be performed annually. The commander may designate any of the following tasks for evaluation during the APART period.

(1) Task 1024, Perform before starting engine through before leaving helicopter checks.
(2) **TASK 1038, PERFORM HOVERING FLIGHT.**
(3) **TASK 1040, PERFORM A VISUAL METEOROLOGICAL CONDITIONS TAKEOFF.**
(4) **TASK 1044, NAVIGATE BY PILOTAGE AND DEAD RECKONING.**
(5) **TASK 1058, PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH.**
(6) Task 1184, Respond to inadvertent instrument meteorological conditions (IIMC).

Chapter 3
Evaluation

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

3-1. EVALUATION PRINCIPLES. The value of any evaluation depends on adherence to fundamental evaluation principles. These principles are described below.

a. **Selection of evaluators.** 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, and MEs who assist the commander in administering the aircrew training program (ATP).

b. **Method of evaluation.** The method used to conduct the evaluation 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 standing operating procedures (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.

c. **Participant understanding.** All participants must completely understand the purpose of the evaluation.

d. **Participant cooperation.** Cooperation by all participants is necessary to guarantee the accomplishment of the evaluation objectives. The emphasis is on all participants, not just on the examinee.

e. **Identification of training needs.** The evaluation must produce specific findings to identify training needs. The examinee needs to know what is being performed correctly or incorrectly, and how improvements can be made.

f. **Purpose of evaluation.** 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.

g. **Crew coordination.** The guidelines for evaluating crew coordination are based on a subjective 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.

h. **Evaluator role as crewmember.** In all phases of evaluation, the evaluator is expected to perform as an effective crewmember. At some point during the evaluation, circumstances may prevent the evaluator from performing as a crewmember. In such cases, a realistic, meaningful, and planned method should be developed to pass this task back to the examinee effectively. During the conduct of the flight evaluation, the evaluator will normally perform as outlined in the task description or as directed by the examinee. At some point, the evaluator may perform a role reversal with the examinee. The examinee must be made aware of both the initiation and termination of role reversals. The examinee must know when a fully functioning crewmember is supporting the examinee.

Note: When evaluating a PC, UT, IP, SP, ME, or IE, the evaluator must advise the examinee that, during role-reversal, the evaluator may deliberately perform some tasks or crew coordination outside the standards to check the examinee's diagnostic and corrective action skills.

3-2. GRADING CONSIDERATIONS

a. **Academic evaluation.** The examinee must demonstrate a working knowledge and understanding of the appropriate subject areas.

b. **Flight evaluation.**

(1) Academic. Some tasks are identified in TRAINING AND EVALUATION REQUIREMENTS as tasks that may be evaluated academically. The examinee must demonstrate a working knowledge of the tasks. Evaluators may use computer based instruction (CBI), mock-ups, or other approved devices to assist in determining the examinee's knowledge of the task.

(2) In the aircraft. Tasks that require evaluation under these conditions must be performed in the aircraft. 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.

Note: During an evaluation, a task iteration performed in a more demanding mode of flight may suffice for an iteration performed in a less demanding mode of flight. The commander determines which mode of flight is more demanding.

3-3. CREWMEMBER EVALUATION. Evaluations are conducted to determine the crewmember's ability to perform the tasks on the commander's task list (CTL) and check understanding of required academic subjects listed in the ATM. When the examinee is an evaluator/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. Initial validation of an aviator's qualifications following a military occupational specialty (MOS) producing course of instruction/school (for example, OH-58D instructor pilot course, maintenance test pilot course, and instrument flight examiners course) will be conducted in the aircraft upon return from that course.

a. **Recommended performance and evaluation criteria.**

(1) Pilot (PI). The PI must demonstrate a working knowledge of the appropriate academic subjects from paragraph 3-4b. In addition, the PI must be familiar with the individual aircrew training folder (IATF), and understand the CTL requirements.

(2) PC/MTP. The PC/MTP must meet the requirements in paragraph 3-3a.(1). In addition, the PC/MTP must demonstrate sound judgment and technical/tactical proficiency in the employment of the aircraft, the unit's mission, the crew, and assets.

(3) UT. The 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, and train to standards and document training.

(4) IP or IE. The IP must meet the requirements in paragraph 3-3a.(2). In addition, the IP must be able to objectively train, evaluate, and document performance of the PI, PC, MTP, and UT, using role-reversal for UT training, as appropriate. This individual must possess a thorough knowledge of the fundamentals of instruction and evaluation, be able to develop and implement an individual training plan, and possess 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 IPs, SPs, UTs, PCs, 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 ME must meet the requirements in paragraph 3-3a(1) and (2). The ME must be able to instruct and evaluate other MEs and MTPs using role reversal when required.

Note: SP/IP/IE/ME/UT will be evaluated on their ability to apply the learning and teaching process outlined in the instructor pilot handbook.

b. **Academic evaluation criteria.**

(1) Proficiency flight evaluations (PFE). The commander or representative selects the appropriate topics to be evaluated from paragraph 3-4b that applies.

(2) APART standardization evaluation. The SP/IP evaluates a minimum of two topics from the subject areas in paragraph 3-4b that apply.

(3) APART instrument evaluation. The IE or IP, if designated by the commander, evaluates a minimum of two topics from the subject areas in paragraphs 3-4b (1) through (3) relative to IMC flight.

(4) Annual NVG evaluation. The NVG SP/IP evaluates a minimum of two topics from the subject areas in paragraph 3-4b that apply.

(5) APART MTP/ME evaluation. The ME evaluates a minimum of two topics from the subject areas in paragraphs 3-4b (1) through (4) and (8) with specific emphasis on how they apply to maintenance test flights.

(6) Other ATP evaluations. The SP/IP will evaluate a minimum of two topics from the subject areas in paragraph 3-4b that apply.

3-4. EVALUATION SEQUENCE.

a. **Phase l—introduction.** In this phase, the evaluator will:

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

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

Note 1: If the evaluation is for an evaluator, the individual conducting the evaluation must explain that the examinee’s ability to apply the learning and teaching process outlined in the instructor pilot handbook will be evaluated.

Note 2: For UTs, the evaluation will include special emphasis on the examinee’s performance in those areas in which UT duties are performed. The evaluation should ensure that the examinee can safely and effectively perform UT duties.

b. **Phase 2—academic evaluation topics.**

(1) Regulations and publications (AR 40-8, AR 95-1, AR 95-2, DA Pamphlet 738-75l, DOD FLIP, FM 3-04.140, TC 1-210, TM 1-1500-328-23, and local SOPs and regulations). Topics in this subject area are—

- ATP requirements.
- SOP/TACSOP requirements.
- DOD FLIP and maps.
- VFR minimums and procedures.
- Aviation life support equipment.
- Flight plan preparation and filing.
- Range operations and safety.
- Local airspace usage.
- Publications required in the aircraft.

(2) Operating limitations and restrictions (FM 3-04.140 and TM 1-1520-248-10). Topics in this subject area are—

- General.
- Power limits.
- Airspeed limits.
- Environmental restrictions.
- Performance chart interpretation.
- Weapon systems limitations.
- Notes, cautions, and warnings.
- System limits.
- Loading limits.
- Maneuvering limits.
- ISAQ/AWR (airworthiness release) limits.
- Weight and balance requirements.
- Laser limitations.

(3) Aircraft emergency procedures and malfunctions (TM 1-1520-248-10). Topics in this subject area are—

- Definition of emergency terms.
- Rotor, transmission, and drive systems.
- Chip detectors.
- Hydraulic system malfunction.
- Electrical system malfunctions.
- Landing and ditching procedures.
- Weapon systems malfunctions.
- Engine malfunctions and restart procedures.
- Tail rotor malfunctions.
- Smoke and fume elimination.
- Fuel system malfunction.
- Caution and warning emergency procedures.
- Flight controls malfunctions.

(4) Aerodynamics (FM 1-203 and TM 1-1520-248-10). Topics in this subject area are—

- Transient torque.
- Settling with power.
- Dynamic rollover.

(5) Tactical and mission operations (FM 1-112, FM 1-114, FM 17-95, FM 1-400, FM 90-4, FM 3-04.140, TC 1-201, TC 1-204, TC 1-210, and unit SOP). Topics in this subject area are—

- Reconnaissance operations (purpose and fundamentals).
- Attack planning and terrain analysis.
- Fire support and joint air attack operations.
- Identification of major U.S. or allied equipment and major threat equipment expected to be in the area of operation.
- Security operations (purpose and fundamentals).
- Tactical formations and fire control.
- Interpretation of tactical overlays.

(6) Weapon system operation and deployment (FM 1-112, FM 3-04.140, and TM 1-1520-248-10). Topics in this subject area are—

- Hellfire weapon system (lock-on before launch [LOBL]/lock-on after launch [LOAL]).
- 2.75-inch rocket system.
- Hellfire missile characteristics.
- Hydra 70 rocket characteristics.
- Ballistics.
- 50-caliber system.
- Air-to-air Stinger system (if selected as a mission task).
- 50-caliber ammunition characteristics.
- Air-to-air Stinger characteristics (if selected as a mission task).
- Laser operations (range/designator).

(7) Night mission operation and deployment (FM 3-04.140, TC 1-204, and TM 1-1520-248-10). Topics in this subject area are—

- Unaided night flight.
- Distance estimation and depth perception.
- ADSS flight symbology and modes.
- Night vision limitations and techniques.
- Infrared characteristics.

(8) Maintenance test pilot (TM 1-1520-248-MTF, TM 1-1520-248-23, and TM 1-2840-263-23). Topics in this subject area are—

- Maintenance management.
- Maintenance operational checks.
- Maintenance test flight forms and records.
- Local airspace usage.
- Hydraulic system.
- Main rotor smoothing.
- Communication and navigation equipment.
- Functional flight checks.
- Maintenance test flights.
- Test flight weather requirements.
- Power train.
- Flight controls.
- Tail rotor balancing.
- Compass calibration.

c. **Phase 3—Flight evaluation.** This phase consists of a crew briefing, a preflight inspection; engine-start, runup, and hover procedures; flight tasks; and engine shutdown and after-landing tasks.

(1) Briefing. The evaluator will explain the flight evaluation procedure and tell the examinee which tasks to perform. When evaluating an evaluator, the individual conducting the evaluation must advise the examinee that the evaluator may deliberately perform some tasks not according to standard to check the examinee's diagnostic and corrective action skills. In addition, the evaluator will conduct or have the examinee conduct a crew briefing that includes, as a minimum, the items listed below.

(a) Mission.
(b) Weather.
(c) Flight route.
(d) Performance data.
(e) Transfer of flight controls.
(f) Crew duties, to include emergency duties.
(g) Procedures for conducting simulated emergencies.
(h) Postcrash rendezvous point.

Note: Refer to TM 1-1520-248-10 and local directives for additional crew briefing requirements.

(2) Preflight inspection and engine-start, runup, hover, and before-takeoff checks. The evaluator will evaluate the examinee's use of TM 1-1520-248-CL or TM 1-1520-248-MTF. The evaluator also will have the examinee properly identify at least two aircraft components and two weapon system components, if installed, and discuss their functions.

(3) Flight tasks. As a minimum, the evaluator will evaluate those tasks identified in chapter 2 as mandatory for the designated crew station and those mission or additional tasks selected by the commander for evaluation. The evaluator may randomly select for evaluation any tasks listed on the mission or additional task list established by the commander. An evaluator must demonstrate an ability to evaluate and instruct appropriate flight tasks. When used as part of the proficiency flight evaluation, the evaluation may include an orientation of the local area, checkpoints, weather, and other pertinent information. All MTF tasks are mandatory for an MTF standardization evaluation.

(4) Engine shutdown and after-landing tasks. The evaluator will evaluate the examinee's use of TM 1-1520-248-CL or TM 1-1520-248-MTF.

d. **Phase 4—debriefing.** During this phase, the evaluator will—

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

(2) Offer the examinee recommendations for improvement.

(3) Tell the examinee whether the evaluation was passed or failed.

(4) Complete the applicable DA forms per instructions in TC 1-210.

3-5. PROFICIENCY FLIGHT EVALUATION. This evaluation is conducted per AR 95-1. Tasks to be completed during a PFE are those designated by the commander. After the evaluation, the IP/SP will debrief the examinee and complete the applicable forms per instructions in TC 1-210.

3-6. ANNUAL NIGHT VISION GOGGLES STANDARDIZATION FLIGHT EVALUATION. This evaluation is conducted per TC 1-210, this manual, and the commander's task list. The evaluation will include all base tasks indicated by an NG in the Eval column of table 2-2 and any iterations of mission tasks listed in Table 2-3 as determined by the commander, for those aviators who maintain NVG currency. After the evaluation, the IP or SP will debrief the examinee and complete the applicable forms per instructions in TC 1-210.

3-7. POST ACCIDENT FLIGHT EVALUATION. This evaluation is required by AR 95-1. After the evaluation, the IP or SP will debrief the examinee and complete the applicable forms per instructions in TC 1-210.

3-8. MEDICAL FLIGHT EVALUATION. This evaluation is conducted per AR 95-1. The IP or SP, on the recommendation of the flight surgeon, will require the examinee to perform a series of tasks most affected by the examinee's disability. The evaluation should measure the examinee's potential to perform ATM tasks despite a disability. It should not be based on current proficiency.

a. After the examinee has completed the medical flight evaluation, the evaluator will prepare a memorandum. The memorandum will include—

(l) A description of the environmental conditions under which the evaluation was conducted (for example, day, night, or overcast).

(2) A list of tasks performed during the evaluation.

(3) A general statement of the individual's ability to perform with the disability and the conditions under which the individual can perform.

b. The unit commander will then forward the memorandum and the applicable forms to Commander, U.S. Army Aviation Warfighting Center, ATTN: HSXY-AER, Fort Rucker, AL 36362-5333.

3-9. NO-NOTICE EVALUATION. This evaluation is conducted per TC 1-210. After the evaluation, the evaluator will debrief the examinee and complete the applicable forms per instructions in TC 1-210.

3-10. COMMANDER'S EVALUATION. This evaluation is conducted per TC 1-210. After the evaluation, the evaluator will debrief the examinee and complete the applicable forms per the instructions in TC 1-210.

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Chapter 4
Crewmember Tasks

This chapter implements portions of STANAG 3114.

This chapter describes those maneuvers and procedures that are essential for maintaining crewmember skills. It does not contain all the maneuvers that can be performed in the aircraft. Some tasks that must be done during required training or evaluation flights may not be mandatory for other flights. (For example, Task 1010 is not mandatory for all flights.) However, aviators must complete the performance planning card when their training/mission involves this task or when the instructor or evaluator requires it.

4-1. TASK CONTENTS.

a. **Task number.** Each ATM task is identified by a ten-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 248 (OH-58D Kiowa Warrior). For convenience, only the last four digits are listed in this training circular. The last four digits of—

- Base tasks are assigned 1000-series numbers.
- Mission tasks are assigned 2000-series numbers.
- Maintenance tasks are assigned 4000-series numbers.

Note: Additional tasks designed by the commander as mission essential are not included in this ATM. The commander will develop conditions, standards, and descriptions for those additional tasks.

b. **Conditions.** The conditions specify the situation in which the task will be performed. They describe the important aspects of the performance environment. References to OH-58D helicopters apply to all OH-58D design helicopters. Reference will be made to a particular helicopter within a design series when necessary. All conditions must be met before task iterations can be credited.

(1) Common conditions are—

(a) In a mission aircraft with mission equipment and crew, items required by AR 95-1 and required publications (operator's manual, checklist, navigational and terrain maps).

(b) Under visual or instrument meteorological conditions.

(c) Day, night, and night vision device employment.

(d) In any terrain or climate.

(e) In a chemical, biological, radiological, and nuclear (CBRN) environment with mission protective posture equipment used.

(f) In an electromagnetic environment.

(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. References to IP in the task conditions include SP.

(b) The following tasks require an IP or SP for training/evaluation in the aircraft.

- **TASK 1072, RESPOND TO ENGINE FAILURE AT A HOVER.**
- **TASK 1074, RESPOND TO ENGINE FAILURE AT CRUISE FLIGHT.**

- **TASK 1078, RESPOND TO STABILITY AND CONTROL AUGMENTATION SYSTEM (SCAS) MALFUNCTION.**
- **TASK 1082, PERFORM AUTOROTATION.**
- **TASK 1100, PERFORM ANALOG THROTTLE OPERATIONS.**
- **TASK 1102, PERFORM MANUAL THROTTLE OPERATIONS (FULL AUTHORITY DIGITAL ELECTRONIC CONTROL [FADEC]).**

(3) Unless otherwise specified in the conditions, all in-flight training and evaluation will be conducted under visual meteorological conditions (VMC). Simulated instrument meteorological conditions (IMC) denotes flight solely by reference to flight instruments/symbology.

(4) Tasks requiring specialized equipment do not apply to aircraft that do not have the equipment installed.

(5) Night vision goggles (NVG) use may be a condition for any flight task, unless otherwise noted. When NVGs are listed as a condition, task standards will be the same as those described for performance of the task without using NVGs.

c. **Standards.** The standards describe the minimum degree of proficiency or standard of performance to which the task must be accomplished. The terms, "without error," properly," and "correctly" apply to all standards. The standards are based on ideal conditions. Task descriptions may contain required elements for satisfactory completion of a given task. Crew actions specified in the description are required to satisfactorily perform crew coordination. Some standards are common to several tasks. The following standards apply to all tasks—

Note: It is essential for the PC to brief specific duties before entering the aircraft. The ability for either crewmember to perform most aircraft/system functions breaks down the standard delineation of duties. This could mean that during an unforeseen event, one crewmember might attempt to resolve the situation alone rather than by seeking assistance from the other crewmember.

(1) All tasks.
  (a) Perform crew coordination actions per chapter 6 and the task description.
  (b) Apply appropriate environmental considerations.

(2) All tasks with the engine operating.
  (a) Maintain airspace surveillance.
  (b) The P* will announce intent to perform a specific maneuver or aircraft movement.
  (c) The P* will announce all takeoff and landings.

d. **Description.** The description explains the required method for accomplishing 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 techniques, as long as the task is done safely and the standards are met. These actions apply in all modes of flight during day, night, IMC, NVG, or CBRN operations. 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), P (pilot not on the controls), do not refer to PC (pilot in command) duties. When required, PC responsibilities are specified. For all tasks, the following responsibilities apply:

(a) Both crewmembers. Perform crew coordination actions and announce malfunctions or emergency conditions. Monitor engine and system 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 for example, during crosschecks) and when attention is focused back outside. Chapter 6 contains examples of crew callouts and guidance on cockpit coordination.

(b) The PC. The PC is responsible for the conduct of the mission, and for operating, securing, and servicing the aircraft the PC commands. The PC will ensure that a crew briefing is accomplished and that the mission is performed per ATC instructions, regulations, and SOP requirements.

(c) The PI. The PI is responsible for completing tasks as assigned by the PC.

(d) The 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 from ATC. The P* will announce changes in altitude, attitude, airspeed, or direction.

(e) The P. The P is responsible for navigation, in-flight computations, and assisting the P* as requested. When duties permit, assist the P* with obstacle avoidance.

(f) The 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, this individual will ensure safe landing areas are available for engine failure training and that aircraft limits are not exceeded.

(g) Additional crew actions. The tasks specify additional crew actions, if any, necessary to successfully accomplish the task.

(2) Procedures. This section explains the portions of a task that an individual or crew accomplishes. The procedures are an important element in standardization and training; however, they should not be construed to be the grading standard, but rather a means to meet the standard. Procedures are flexible enough to allow the P* to use judgment for minor deviations as long as the standards are met.

e. **Considerations.** This section defines considerations for task accomplishment under various conditions (for example, night or NVG, or snow/sand/dust). The inclusion of environmental considerations in a task does not relieve the commander of the requirement for developing an environmental training program per TC 1-210. Common night/NVG considerations are listed below and will be applied to tasks conducted in N/NVG environments. Training considerations establish specific actions and standards used in the training environment.

(1) Night and NVG. Wires and other hazards are much more difficult to detect and must be accurately marked and plotted on maps. 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 use of artificial illumination may sometimes be necessary. Determine the need for artificial lighting prior to descending below barriers. 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. Take special precautions to identify and confirm the correct switches/buttons.

(2) Night unaided. Use of the white light or weapons flash will impair night vision. The P* should not view white lights, weapons flash, or ordnance impact directly. Allow time for dark adaptation or, if necessary, adjust altitude and airspeed until adapted. Exercise added caution if performing flight tasks before reaching full dark adaptation. Dimly visible objects may be more easily detected using peripheral vision, but may tend to disappear when viewed directly. Use proper viewing techniques to locate and orient on objects.

(3) NVG. Use of NVGs 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. If possible, confirm the distance unaided. Weapons flash may temporarily impair or shut down NVGs.

(4) Snow/sand/dust. FM 1-202 outlines procedures for reducing hazards associated with the loss of visual references during takeoff or landing due to blowing snow, sand, or dust (or any other obscuration).

f. **Training and evaluation requirements.** Training and evaluation requirements define whether the task will be trained or evaluated in the aircraft, cockpit procedural trainer (CPT), or academic environment. Training and evaluations will be conducted only in the listed environments, but may be done in any or all combinations. Listing aircraft and/or simulator under evaluation requirements does not preclude the IP from evaluating elements of the task academically to determine depth of understanding or planning processes. The evaluation must include hands-on performance of the task. Chapter 2, table 2-2 lists the modes of flight in which the task must be evaluated. The commander may also select mission and/or additional tasks for evaluation.

g. **References.** The references are sources of information relating to that particular task. Many references are common to several tasks. Unless otherwise specified in the individual task, the references below apply. Alternate or additional references will be listed in individual tasks.

(1) All flight tasks (with engine operating).
- (a) AR 95-1.
- (b) FM 1-201.
- (c) FM 1-230.
- (d) TM 1-1520-248-10.
- (e) TM 1-1520-248-CL.
- (f) DOD FLIP.
- (g) Title 14 CFR/host country regulations.
- (h) Unit/local SOPs.
- (i) Aircraft logbook
  - i. DA Form 2408-12 Army Aviator's Flight Record
  - ii. DA Form 2408-13 Aircraft Status Information Record
  - iii. DA Form 2408-13-1 Aircraft Inspection and Maintenance Record
  - iv. DA Form 2408-14-1 Uncorrected Fault Record
  - v. DA Form 2408-18 Equipment Inspection List

(2) All instrument tasks.
- (a) AR 95-1.
- (b) FM 1-240.
- (c) DOD FLIP.
- (d) Aeronautical Information Manual.

(3) All tasks with environmental considerations.
- (a) FM 1-201.
- (b) TC 1-204.

(4) All tasks used in a tactical situation.
   (a) FM 3-04.140
   (b) FM 1-114.
   (c) FM 1-112.
   (d) FM 17-95.
   (e) FM 6-30.
   (f) FM 3-25.26.
   (g) FM 90-4.

4-2. TASKS

a. **Standards versus descriptions.** Descriptions contain required elements for satisfactory completion of a given task. Crew actions specified in the description are required to satisfactorily perform crew coordination. Attention to the use of the words: will, should, shall, must, can, or may throughout the text of a task description is crucial.

b. **Critical tasks.** The following numbered tasks are OH-58D aviator critical tasks.

TASK 1000

Participate in a crew mission briefing

CONDITIONS: Before flight in an OH-58D and given DA Form 5484-R (*Mission Schedule/Briefing*) and a unit-approved crew briefing checklist.

STANDARDS:

1. The pilot in command (PC) will actively participate in and acknowledge an understanding of DA Form 5484-R. The PC will conduct or supervise a crew briefing using a unit-approved crew briefing checklist.

2. The crewmember receiving the crew/mission brief will verbally acknowledge a complete understanding of the crew/mission briefing.

DESCRIPTION:

1. Crew actions.

   a. A designated briefing officer will brief key areas of the mission to the PC in accordance with AR 95-1. The PC will acknowledge a complete understanding of the mission brief and initial DA Form 5484-R. The PC has overall responsibility for the crew mission briefing.

   b. The crewmember being briefed will address any questions to the briefer and will acknowledge understanding of the assigned actions, duties, and responsibilities. Lessons learned from previous debriefings should be addressed as applicable during the crew briefing.

2. Procedures. The PC and/or crew will receive the mission briefing (DA Form 5484-R) from a designated briefing officer. The PC will ensure that a crew briefing is completed prior to the mission/flight. (See the following suggested format for a crew briefing checklist.) Identify mission and flight requirements that will demand effective communication and proper sequencing and timing of actions by the crewmembers.

CREW BRIEFING CHECKLIST
1. Mission overview.
2. Flight route.
3. Weather. Departure, en route, destination, and void time.
4. Required items, mission equipment, and personnel.
5. Analysis of the aircraft.
a. Logbook and preflight deficiencies.
b. Performance planning.
c. Mission deviations required based on aircraft analysis.

CREW BRIEFING CHECKLIST

6. Crew actions, duties, and responsibilities.

> **WARNING**
>
> **If the copilot-gunner (CPG) cyclic is to be used as a flight control, the cyclic shall be engaged.**

   a. Transfer of flight controls and two challenge rule (pilot on the controls [P*]).
   b. Assign scan sectors.
   c. Emergency actions.
      (1) Mission considerations.
      (2) Inadvertent instrument meteorological conditions (IIMC).
      (3) Egress procedures and rendezvous point.
      (4) Actions to be performed by P* and pilot not on the controls (P).
      (5) Night vision goggles (NVG) failure.
7. General crew duties.
   a. Pilot on the controls (P*).
      (1) Fly the aircraft - primary focus outside when visual meteorological conditions (VMC), inside when IMC.
      (2) Avoid traffic and obstacles.
      (3) Cross-check systems and instruments.
      (4) Monitor/transmit on radios as directed by the PC.
   b. Pilot not on the controls - P.
      (1) Assist in traffic and obstacle avoidance.
      (2) Tune radios and set transponder.
      (3) Navigate.
      (4) Copy clearances, automatic terminal information service (ATIS), and other information.
      (5) Cross-check systems and instruments.
      (6) Monitor/transmit on radios as directed by the PC.
      (7) Read and complete checklist items as required.
      (8) Set/adjust switches and systems as required.
      (9) Announce when focused inside for more than five seconds (VMC).
8. Risk assessment considerations.
9. Crewmembers' questions, comments, and acknowledgment of mission briefing.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1004

Plan a visual flight rules flight

CONDITIONS: Before flight in an OH-58D helicopter and given access to weather information; notices to airmen (NOTAMs); flight planning aids; necessary charts, forms, publications; and weight and balance information.

STANDARDS:

1. Determine if the aircrew and aircraft are capable of completing the assigned mission.
2. Determine if the flight can be performed under visual flight rules (VFR) per AR 95-1, applicable code of federal regulations (CFRs)/host nation regulations, and local regulations and standing operating procedures (SOPs).
3. Determine the correct 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 (DOD) flight information publication (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) ±3 minutes for each leg of the flight. Compute magnetic heading(s) ±5 degrees.
6. Determine the fuel required per AR 95-1, ±25 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) will ensure that the pilot (PI) is current and qualified to perform the mission, and that the aircraft is equipped to accomplish the assigned mission. The PC may direct the PI to complete some portions of the VFR flight planning.
   b. The PI will complete all assigned elements and report the results to the PC.
2. Procedures. Using appropriate military, Federal Aviation Administration (FAA), or host-country weather facilities, obtain information about the weather. After ensuring that the flight can be completed under VFR, check NOTAMs, chart update manuals (CHUMs), and other appropriate sources for any restrictions that may 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 weather or terrain. Select the course(s) and altitude(s) that will best facilitate mission accomplishment. Use a (CPU)-26A/P computer/Weems plotter (or equivalent) or air mission planning system to determine the magnetic heading, ground speed, and ETE for each leg. Compute total distance and flight time, and calculate the required fuel using the appropriate charts in TM 1-1520-248-10. Determine if the duplicate weight and balance forms in the aircraft logbook apply to the aircraft configuration. Verify that the aircraft weight and center of gravity (CG) will remain within allowable limits for the entire flight. Complete the flight plan and file it with the appropriate agency.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Checkpoints used during the day may not be suitable for night or NVG use.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1010

Prepare a performance planning card

CONDITIONS: Given a completed DD Form 365-4 (*Weight and Balance Clearance Form F-Transport*); TM 1-1520-248-10; environmental conditions at takeoff, en route, and landing; and a blank performance planning card (PPC).

STANDARD: Complete the PPC according to procedures given in TM 1-1520-248-10, current interim statement of airworthiness qualification (ISAQ)/airworthiness release (AWR) instructions, and the description below.

Note: Current aviation and missile command (AMCOM) approved PPC programs may be used to obtain performance planning data.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will determine and have available aircraft performance data necessary to complete the mission. The PC must ensure that aircraft limitations and capabilities are not exceeded.

   b. The pilot (PI) will assist the PC as directed.

2. Procedures. DA Form 5701-58-R (OH-58D *Performance Planning Card*) is used as an aid to organize performance planning data. Units may develop their own performance planning card. Figure 4-1 is an example of an OH-58D PPC.

3. Departure.

Item 1 — Pressure altitude (PA) takeoff (T/O). Record the pressure altitude at the departure point at the estimated time of departure.

Item 2 — Free air temperature (FAT) T/O. Record the temperature at the departure point at the estimated time of departure.

Item 3 — PA maximum (max). Record the forecasted maximum pressure altitude for the duration of the mission.

Item 4 — FAT max. Record the forecasted maximum temperature for the duration of the mission.

Item 5 — T/O weight. Record the gross weight of the aircraft at departure.

Item 6 — Max weight. Record the heaviest gross weight that may occur for the duration of the mission. (For example, if the mission includes forward arming refueling point (FARP) operations, the maximum weight would include the ammunition and fuel that may be loaded. This may or may not be the same as the takeoff gross weight.)

Item 7 — Fuel required. Record the estimated fuel required (including reserve) at takeoff to complete the mission.

Item 8 — Max fuel. Record the maximum fuel weight at takeoff if fuel must be limited to meet takeoff maximum gross weight requirements.

Item 9 — Notes. These blocks are provided for reminders of specific limits or requirements. (For example, the maximum fuel may be limited only with a full load of ammunition.)

Item 10 — Maximum torque available – 5 minutes. Using the maximum PA and maximum FAT, determine and record the maximum torque available for 5 minute operation. Not applicable to the OH-58D(R).

Item 11 — Maximum torque available – 30 minutes. Using the maximum PA and maximum FAT, determine and record the maximum torque available for 30 minute operation.

Item 12 — Maximum torque available – continuous. Using the maximum PA and maximum FAT, determine and record the maximum torque available for continuous operation.

Item 13 — Predicted hover torque – at takeoff – in ground effect (IGE). Using the departure conditions and the takeoff gross weight, determine the estimated mast torque required to hover in ground effect (3 feet).

Item 14 — Predicted hover torque – at takeoff – out-of-ground effect (OGE). Using the departure conditions and the takeoff gross weight, determine the estimated mast torque required to hover out of ground effect.

Item 15 — Predicted hover torque – max condition – IGE. Using the maximum PA, maximum FAT, and the maximum weight (Item 6), determine the estimated mast torque required to hover in ground effect (3 feet).

Item 16 — Predicted hover torque – max condition – OGE. Using the maximum PA, maximum FAT, and the maximum weight (Item 6), determine the estimated mast torque required to hover out of ground effect.

Item 17 — Maximum allowable gross weight – at takeoff – IGE. Using the departure conditions and the maximum torque available, determine the maximum allowable gross weight. (This may be limited by torque available, by aircraft structural limits, or by interim statement of airworthiness qualification (ISAQ)/AWR limitations.)

Item 18 — Maximum allowable gross weight – at takeoff – OGE. Using the departure conditions and the maximum torque available, determine the maximum allowable gross weight. (This may be limited by torque available, by aircraft structural limits, or by ISAQ/AWR limitations.)

Item 19 — Maximum allowable gross weight – max condition – IGE. Using the maximum PA, maximum FAT, and the maximum torque available, determine the maximum allowable gross weight. (This may be limited by torque available, by aircraft structural limits, or by ISAQ/AWR limitations.)

Item 20 — Maximum allowable gross weight – max condition – OGE. Using the maximum PA, maximum FAT, and the maximum torque available, determine the maximum allowable gross weight. (This may be limited by torque available, by aircraft structural limits, or by ISAQ/AWR limitations.)

4. En route.

Item 21 — Altitude. Record the planned cruise altitude.

Item 22 — Temp. Record the forecasted or estimated temperature at cruise altitude.

Item 23 — D Drag square foot (Sq. Ft). Record the net change in square feet of flat plate drag between the standard drag configuration and the configuration to be flown.

Item 24 — Torque D for cruise airspeed. Record the predicted increase or decrease in mast torque necessary to maintain cruise airspeed as required for nonstandard drag configurations.

Item 25 — Cruise – Indicated airspeed (IAS). Record the planned indicated airspeed for cruise.

Item 26 — Cruise – Torque. Record the mast torque required to maintain cruise airspeed. This value should be the cruise torque after the adjustment made for nonstandard drag configuration as necessary.

Item 27 — Cruise – Fuel Flow. Record the predicted fuel flow at the torque setting (Item 26) to maintain cruise airspeed.

Item 28 — Max Range – IAS. Record the indicated airspeed for maximum range. This value is only valid for the standard drag configuration. For nonstandard drag configurations the maximum range torque (Item 29) should be maintained to achieve maximum range.

Item 29 — Max Range – Torque. Record the mast torque required to maintain maximum range airspeed. Do not adjust this value for nonstandard drag configurations.

Item 30 — Max Range – Fuel Flow. Record the predicted fuel flow at the torque setting (Item 29) to maintain maximum range airspeed.

Item 31 — Max Rate of Climb (R/C) or End – IAS. Record the indicated airspeed for maximum rate of climb or maximum endurance. For nonstandard drag configurations the maximum endurance torque (Item 32) should be maintained to achieve maximum endurance

Item 32 — Max R/C or End – Torque. Record the mast torque required to maintain maximum endurance airspeed. The torque required to achieve maximum rate of climb is maximum torque available.

Item 33 — Max R/C or End – Fuel Flow. Record the predicted fuel flow at the torque setting (Item 32) to maintain maximum endurance.

Item 34 — Velocity never exceed (Vne) – IAS. Record the indicated airspeed for Vne.

Item 35 — Vne – Torque. Record the predicted mast torque required to maintain Vne airspeed.

Item 36 — Vne – Fuel Flow. Record the predicted fuel flow at the torque setting (Item 35) to maintain maximum Vne airspeed.
Item 37 — Notes. These blocks are provided additional information as necessary. (For example, the true airspeed for cruise may be entered.)
Item 38 — Conditions. Record the appropriate letter (A, B, or C) for the lateral loading conditions defined.

5. Arrival. Compute arrival data if environmental conditions at destination are higher by 5°C, 500 feet PA, or if aircraft weight increases 200 pounds from takeoff point.

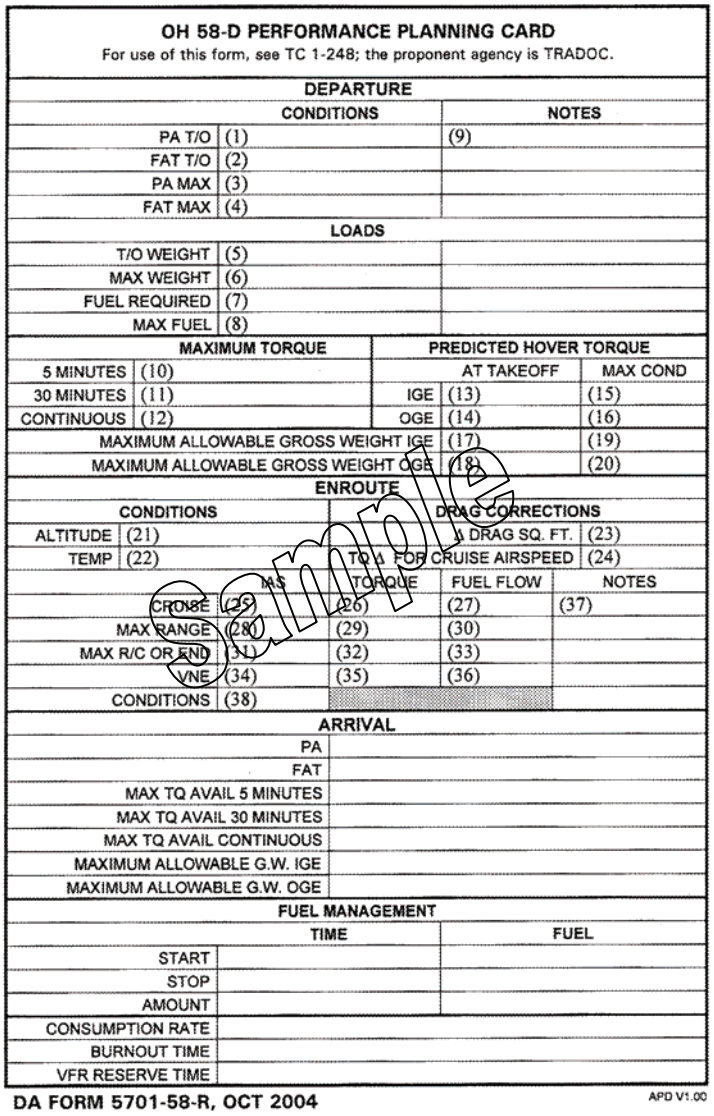
- Fuel Management. Use this section to record the in-flight fuel consumption check, to include fuel consumption rate, estimated fuel burnout time, and appropriate reserve.

Note: The same PPC will suffice for consecutive takeoffs and landings when the load or environmental conditions have not increased significantly (5°C, 500 feet PA, or 200 pounds).

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.



OH 58-D PERFORMANCE PLANNING CARD

For use of this form, see TC 1-248; the proponent agency is TRADOC.

DEPARTURE			
CONDITIONS		NOTES	
PA T/O	(1)	(9)	
FAT T/O	(2)		
PA MAX	(3)		
FAT MAX	(4)		
LOADS			
T/O WEIGHT	(5)		
MAX WEIGHT	(6)		
FUEL REQUIRED	(7)		
MAX FUEL	(8)		

MAXIMUM TORQUE		PREDICTED HOVER TORQUE		
			AT TAKEOFF	MAX COND
5 MINUTES	(10)			
30 MINUTES	(11)	IGE	(13)	(15)
CONTINUOUS	(12)	OGE	(14)	(16)
MAXIMUM ALLOWABLE GROSS WEIGHT IGE			(17)	(19)
MAXIMUM ALLOWABLE GROSS WEIGHT OGE			(18)	(20)

ENROUTE			
CONDITIONS		DRAG CORRECTIONS	
ALTITUDE	(21)	Δ DRAG SQ. FT.	(23)
TEMP	(22)	TQ Δ FOR CRUISE AIRSPEED	(24)

	KIAS	TORQUE	FUEL FLOW	NOTES
CRUISE	(25)	(26)	(27)	(37)
MAX RANGE	(28)	(29)	(30)	
MAX R/C OR END	(31)	(32)	(33)	
VNE	(34)	(35)	(36)	
CONDITIONS	(38)			

ARRIVAL	
PA	
FAT	
MAX TQ AVAIL 5 MINUTES	
MAX TQ AVAIL 30 MINUTES	
MAX TQ AVAIL CONTINUOUS	
MAXIMUM ALLOWABLE G.W. IGE	
MAXIMUM ALLOWABLE G.W. OGE	

FUEL MANAGEMENT		
	TIME	FUEL
START		
STOP		
AMOUNT		
CONSUMPTION RATE		
BURNOUT TIME		
VFR RESERVE TIME		

Sample

DA FORM 5701-58-R, OCT 2004 APD V1.00

Figure 4-1. OH-58D Performance Planning Card Sample

TASK 1012

Verify aircraft weight and balance

CONDITIONS: Given crew weights, aircraft configuration, and aircraft weight and balance information.

STANDARDS:

1. Verify that center of gravity (CG) and gross weight (GWT) remain within aircraft limits for the duration of the flight per TM 1-1520-248-10.
2. Identify all mission or flight limitations imposed by weight or CG.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will brief the pilot (PI) on any limitations.
   b. The PI (if directed) will verify or complete the DD Form 365-4 (*Weight and Balance Clearance Form F-Transport*) and report the results to the PC.
   c. Both crewmembers will continually monitor aircraft loading during the mission (for example, fuel and weapons loading/expenditure) to ensure CG remains within limits.
2. Procedures. 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, refer to the unit weight and balance technician, TM 55-1500-342-23, or complete a new DD Form 365-4.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1013

Operate mission planning system

> **CAUTION**
>
> The data transfer module/cartridge (PC-DTS/PC-VDTS/DTM/DTC) must be handled carefully. Rough handling may cause a complete loss of mission data.

CONDITIONS: Given a mission planning system, mission briefing, signal operation instruction (SOI) information, weather information, navigational maps, Department of Defense (DOD) flight information publications (FLIP), intelligence data, and other materials as required.

Note: This task applies only to individuals in units that have access to a mission planning system.

STANDARDS:

1. Perform tactical flight mission planning.
2. Configure and operate the mission planning system.
3. Conduct a map reconnaissance and terrain analysis.
4. Select and enter appropriate navigational data.
5. Select and enter appropriate communication and improved data modem (IDM) data.
6. Enter appropriate weapons data.
7. Enter any additional data to include laser codes, mast-mounted sight (MMS) prepoints, and notebook information
8. Load mission data to PC-DTS/ PC-VDTS /DTM/DTC.
9. Print out time, distance, and 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. Mission data from higher headquarters may be received digitally, in the form of overlay or on paper. One or both crewmembers may enter data into the aviation mission planning system.

2. Procedures. Analyze the mission and mission data. Plan the flight by conducting a map reconnaissance and terrain analysis using the available map database. Terrain analysis may be accomplished by using the topographic view with either the intervisibility plot or height above terrain feature. The profile view and alternate profile view in the mission dialog boxes may be used in this analysis. If mission independent data is provided, waypoint, target, battlefield graphics list (BFGL), and route information is most easily input via the map. Threat data, if available, should be inputted with appropriate values for radius of detection and radius of kill. When detailed information is required for a waypoint or target (for example, an update point or a named area of interest [NAI]), the mission dialog boxes allow the most precise information to be entered by grid coordinate. Ensure the correct datum is being used on the map and in the mission dialog boxes. IDM and communication databases should remain relatively unchanged after initial input of unit data. Enter appropriate frequencies, call signs, and expanders or select them from the appropriate database. Determine communications requirements and build radio presets, IDM initialization information, and Have

Quick frequencies. Enter laser codes, MMS prepoints, notebook data, and appropriate weapons data. The input of weapons data does not reduce the need for a weapons initialization once the crew is in the aircraft. Ensure the correct aircraft software version is selected, and download mission(s) to the PC-DTS/ PC-VDTS/DTM/DTC. Print out waypoint cards, communication cards, kneecards, and TDH cards as required.

Note: If more than one aircraft PC-DTS/ PC-VDTS/DTM/DTC is loaded with a mission, crews will have to change the individual identifiers and codes after loading the aircraft

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and:
Task 1012
Task 1022

TASK 1014

Operate aviation life support equipment

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

STANDARDS: Appropriate common standards plus these additions/modifications:

Inspect/perform operational checks on 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. Based on mission requirements, obtain the required ALSE. Inspect equipment for serviceability and perform required operational checks. Secure the required ALSE in the aircraft per FM 1-302, Operators Manual, and the unit standing operating procedures (SOP).

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1022

Perform preflight inspection

CONDITIONS: With an OH-58D helicopter.

STANDARDS:

1. Perform the preflight inspections of the aircraft, armament, and personal flight gear (helmet, vest, and any other required equipment) per the appropriate technical manuals.
2. Follow armament safety and ground procedures.
3. Enter all 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*).

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) is responsible for ensuring that a preflight inspection is conducted using the TM 1-1520-248-10/TM 1-1520-248-CL. The PC may direct the pilot (PI) to complete elements of the aircraft preflight inspection as applicable, and will verify that all checks have been completed. 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 (*Army Aviator's Flight Record*) and DA Form 2408-13 (*Aircraft Status Information Record*) and DA Form 2408-13-1 (*Aircraft Maintenance and Inspection Record*). The PC will perform a walk-around inspection prior to aircraft start.

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

2. Procedures.

   a. Consider the helicopter armed and approach it from the side to avoid danger areas. Ensure that the aircraft is in an armament safe status and follow grounding procedures prior to continuing further with the preflight.

   b. Ensure the preflight inspections are conducted per the TM 1-1520-248-10/ TM 1-1520-248-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.

Note 1: If circumstances permit, accomplish preflight inspection during daylight hours.

Note 2: The crew performing the preflight should be aware of any recent maintenance that has occurred and should consider examining those areas in greater detail.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A white lens flashlight should be used if performing the preflight inspection during the hours of darkness. Hydraulic leaks, oil leaks, and other defects are difficult to see using a flashlight with a colored lens.

SNOW/SAND/DUST CONSIDERATIONS: If an aircraft is preflighted other than immediately prior to flight, consideration should be given to reinstalling aircraft covers to prevent accumulation of snow/sand/dust in aircraft and equipment. Ensure all ice/snow accumulations are removed from the aircraft before starting engine.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted at the aircraft (for aircraft preflight) and academically (for personal gear).
2. Evaluation will be conducted at the aircraft (for aircraft preflight) and academically (for personal gear).

REFERENCES: Appropriate common references.

TASK 1024

Perform before starting engine through before leaving helicopter checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Perform procedures and checks in accordance with TM 1-1520-248-10/TM 1-1520-248-CL.
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*).
3. Complete postflight inspection and secure the aircraft.

DESCRIPTION:

1. Crew actions.
   a. Both crewmembers will complete the required checks pertaining to the assigned crew duties using TM 1-1520-248-CL. One or both will clear the area around the aircraft before starting engine.
   b. The pilot on the controls (P*) will announce when starting engine.
   c. Enter appropriate information on DA Form 2408-12, DA Form 2408-13, and DA Form 2408-13-1.
   d. Pilot in command (PC) ensures aircraft is secure before departing.
2. Procedures. Perform the before starting engine checks through before leaving helicopter checks per TM 1-1520-248-CL. Crewmembers will use the checklist to complete checks and procedures appropriate to their crew station. Crewmembers will announce any check that involves an action by the opposite crewmember. The opposite station crewmember will reply with an answer that conveys understanding of the check and status in relation to that specific check. Responses that do not clearly communicate action completion or system status should not be used.

Note: For single pilot operations, the PC will complete all the above tasks.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Before starting the engine, ensure that all internal and external lights are 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 prior to starting engine.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft or cockpit procedural trainer (CPT).
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1026

MAINTAIN AIRSPACE SURVEILLANCE

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards and the following:

1. Clear the aircraft and immediately inform the other crewmember of all air traffic, targets, or obstacles that pose a threat to the aircraft.
2. Announce heading, altitude or position changes.
3. Alert wingman, team, section, and unit to all sightings of other aircraft, obstacles, or unknowns that may pose a threat.
4. Acknowledge alerts of aircraft, obstacles or unknowns.
5. Announce when attention will be focused inside the aircraft.

DESCRIPTION:

1. Crew actions.

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

   b. The pilot not on the controls (P) will inform the pilot on the controls (P*) of any unannounced heading, altitude, attitude or position changes. The P will announce his inability to assist due to concentration inside the aircraft.

   c. 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 (close, mid, and far areas) surveillance of the surrounding airspace. Inform the opposite crewmember or other aircraft by voice radio immediately of any air traffic or obstacles that pose, or may post, a threat. Call out the location of traffic or obstacles by the clock position, altitude, and distance method. (The 12 o'clock position is at the nose of the aircraft.) Give distance in kilometers or fractions of kilometers. When reporting air traffic, specify the type of aircraft (fixed-wing or helicopter) and, if known, the model. Given direction of travel; for example, left to right, right to left, climb, or descent. The altitude of the air traffic should be reported as the same, higher, or lower than the altitude at which you are flying.

   b. Prior to changing altitude or heading, visually clear the aircraft for hazards and obstacles. Hazards and obstacles will be noted by each crewmember and information shared.

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

   NIGHT OR NVD CONSIDERATIONS: The use of proper scanning techniques will assist in detecting traffic, obstacles, and in avoiding spatial disorientation. Hazards such as wires are difficult to detect.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft.

2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1028

PERFORM HOVER POWER CHECK

CONDITIONS: In an OH-58D helicopter with performance planning information available.

STANDARDS:

1. Perform the hover power check near the takeoff point and in the direction of takeoff.
2. Maintain a stabilized 3-foot hover, ±1 foot, and determine that sufficient power is available to complete the mission.

DESCRIPTION:

1. Crew actions.

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

   b. The pilot on the controls (P*) will remain primarily focused outside the aircraft to maintain clearance and announce when the aircraft is stabilized at the appropriate hover height.

   c. The pilot not on the controls (P) will monitor the aircraft instruments. The P will announce hover torque and maximum torque available and alert the P* of the difference. The P will announce when the power check is complete.

2. Procedure. While near the intended takeoff point and in the direction of takeoff, establish the aircraft at a stabilized 3-foot hover. Compare the actual mast torque required to hover with the predicted maximum torque available. Depending on the torque differential, the following takeoff and landing restrictions apply:

   a. Less than 5 percent torque differential. Ensure that adequate room exists for takeoff with minimum or existing power. The destination must allow a normal or shallower-than-normal approach to landing areas with a surface, which will permit a descent to the ground if necessary.

   b. 5 to 9 percent torque differential. Normal approaches and takeoffs may be performed.

   c. 10 to 14 percent torque differential. Steep approaches and instrument takeoffs may be performed.

   d. 15 percent or more torque differential. Takeoff and landing restrictions do not apply.

   e. The aircrew will not attempt the tasks or task elements (or perform any other maneuver requiring an out-of-ground effect [OGE] hover) listed below when the torque differential is less than 15 percent unless an OGE hover power check is successfully completed.

      (1) **TASK 1407, PERFORM TERRAIN FLIGHT TAKEOFF.**

      (2) **TASK 1408, PERFORM TERRAIN FLIGHT (NAP OF THE EARTH [NOE]).**

      (3) **TASK 1409, PERFORM TERRAIN FLIGHT APPROACH.**

      (4) **TASK 1410, PERFORM MASKING AND UNMASKING.**

      (5) **TASK 1411, PERFORM TERRAIN FLIGHT DECELERATION (NOE).**

      (6) **TASK 2125, PERFORM PINNACLE RIDGELINE OPERATIONS.**

      (7) **TASK 2129, PERFORM COMBAT POSITION OPERATIONS.**

Note: Anytime the load or environmental conditions increase significantly (5 degrees Celsius (C), 500 feet pressure altitude (PA), or 200 pounds aircraft weight), additional hover power checks must be performed.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Use proper scanning techniques to avoid spatial disorientation.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1030

PERFORM HOVER OUT-OF-GROUND EFFECT CHECK

CONDITIONS: In an OH-58D with aircraft heading into the wind.

STANDARDS:

1. Do not allow drift to exceed 10 feet during the ascent, descent, or while at a hover.
2. Maintain heading ±10 degrees.
3. Establish a hover altitude of 50 feet or above surrounding obstacles, whichever is higher, ±10 feet.
4. Maintain a constant rate of turn, not to exceed 90 degrees in 4 seconds, while performing the required 360-degree left pedal turn.
5. Determine if aircraft power and controllability are sufficient.
6. Do not exceed 200 feet per minute during the vertical descent.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will acknowledge all drift and obstacle clearance instructions given by the pilot not on the controls (P).

   b. The P will provide drift and obstacle information to the P* and will note the mast torque, engine torque, and TGT values observed. The P will warn the P* if it appears that limitations may be exceeded.

2. Procedures. Vertically ascend to 50 feet or above surrounding obstacles, whichever is higher. Constantly monitor TGT, mast torque, engine torque, and aircraft instruments while not exceeding any limitations. Execute a 360-degree left pedal turn while constantly checking aircraft power and controllability. Terminate the maneuver at an in ground effect (IGE) hover, on the ground, or as required.

Note 1: An out-of-ground effect (OGE) hover check should be verified anytime aircraft controllability or power is in doubt.

Note 2: The position box is not adequate for obstacle avoidance and should not be used as the sole position reference.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: If possible, select an area with good ground contrast and several reference points that are of the same height or higher than the OGE hover. Under NVG, this procedure helps in maintaining a constant altitude and position over the ground during turns.

Note: The ADSS should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1032

Perform radio communication procedures

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Check and operate aircraft radios.
2. Establish and maintain radio contact with the desired unit or air traffic control (ATC) facility.
3. Operate intercom system.
4. Describe two-way radio failure procedures per the flight information handbook (FIH) or host country regulations.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will assign radio frequencies per mission requirements during the crew briefing and will indicate which crewmember will establish and maintain communications.

   b. The pilot on the controls (P*) remains focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will maintain communications on the assigned radios.

   c. The pilot not on the controls (P) will monitor radios and perform frequency changes as directed and will copy/read pertinent information as requested by the P*. In case of two-way radio failure, the P will attempt to reestablish communication.

2. Procedures. Set radios, frequencies, and digital nets as required. Copy pertinent information. Select the proper frequency on the remote frequency display (RFD) as required/directed. Continuously monitor the radios as directed by the PC. Monitor the frequency before transmitting. Use the correct radio call sign when acknowledging each communication. When advised to change frequencies, acknowledge the instructions. Select, or request the other crewmember to select, the new frequency as soon as possible unless instructed to do so at a specified time, control measure, fix, or altitude. Use standard radio communication procedures, terms, and phraseology as appropriate for the area and type of operations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft or cockpit procedural trainer (CPT).
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1038

PERFORM HOVERING FLIGHT

CONDITIONS: In an OH-58D helicopter, with before takeoff check completed and aircraft cleared.

STANDARDS:

1. Takeoff to a hover.
   a. Perform a smooth, controlled ascent to hover.
   b. Establish a hover altitude of 3 feet ±1 foot.
   c. Maintain heading ±10 degrees.
   d. Do not allow drift to exceed 1 foot.
   e. With the aid of TM 1-1520-248-CL, perform the hover checks in the correct sequence.
2. Hovering flight. Maintain a constant rate of movement for existing conditions.
3. Hovering turns.
   a. Maintain a constant rate of turn not to exceed 90 degrees in 4 seconds.
   b. Maintain position over pivot point ±2 feet.
4. Landing from a hover.
   a. Maintain heading ±10 degrees.
   b. Perform a smooth, controlled descent with minimal drift at touchdown.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will announce intent to perform a specific hovering flight maneuver and will remain focused outside the aircraft. The P* will announce the termination of the maneuver.

   b. The pilot not on the controls (P) will assist in clearing the aircraft and will provide adequate warning of obstacles and unannounced or unusual drift/altitude changes. The P will announce when attention is focused inside the cockpit and again when attention is focused outside.

2. Procedures. Control heading, direction of turn, and rate of turn with the pedals. Control altitude, rate of ascent, and rate of descent with the collective. Control position and direction of movement with cyclic.

   a. Takeoff to a hover. With the collective full down, place the cyclic in a neutral position. Increase the collective until the aircraft becomes "light on the skids"; apply pressure and counterpressure on the pedals to ensure the aircraft is free to ascend. Apply pedals as necessary to maintain heading and coordinate the cyclic for a vertical ascent. As the aircraft leaves the ground, check for proper control response and aircraft center of gravity (CG). Upon reaching the desired hover altitude, adjust the flight controls to maintain position over the intended hover point. If sloping conditions are suspected, see Task 1062.

   b. Hovering flight. Adjust the cyclic to maintain a stationary hover or to move in the desired direction. Control heading with pedals and maintain altitude with the collective. Maintain a constant hover speed. To return to a stationary hover, apply the cyclic in the opposite direction while maintaining altitude with collective and heading with the pedals.

c. Hovering turns. Clear the aircraft. Apply pressure to the desired pedal to begin the turn. Use pressure and counter pressure on the pedals to maintain a constant rate of turn. Coordinate cyclic to maintain position over the pivot point while maintaining altitude with the collective. (Hovering turns can be made around the vertical axis, nose, or tail of the aircraft.)

d. Landing from a hover. From a stationary hover, lower the collective to affect a smooth descent to touchdown. Make necessary corrections with the pedals and cyclic to maintain a constant heading and position. On ground contact, ensure that the aircraft remains stable. (If uneven surface conditions are suspected, use pedals to perform a suitability check prior to lowering the collective full down.) Continue decreasing the collective smoothly and steadily until the entire weight of the aircraft is on the ground. Neutralize the pedals and cyclic, and reduce the collective to the fully down position.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Movement over areas of limited contrast, such as tall grass, water, or desert tends to cause spatial disorientation. To avoid spatial disorientation, seek hover areas that provide adequate contrast and use proper scanning techniques. If disorientation occurs, apply sufficient power and execute a takeoff. If a takeoff is not feasible, try to maneuver the aircraft forward and down to the ground to limit the possibility of touchdown with sideward or rearward movement. Maintain a proper scanning technique to avoid spatial disorientation.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

SNOW/SAND/DUST CONSIDERATIONS: During ascent to a hover, if visual references deteriorate to an unacceptable level, continue ascent to a hover altitude above the blowing conditions. The P should keep the P* informed of the location of the snow/sand/dust cloud.

1. 10-foot hover taxi. During takeoff to a hover, simultaneously accelerate the aircraft to a ground speed that keeps the snow/sand/dust cloud behind the main rotor mast. 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 10-foot hover taxi unsafe, determine whether to abort the maneuver, ground taxi, air taxi, or perform a takeoff.

2. 20- to 100-foot air taxi. Use this maneuver when it is necessary to move the aircraft over terrain that is unsuitable for hover taxi. Initiate air taxi the same as for a 10-foot hover, but increase altitude to not more than 100 feet and accelerate to a safe airspeed above effective translational lift (ETL). Ensure that an area is available to safely decelerate and land the aircraft. Under certain conditions (for example, adverse winds), it may be necessary to perform a traffic pattern to optimize conditions at the desired termination point.

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 instrument takeoff if ground reference is lost.

Note: At night, use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust.

Note: Consider the effects of the snow/sand/dust cloud on personnel and equipment in/around the landing area.

MUD/MUSKEG/TUNDRA CONSIDERATIONS: Smoothly increase the collective until the crew confirms that the landing gear is free.

Note: Before performing operations in a mud/muskeg/tundra environment, it is important to understand dynamic rollover characteristics.

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 will be conducted in the aircraft. The normal height for IGE hover is 3 feet. The normal height for OGE hover is 50 feet or greater.
2. Evaluation will be conducted in the aircraft. The normal height for IGE hover is 3 feet. The normal height for OGE hover is 50 feet or greater.

REFERENCES: Appropriate common references.

TASK 1040

PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF

CONDITIONS: In an OH-58D helicopter with a hover power and before takeoff checks complete.

STANDARDS:

1. Initiate takeoff from an appropriate hover altitude or from the ground.
2. Maintain ground track alignment in the takeoff direction with minimum drift.
3. Maintain the aircraft in trim above 50 feet above ground level (AGL).
4. Accelerate to desired airspeed ±10 knots.
5. Maintain desired rate of climb ±100 feet per minute.
6. Maintain takeoff power until reaching desired airspeed for mode of flight.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft during the maneuver and is responsible for clearing the aircraft and obstacle avoidance. The P* will announce whether the takeoff is from the ground or from a hover and intent to abort or alter the takeoff. The P* will consider snow, sand, and obstacle barrier clearance when evaluating the power required versus power available.

   b. The pilot not on the controls (P) will complete the before-takeoff checks and announce when ready for takeoff. The P will remain focused primarily outside the aircraft to assist in clearing the aircraft and to provide adequate warning of obstacles. The P will monitor power requirements and advise the P* if power limits are being approached.

2. Procedures.

   a. Visual meteorological conditions (VMC) takeoff from the ground. Evaluate the winds and determine direction of takeoff. Select reference points to maintain ground track. With the cyclic in the neutral position, increase the collective until the aircraft becomes "light on the skids." Apply pressure and counterpressure on the pedals to ensure the aircraft is free to ascend. Maintain heading with the pedals. Continue increasing the collective until the aircraft leaves the ground. As the aircraft leaves the ground, apply forward cyclic as required to accelerate through effective translational lift (ETL) at an altitude to clear terrain and obstacles. As the aircraft reaches ETL, adjust the cyclic to obtain the desired climb airspeed. Maintain ground track and keep the aircraft aligned with takeoff direction below 50 feet; then place the aircraft in trim above 50 feet AGL. Position the collective to establish the desired rate of climb.

Note: If greater than hover power is used for takeoff; maintain that power setting until approximately 10 knots prior to reaching climb airspeed. Then adjust power as required to establish the desired rate of climb and airspeed. The P should cross-check the instruments.

   b. VMC takeoff from a hover. Evaluate the winds and determine direction of takeoff. Select reference points to maintain ground track. Apply forward cyclic to accelerate the aircraft while maintaining altitude with the collective. Perform the rest of the maneuver the same as a takeoff from the ground.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS:

1. If sufficient illumination or NVG resolution exists to view obstacles, the P* can accomplish the takeoff in the same way as a normal VMC takeoff during the day. Visual obstacles, such as shadows, should be treated the same as physical obstacles. If sufficient illumination or NVG resolution does not exist, the P* should perform an altitude-over-airspeed takeoff to ensure obstacle clearance. The P* may perform the takeoff from a hover or from the ground.

2. Reduced visual references during the takeoff and throughout the ascent at night may make it difficult to maintain the desired ground track. The crew should know the surface wind direction and velocity. This will assist the P* in establishing the crab angle required to maintain the desired ground track.

Note 1: The crew must use proper scanning techniques to avoid spatial disorientation.

Note 2: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

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 all barriers, accelerate to climb airspeed and trim the aircraft.

Note 1: In some cases, applying collective to blow away loose snow/sand/dust from around the aircraft is beneficial before performing this maneuver.

Note 2: The P* should be prepared to transition to instruments if ground reference is lost.

Note 3: At night, use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust.

Note 4: The P should have vertical situation display (VSD) selected and also be prepared to transition to instruments if ground references are lost to aid the P* as necessary.

MUD/MUSKEG/TUNDRA CONSIDERATIONS: Smoothly increase the collective until the crew confirms that the landing gear is free. Adjust controls as necessary to perform a VMC takeoff.
Note: Before performing operations in a mud/muskeg/tundra environment, it is important to understand dynamic rollover characteristics.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft (60 knots indicated airspeed (KIAS) and 500 feet per minute rate of climb is generally used in a training environment.)
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1044

NAVIGATE BY PILOTAGE AND DEAD RECKONING

CONDITIONS: In an OH-58D helicopter, given the appropriate maps, plotter, flight computer, and flight log.

STANDARDS:

1. Maintain orientation within 1/4 mile or 400 meters.
2. Arrive at checkpoints/destination ±3 minutes of estimated time of arrival (ETA).

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will acknowledge commands issued by the pilot not on the controls (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 and airspeed as appropriate to navigate the desired course. The P will use rally terms, specific headings, relative bearings, or key terrain features in accomplishing this task. He will announce all plotted hazards prior to approaching their location, and as workload permits will assist in clearing the aircraft and will provide adequate warning to avoid traffic and obstacles.

2. Procedures. After obtaining current weather forecasts, plan the flight by marking the route and appropriate checkpoints. Compute the time, distance, and heading for each leg of the flight. Use both pilotage and dead reckoning to maintain the position of the aircraft along a planned route. 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 route using actual ground speed. Determine correction for winds, if necessary, so that the airspeed or ground speed and heading can be computed for the remaining legs of the flight. Make heading corrections to maintain the desired course (ground track).

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: More detailed flight planning is required when the flight is conducted at terrain flight altitudes, when visibility is reduced, or in the night or NVG environment. TC 1-204 contains details about night and NVG navigation. Interior cockpit lighting should be considered when selecting colors for preparing navigational aids (for example, maps and knee board notes). Select prominent terrain features as turning points and barriers.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1046

Perform electronically aided navigation

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Prepare the navigation system for operation.
2. Align and update the system as required.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will assign navigation programming/verification duties.
   b. The pilot on the controls (P*) or pilot not on the controls (P) will perform route navigation and position verification as required. The P* will fly the programmed navigation course using appropriate navigation cues provided through the multifunction display (MFD). The P* will acknowledge and verify the new navigation heading.
   c. The P will announce all navigation destination changes and verify the heading.

Note: Only the P will perform in-flight time/labor intensive navigation programming duties. Whenever possible, the P should perform most navigation programming duties.

2. Procedures. During premission planning, the crewmembers determine the navigation data required for entry into the system. Use the waypoint, flight plan, and battlefield graphics pages or air mission planning system to enter the required waypoints and construct the flight plan. During aircraft runup, access the NAV ALIGN page and enter the appropriate data. Operate the navigation system in accordance with the operator's manual.

Note: When the mission dictates single-pilot operation, the above duties are performed by the P*.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft or cockpit procedural trainer (CPT).
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1048

Perform fuel management procedures

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Verify that the required amount of fuel is on board at the time of takeoff.
2. Perform an in-flight fuel consumption check 30 to 60 minutes after level off or entry into mission profile.
3. Initiate an alternate course of action if actual fuel consumption varies from the planning value and the flight cannot be completed with the required reserve.
4. Monitor fuel quantity and consumption rate during the flight.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will brief fuel management responsibilities before takeoff. The PC will initiate an alternate course of action during the flight, if the actual fuel consumption varies from the planning value and the flight cannot be completed with the required reserve.

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

   c. The pilot not on the controls (P) will record initial fuel figures, fuel flow computation, and burnout, and reserve times. The P will announce initiation and completion of the fuel check and the results of the fuel check.

2. Procedures.

   a. Before-takeoff fuel check. Determine the total fuel on board, and compare it with mission fuel requirements determined during premission planning. If the fuel on board is inadequate, have the aircraft refueled or abort/revise the mission.

   b. Initial airborne fuel reading. After the aircraft has leveled off or entered mission profile and appropriate power is set, record the total fuel quantity and the time of reading.

   c. Fuel consumption check. With the aircraft in mission/cruise profile, 30 to 60 minutes after performing the initial airborne fuel reading, record the remaining fuel and time of reading. Compute and record the rate of consumption, burnout, and reserve entry time. Determine if the remaining fuel is sufficient to complete the flight with the required reserve. If the fuel quantity is inadequate, initiate an alternate course of action.

   d. 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 fuel quantity is adequate to complete the flight.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: The P should complete all duties associated with fuel management procedures.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1052

PERFORM VISUAL METEOROLOGICAL CONDITIONS FLIGHT MANEUVERS

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Turns.
   a. Properly clear the aircraft.
   b. Maintain aircraft in trim.
   c. Maintain selected airspeed ±10 knots.
   d. Maintain selected bank angle ±10 degrees.
   e. Maintain altitude ±100 feet.
   f. Roll out on desired heading ±10 degrees.
2. Climbs and descents.
   a. Maintain aircraft in trim.
   b. Maintain selected airspeed ±10 knots.
   c. Maintain rate of climb or descent ± 100 feet per minute.
   d. Maintain desired heading ±10 degrees.
3. Straight and level flight.
   a. Maintain selected airspeed ±10 knots.
   b. Maintain aircraft in trim.
   c. Maintain altitude ±100 feet.
4. Traffic pattern flight. Enter, operate in, and depart a traffic pattern.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance.

   b. The pilot not on the controls (P) will assist in clearing the aircraft and will provide adequate warning to avoid traffic and obstacles. The P will announce when attention is focused inside the cockpit.

2. Procedures.

   a. Visual meteorological conditions (VMC) climb. Increase collective to initiate climb. Adjust pedals to maintain aircraft in trim. Reduce collective to stop climb at desired altitude.

   b. VMC climbing turns. Increase collective to initiate climb. Adjust pedals to maintain aircraft in trim. Apply cyclic in the desired direction of turn. Adjust cyclic as required to stop turn on heading. Reduce collective to stop climb at desired altitude.

   c. VMC straight-and-level flight. Adjust collective to maintain altitude. Adjust pedals to maintain aircraft in trim. Maintain airspeed and heading.

   d. VMC level turns. Apply cyclic in the desired direction of turn. Adjust collective to maintain altitude. Adjust pedals to maintain aircraft in trim. Apply cyclic opposite the direction of turn to stop the turn on the desired heading.

e. VMC descents. Decrease collective to initiate the descent. Adjust pedals to maintain aircraft in trim. Increase collective to stop rate of descent at the desired altitude.

f. VMC descending turns. Decrease collective to initiate descent. Adjust pedals to maintain aircraft in trim. Apply cyclic in the desired direction of turn. Adjust cyclic as required to stop turn on desired heading. Increase collective to stop descent at desired altitude.

g. Traffic pattern flight.

(1) Maneuver the aircraft into position to enter the downwind leg midfield at a 45-degree angle (or according to local procedures), at traffic pattern altitude, and at the desired airspeed. (A straight-in or base-leg entry may be used if approved by air traffic control [ATC].) On downwind, complete the before-landing check. Prior to turning base, reduce power and airspeed as required and initiate a descent. If performing a straight-in or a base-leg entry, reduce airspeed at a point to facilitate a normal approach. Turn base and final leg, as appropriate, to maintain the desired ground track. Execute the desired approach. Announce and clear each turn in the pattern and the type of approach planned.

(2) For a closed traffic pattern after takeoff, climb straight ahead at climb airspeed to the appropriate altitude, turn to crosswind, and continue the climb. Initiate the turn to downwind as required to maintain the desired ground track. Adjust power and attitude, as required, to maintain traffic pattern altitude and airspeed.

h. Before-landing check.

(1) Ensure that the before-landing check is completed.

(2) Call out the before-landing check and announce when it is completed. The other crewmember will acknowledge that the before-landing check is complete.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Maintain a continuous coordinated turn to the downwind leg and establish airspeed and altitude as required. Initiate the turn from downwind when in a position to make a continuous coordinated turn to the final approach course.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

OVERWATER/SNOW/SAND CONSIDERATIONS (LIMITED CONTRAST AREAS): Flight over areas of limited contrast, especially at night, 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 altitude warning may used to assist in altitude control. Hazards to terrain flight (for example, harbor lights, buoys, wires, and birds) must also be considered during overwater flight.

TRAINING AND EVALUATION REQUIREMENTS:

Note: VMC flight maneuvers can be trained and evaluated completely separate from, or as components of, a traffic pattern.

1. Training will be conducted in the aircraft. For traffic pattern training, the recommended airspeed is 60 knots indicated airspeed (KIAS) on crosswind and base legs and 80 KIAS on the downwind leg. For NVG training in the traffic pattern, the recommended maximum airspeed is 80 KIAS, and the recommended maximum bank angle is 30 degrees.
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1058

PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Select a suitable landing area.
2. Establish the proper altitude to clear obstacles on final approach and maintain altitude ±100 feet.
3. Establish entry airspeed ±10 knots.
4. Maintain ground track alignment with the landing direction, as appropriate.
5. Maintain the appropriate approach angle and rate of closure necessary for the conditions.
6. Perform a smooth and controlled termination to a hover or to the ground.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will announce the beginning of the approach, whether the approach will terminate to a hover or to the ground, the intended point of landing, and any deviation to the approach.

   b. The pilot not on the controls (P) will confirm the suitability of the area, assist in clearing the aircraft, and provide adequate warning of traffic or obstacles. The P will acknowledge any intent to deviate from the approach and will announce when attention is focused inside the cockpit.

2. Procedures. Evaluate the winds and determine direction of landing. 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 above ground level (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, touchdown), or until a decision is made to perform a go-around.

   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.) Touchdown 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.

   c. Go-around. Perform a go-around if a successful landing is doubtful or if visual reference with the intended termination point is lost. Once climb is established, reassess the situation

   and develop a new course of action. Hover out-of-ground effect (OGE) power may be required in certain situations. Evaluate power required versus power available.

Note 1: Airspeed indications are unreliable below 20 knots.

Note 2: Steep approaches can place the aircraft in potential settling-with-power conditions. The crew must be familiar with diagnosing and correcting these situations.

Note 3: If a visual approach path indicator (VAPI) system is used during a visual meteorological conditions (VMC) approach, the crew must determine the type of system used and follow the instructions described in the flight information handbook (FIH) for course and altitude indications.

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.

NIGHT OR NIGHT VISION GOGGLES (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, reduce airspeed to approximately 40 to 45 knots until apparent ground speed and rate of closure appear to be increasing. Progressively decrease the rate of descent and forward speed until termination.
2. Surrounding terrain or vegetation may decrease contrast and degrade 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. Hazards, especially wires, are more difficult to detect at night. Thorough premission planning is required.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and in maintaining attitude and altitude.

SNOW/SAND/DUST CONSIDERATIONS:

1. Termination to a point OGE. Terminate to a stationary OGE hover over the touchdown area. This approach requires OGE power and may be used for most snow landings and some sand/dust landings. Slowly lower the collective and allow the aircraft to descend. The descent may be vertical or with forward movement. The rate of descent will be determined by the rate in which the snow/sand/dust is blown from the intended landing point. During the descent, remain above the snow/sand/dust cloud until it dissipates and the touchdown point can be seen. Both crewmembers should be focused outside the cockpit. Be prepared to execute a takeoff.
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. Maintain the minimum rate of closure that ensures that the snow/sand/dust cloud remains behind the pilot's station. When the skids contact the snow/ground, lower the collective and allow the aircraft to settle. Apply slight aft cyclic at touchdown to prevent snagging the skid toes. The P should keep the P* informed of the location of the snow/sand/dust cloud. Be prepared to execute a go-around.

3. Termination to the surface with no forward speed. This termination should be made to landing areas where slopes, obstacles, or unfamiliar terrain preclude a landing with forward speed. It is not recommended when new or powder snow or fine dust is present because whiteout/brownout conditions may occur. The termination is made directly to a reference point on the ground with no forward speed. The P should keep the P* informed of the location of the snow/sand/dust cloud. Be prepared to execute a go-around.

Note 1: When landing in deep snow, the aircraft skids may settle at different rates and the aircraft will normally terminate in a tail low attitude.

Note 2: 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 3: At night, use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft. 60 knots is recommended for entry airspeed.
2. Evaluation will be conducted in the aircraft. 60 knots is recommended for entry airspeed.

REFERENCES: Appropriate common references.

TASK 1062

PERFORM SLOPE OPERATIONS

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Select a suitable landing area.
2. Do not exceed aircraft slope limits.
3. Maintain heading ±5 degrees.
4. Maintain drift within ±1 foot.
5. Perform a smooth, controlled descent and touchdown.
6. Perform a smooth, controlled ascent.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will announce his intent to perform a slope operation and should be aware of the common tendency to over control the aircraft during slope landings.

   b. The pilot not on the controls (P) will assist in clearing the aircraft and will provide adequate warning of obstacles, drift, or altitude changes. The P will assist in confirming the suitability of the intended landing area and will announce when attention is focused inside the cockpit.

2. Procedures.

   a. Landing. Select a suitable area for slope operations that appears to not exceed slope limitations. The degree of the slope should not be so great as to create a need for large cyclic inputs. If possible, orient the aircraft into the wind. Select a reference to determine the roll angle during the execution of the maneuver. Announce the initiation of the slope landing. Smoothly lower the collective until the upslope skid contacts the ground. Adjust the cyclic to maintain the aircraft in a level attitude while maintaining heading with the pedals. Coordinate the collective and cyclic to control the rate of attitude change to lower the downslope skid to the ground. With the entire weight of the aircraft on the ground, simultaneously lower the collective 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 raise the collective and apply the cyclic into the slope to maintain the position of the upslope skid. Continue to raise the collective, maintain heading with the pedals, and simultaneously adjust the cyclic to level the aircraft laterally. As the aircraft leaves the ground, adjust the cyclic to accomplish a vertical ascent to a hover with minimum drift.

Note: Before conducting slope operations, the crew must understand dynamic rollover characteristics.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: The degree of slope is difficult to determine using the NVGs. Select reference points to determine slope angles. (References will probably

be limited and difficult to ascertain.) Determine the need for artificial illumination prior to starting the maneuver. If successful completion of the landing is doubtful at any time, abort the maneuver. Both crewmembers should focus outside the cockpit.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1066

PERFORM A RUNNING LANDING

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Select a suitable landing area.
2. Establish the proper altitude to clear obstacles on final approach and maintain altitude ±100 feet.
3. Establish entry airspeed ±10 knots.
4. Maintain the proper approach angle to clear obstacles.
5. Maintain heading control and ground track alignment with the landing direction ±10 degrees.
6. Execute a smooth and controlled termination.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft during the maneuver.

   b. The pilot not on the controls (P) will remain focused outside the aircraft to assist in clearing and to provide adequate warning of obstacles or traffic. The P will announce when attention is focused inside the cockpit.

2. Procedures. On final approach, determine an approach angle, which allows safe obstacle clearance to arrive at the intended point of landing. Once the approach angle is intercepted, adjust the collective as necessary to establish and maintain the angle. Maintain entry airspeed until apparent ground speed and rate of closure appear to be increasing. Control the rate of descent at touchdown with the collective. Maintain aircraft attitude and landing alignment with the cyclic and heading with the pedals. The touchdown speed may vary from, at, above, or below effective translational lift (ETL) as dictated by landing area conditions. After ground contact, ensure the aircraft remains stable as the collective is lowered to reduce ground run. Once the aircraft has come to a complete stop, reduce the collective to the full down position and neutralize the pedals and cyclic.

   Note: Airspeed indications below 20 knots are unreliable.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: 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, reduce airspeed to approximately 40 to 45 knots until apparent ground speed and rate of closure appear to be increasing. Progressively decrease the rate of descent and forward speed until termination.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1070

Respond to emergencies.

CONDITIONS: In an OH-58D or academically given the indications of an emergency condition or specific malfunction.

STANDARDS:

1. Recognize, announce, and analyze indications of an emergency. Perform or describe all immediate action procedures in TM 1-1520-248-10/TM 1-1520-248-CL.
2. Perform appropriate emergency procedures.
3. Make mayday call, jettison weapon system (if necessary), lock shoulder harness, and tune transponder to emergency if required based on type of emergency.

DESCRIPTION:

1. Crew actions. When either crewmember detects an emergency situation, one will immediately alert the other crewmember.
   a. The pilot on the controls (P*) will perform or direct the pilot not on the controls (P) to perform the underlined steps in TM 1-1520-248-10/TM 1-1520-248-CL and will initiate the appropriate type of landing, if required for the emergency.
   b. The P will perform as directed or briefed and if time permits, will verify all emergency checks with TM 1-1520-248-10/TM 1-1520-248-CL. The P will request appropriate emergency assistance as described in the flight information handbook (FIH).
2. Procedures. At the first indication of a warning/caution/advisory message, abnormal aircraft noise, and/or odor, make an announcement. Identify the malfunction and perform the appropriate emergency procedure.

TRAINING CONSIDERATIONS: This task is used for the cockpit procedural trainer (CPT) or academic training and evaluation of emergency procedures from the operator's manual that do not have corresponding tasks in this aircrew training manual (ATM). This task does not prevent the conduct of any training in the aircraft that is not specifically prohibited by this ATM or the operator's manual.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and the FIH.

TASK 1072

RESPOND TO ENGINE FAILURE AT A HOVER

CONDITIONS: In an OH-58D helicopter with an instructor pilot (IP), in an approved touchdown area, with the mast-mounted sight (MMS) off, at hover altitude.

STANDARDS:

1. Execute the appropriate immediate action steps.
2. Maintain heading ±10 degrees.
3. Do not allow lateral drift to exceed 3 feet.
4. Execute a smooth, controlled descent and touchdown with no rearward drift.

DESCRIPTION:

1. Crew actions.

   a. The IP will confirm suitability of the landing area and comply with army regulations and local requirements prior to initiating the maneuver. The IP will announce "hovering auto" when retarding the throttle and will monitor the position of the aircraft and take corrective action if necessary.

   b. Upon detecting engine failure, the pilot on the controls (P*) will focus outside the aircraft and adjust the flight controls as necessary to land.

   c. The pilot not on the controls (P) will assist the P* as directed.

2. Procedures. Upon detecting engine failure, maintain heading with the pedals and correct any lateral or rearward drift with the cyclic. If the maneuver is initiated while the aircraft is moving forward over a smooth or prepared surface, adjust the cyclic to attain a landing attitude while avoiding a tail-low condition. Make ground contact with some forward speed. When the helicopter is resting firmly on the ground, smoothly lower the collective to the full-down position while simultaneously neutralizing the pedals and cyclic.

Note: Do not use heading hold during this maneuver.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Select an area with good contrast and several good reference points to assist in maintaining present position. Determine the need for artificial illumination prior to starting the maneuver.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1074

RESPOND TO ENGINE FAILURE AT CRUISE FLIGHT

CONDITIONS: In an OH-58D helicopter with an instructor pilot (IP), mast-mounted sight (MMS) stowed, minimum entry altitude of 1200 feet above ground level (AGL), and termination as directed (power recovery or terminate with power).

STANDARDS:

1. Recognize the emergency, determine the appropriate corrective action, and perform or simulate as required, from memory, all immediate action procedures described in TM 1-1520-248-CL.
2. Select a suitable landing area.
3. Correctly terminate the maneuver as directed by the IP.
4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew actions.

   a. The IP will confirm suitability of the landing area and comply with army regulations and local requirements prior to initiating the maneuver. The IP will announce "simulated engine failure" when retarding the throttle and will monitor the position of the aircraft and take corrective action if necessary.

   b. Upon detecting engine failure, the pilot on the controls (P*) will focus outside the aircraft and adjust the flight controls as necessary to land.

   c. The pilot not on the controls (P) will assist the P* as directed.

2. Procedures. Upon detecting engine failure, the P* will lower the collective to maintain rotor revolutions per minute (RPM) within limits while simultaneously adjusting the pedals to trim the aircraft. The P* will select a suitable landing area and will also use turns and vary the airspeed (between minimum rate of descent and maximum glide), as necessary, to maneuver the aircraft for a safe landing at the intended landing area. The final approach should be generally into the wind. The P* will call out rotor RPM, gas producer, and aircraft in trim. The P* will also simulate setting the emergency communications (EMERG COMM) switch to emergency and making a Mayday call to the appropriate agency. The P* will complete or simulate emergency procedures outlined in TM 1-1520-248-CL and if time permits will direct the P to verify the procedures. The crew should plan each forced landing as continuing to the ground. With the aircraft in a safe autorotative profile, the IP will smoothly advance the throttle to the full open position prior to descending below 400 feet AGL and will state one of the two commands described below.

   a. Power recovery. Upon receiving the command "power recovery," the P* will maintain trim with pedals and continue autorotative descent as the IP confirms normal operating RPM by throttle pressure with springback and by visually checking that the NP RPM is at 100 percent. When operating RPM has been confirmed, the P* will apply sufficient collective to establish a normal climb. The P* will complete the recovery prior to reaching 200 feet AGL.

b. Terminate with power. Upon receiving the command "terminate with power," the P* will continue the autorotative descent. The IP will confirm normal operating revolutions per minute with throttle pressure with springback and visually checking that the NP RPM is at 100 percent. The P* will trim the aircraft with the pedals and continue autorotative descent. During the final portion of the approach, the P* will apply sufficient power and collective pitch to decrease the rate of descent to zero at 3 to 5 feet AGL with the aircraft in a landing attitude. The airspeed at this point should be the same as if an actual touchdown were to be effected. The P* will maintain proper trim throughout the maneuver with the pedals, and maintain an altitude of 3 to 5 feet until the aircraft is brought to a stationary hover.

Note: Do not use heading hold during this maneuver.

Note: If time permits during the descent, the IP will announce, "THROTTLE CONFIRMED" when certain that the engine is back to operating revolutions per minute.

Note: The IP should continue checking the throttle throughout the maneuver to ensure it is full open.

Note: It is the IP's responsibility to manipulate the throttle during this task. However, provisions should be made during the crew briefing to allow the P* (as a backup) to verify the throttle is full open.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Altitude, apparent ground speed, rate of closure, and rate of descent are difficult to estimate during night and NVG flight modes. Aircraft altitude and rate of descent should be closely monitored by both the P* and the P. Determine the need for artificial illumination prior to starting the maneuver.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used to help in maintaining attitude, airspeed, and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1078

RESPOND TO STABILITY AND CONTROL AUGMENTATION SYSTEM (SCAS) MALFUNCTION

CONDITIONS: In an OH-58D helicopter with an instructor pilot (IP).

STANDARDS:

1. Maintain task standards (heading, altitude, and airspeed) as described for **TASK 1040 (PERFORM A VMC TAKEOFF), TASK 1058 (PERFORM VMC APPROACH), AND TASK 1052 (PERFORM VMC FLIGHT MANEUVERS).**
2. Maintain a constant approach angle.

DESCRIPTION:

1. Crew actions.

   a. The IP will monitor the actions of the pilot on the controls (P*) and take corrective action, if necessary.

   b. The P* will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will announce when disengaging the stability and control augmentation system (SCAS).

   c. The pilot not on the controls (P) will assist the P* as directed.

2. Procedures. While on downwind, press the SCAS release switch on the pilot's cyclic to disengage the SCAS. Adjust airspeed as necessary to attain the most comfortable level of control movements. Continue the traffic pattern until intercepting a shallow approach angle and then decrease the collective as required to establish and maintain the selected angle. Maintain entry airspeed until apparent ground speed and rate of closure appear to be increasing. At this time progressively decrease the rate of descent and forward speed to facilitate termination of the approach. Termination of the approach may be either to the ground or to a hover as appropriate. If to a hover, the aircraft will be landed prior to re-engaging the SCAS.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Select an area with good contrast and several good reference points to assist in maneuvering the aircraft. Determine the need for artificial illumination prior to starting the maneuver.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1082

PERFORM AUTOROTATION

CONDITIONS: In an OH-58D helicopter with an instructor pilot (IP); aircraft heading into the wind; in an approved touchdown area; with the mast-mounted sight (MMS) off.

STANDARDS:

1. Establish an entry altitude of 3 feet, ±1 foot.
2. Maintain heading ±10 degrees.
3. Maintain position over ground ±1 foot.
4. Execute a smooth and controlled descent and touchdown.

DESCRIPTION:

1. Crew actions.

   a. The IP will confirm suitability of the landing area, and ensure all army regulations and local requirements are met prior to the maneuver. The IP will brief the conduct of the maneuver and will ensure obstacle avoidance, monitor the aircraft position, and take corrective action if necessary.

   b. The pilot on the controls (P*) will focus outside the cockpit and acknowledge the IP's briefing and will announce initiation of the maneuver. Upon completion of the autorotation, the P* will increase power turbine speed (Np) to 100 percent and announce the throttle is full open.

   c. The pilot not on the controls (P) will assist the P* as directed.

2. Procedures. From a stabilized 3-foot hover into the wind, retard the throttle to engine idle stop. (While retarding the throttle, do not raise or lower the collective.) Apply right pedal as necessary to maintain heading and adjust the cyclic to maintain position over the ground. As the helicopter settles, apply sufficient collective to make a smooth descent and touchdown. Do not stop the descent by over applying the collective; be alert for lateral or rearward drift. When the helicopter is resting firmly on the ground, smoothly lower the collective to the full-down position while simultaneously neutralizing the pedals and cyclic.

   Note: Do not use heading hold during this maneuver.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Select an area with good contrast and several good reference points to assist in maintaining present position. Determine the need for artificial illumination prior to starting the maneuver.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1100

PERFORM ANALOG THROTTLE OPERATIONS

CONDITIONS: In an OH-58D helicopter with an instructor pilot (IP).

STANDARDS:

1. Maintain task standards as described for **TASK 1040 (PERFORM VMC TAKEOFF)**, **TASK 1058 (PERFORM VMC APPROACH)**, and **TASK 1052 (PERFORM VMC FLIGHT MANEUVERS)**.
2. Maintain the throttle in the full-open position.
3. Maintain aircraft at or above 500 feet above highest obstacle (AHO) prior to switching the fuel control mode.
4. Maintain mast torque at or below 60 percent when switching to the digital mode.

> **CAUTION**
>
> In the analog mode, the revolutions per minute (RPM) trim switch, collective anticipation, start temperature limiting, and RPM surge protection are inactive.

DESCRIPTION:

1. Crew actions.

   a. The IP will monitor the actions of the pilot on the controls (P*) and take corrective action if necessary.

   b. The P* will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will coordinate with the pilot not on the controls (P) when switching electronic supervisory control (ESC) modes.

   c. The P will perform as directed by the P* when switching ESC modes and will provide obstacle avoidance and announce when focused inside the aircraft.

2. Procedures. While on downwind with the before-landing check completed, place the normal analog (NORM-ANLG) backup switch to the ANLG backup position. Maintain the throttle in the full-open position throughout the maneuver. Execute a visual meteorological conditions (VMC) approach. After landing, with the before takeoff check completed, execute a VMC takeoff. On downwind, place the NORM-ANLG backup switch to the NORM position.

Note: Maneuvers requiring out-of-ground effect (OGE) capability will not be performed while operating in the ANLG back up mode.

CAUTION

When switching from normal to analog and from analog to normal, the aircrew will notice a momentary drop in rotor speed (Nr)/power turbine speed (Np) in powered flight (collective applied).

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Select an area with good contrast and several good reference points to assist in maneuvering the aircraft. Determine the need for artificial illumination prior to starting the maneuver.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude, airspeed, and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft. The following tasks may be performed while in the ESC back up mode—
   a. **TASK 1038, PERFORM HOVERING FLIGHT (in-ground effect [IGE] ONLY).**
   b. **TASK 1040, PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF.**
   c. **TASK 1052, PERFORM VISUAL METEOROLOGICAL CONDITIONS FLIGHT MANEUVERS.**
   d. **TASK 1058, PERFORM VISUAL METEOROLOGICAL CONDITIONS APPROACH.**
   e. **TASK 1062, PERFORM SLOPE OPERATIONS.**
   f. **TASK 1072, RESPOND TO ENGINE FAILURE AT A HOVER.**
   g. **TASK 1082, PERFORM AUTOROTATION.**
   h. Task 1176, Perform nonprecision approach (ground-controlled approach [GCA]).
   i. Task 1178, Perform precision approach (GCA).
   j. Task 1180, Perform emergency global positioning system (GPS) recovery procedure.
   k. Task 1182, Perform unusual attitude recovery.
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1102

PERFORM MANUAL THROTTLE OPERATIONS (FULL AUTHORITY DIGITAL ELECTRONIC CONTROL)

WARNING

Underspeed below 95 percent rotor speed (Nr) can cause unrecoverable rates of descent during final approach. Instructor pilots (IPs) must be prepared to take corrective action anytime it becomes apparent the standards will be exceeded.

CONDITIONS: In an OH-58D(R) helicopter with an instructor pilot (IP), with the mast-mounted sight (MMS) off, during the day only, surface winds 20 knots or less, maximum gust spread of 10 knots, and no more than light turbulence.

CAUTION

Manual throttle operations with winds greater than 10 knots and/or a gust spread greater than 5 knots can be very difficult depending upon the experience of the IP and the pilot.

STANDARDS:

1. Recognize the emergency and determine the appropriate corrective action.
2. Perform or simulate, from memory, all immediate action procedures outlined in TM 1-1520-248-CL.
3. Maintain revolutions per minute (RPM) rotor speed (Nr)/power turbine speed (Np) 100 percent ±5 percent.
4. Smoothly coordinate throttle and collective controls.

CAUTION

In the manual mode, Np governing, engine gas generator speed (Ng) governing, turbine gas temperature (TGT) limiting, engine torque limiting, limit override logic, engine surge detection/avoidance, and flameout detection/auto-relight are not available. Smooth and coordinated throttle and collective adjustments are required to prevent engine overspeed, underspeed, overtemperature, surges, or compressor stall. Closely monitor Nr, Np, Ng, and TGT.

DESCRIPTION:

1. Crew actions.

   a. The crew must divide their attention to maintain airspace surveillance, obstacle avoidance, and maintain RPM within limits. The IP will inform the pilot on the controls (P*) of all obstacles and will confirm aircraft clearance during all turns. The IP will provide adequate warning for corrective action if maximum engine operating limits may be exceeded. The IP/pilot not on the controls (P) will manipulate the full authority digital electronic control (FADEC) auto/manual push-button switch as required and acknowledge any intent to deviate from the planned maneuver.

   b. The P* will coordinate with the P for manipulation of the FADEC auto/manual switch.

   c. The P will perform as directed by the P* when switching to and from the auto and manual position. During the maneuvers the P will provide obstacle avoidance and announce when focused inside the aircraft.

2. Procedures.

   a. Switching from automatic to manual mode on the ground—While the aircraft is on the ground with the throttle reduced to idle and the collective full down, the IP/P will press the FADEC auto/manual button to the manual position. The P* will adjust the throttle to 100 percent Nr and will bring the aircraft to a stabilized hover while adjusting the throttle carefully to maintain RPM.

> **CAUTION**
>
> When switching from automatic to manual mode the aircrew may notice either an increase or a decrease in Nr/Np. When switching from automatic to manual mode at a hover/in flight, the aircraft will be positioned over a suitable forced landing area. When switching from automatic to manual mode in flight, maintain an altitude that will ensure obstacle clearance should there be a decrease in Nr/Np.

   b. Switching from automatic to manual mode in flight (failed fixed simulation)—While the aircraft is at a stationary hover or in level flight with cruise/hover power applied, the IP will announce "FADEC fail." The P* will react to the FADEC failure by reducing the throttle as appropriate for the conditions and maintain the collective position. The P will then press the FADEC auto/manual button to the manual position. The P* will then smoothly adjust the collective as necessary to gain control of the RPM and will adjust the throttle and collective as necessary to maintain RPM.

   c. Switching from automatic to manual mode in flight (failed to manual simulation)—While the aircraft is at a stationary hover or in level flight with cruise/hover power applied, the IP/P will press the FADEC auto/manual button to the manual position and announce "FADEC manual." The P* will react to the FADEC audio tone by immediately reducing the throttle as appropriate for the conditions and smoothly adjust the collective as necessary to gain control of the RPM, then adjust the throttle and collective as necessary to maintain RPM.

CAUTION

Switching from manual to automatic mode in flight should not be accomplished with the Nr below 96 percent unless safe outcome of the maneuver is in doubt. This prevents rapid torque increases, which may exceed limitations.

d. Switching from manual to automatic mode—Switching the FADEC to the automatic mode may be performed on the ground, (with the throttle reduced to idle and the collective full down), at a hover or in flight. To switch to the automatic mode press the FADEC auto/manual button to the auto position. Confirm that the auto legend on the button is illuminated; then adjust the throttle to the full open position while ensuring that the FADEC system operates properly and maintains 100 percent Nr.

Note 1: In the manual mode the collective is the most effective means of controlling Nr due to reduced throttle response rates.

Note 2: In case of an actual in-flight emergency that requires FADEC manual mode operation, the crew must use the procedures in TM 1-1520-248-10 or TM 1-1520-248-CL.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the OH-58D(R) helicopter in accordance with appendix B. Only the following maneuvers may be performed while conducting FADEC manual mode training/evaluations:

   a. Hovering flight.

   b. Visual meteorological conditions (VMC) takeoff.

   c. VMC flight maneuvers.

   d. Running landing (as described in appendix B).

   e. VMC approach.

Note: For initial qualification, crewmembers must be trained and demonstrate proficiency to a running landing technique as described in appendix B, and may be trained to terminate the maneuver with a VMC approach.

2. Evaluation. Crewmembers must demonstrate proficiency to terminate with a running landing and may be assessed to terminate with a VMC approach. IPs/SPs must demonstrate proficiency in both approaches.

REFERENCES: Appropriate common references.

TASK 1142

Perform digital communication

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Configure the Improved Data Modem (IDM)/Blue Force Tracker (BFT) for desired operations.
2. Access and review situational awareness displays provided by IDM/BFT.
3. Transmit and receive air missions using the IDM/BFT.
4. Operate the IDM/BFT messaging systems.

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) (left seat) will operate the system and announce when focused inside the cockpit.

2. Procedures. Configure the IDM/BFT in accordance with the unit standing operating procedure (SOP) and operate it in accordance with the operator's manual.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. When operating the system, the P must not distract the P*'s attention away from flying the aircraft. The P should assist the P* with obstacle avoidance and clearing the aircraft and announce when doing so.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft or cockpit procedural trainer (CPT).
2. Evaluation will be conducted in the aircraft.

REFERENCE: Appropriate common references

TASK 1155

NEGOTIATE WIRE OBSTACLES

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Locate and determine the height of wires.
2. Determine the method (underflight or overflight) to negotiate the wire obstacle.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will determine if under flight of the wire obstacles will be performed.

   b. The pilot on the controls (P*) will focus primary attention scanning outside the aircraft and will confirm visual contact with wires and supporting structures. The P* is responsible for clearing the aircraft and obstacle avoidance.

   c. The pilot not on the controls (P) will assist with clearing the aircraft and will announce adequate warning to avoid hazards, wires, and poles or supporting structures. The P also will announce when the aircraft is clear, and when focused inside the aircraft.

2. Procedures.

   a. Program known wire hazards and other obstacles through the air mission planning system and download to the data transfer cartridge (DTC)/data transfer module (DTM) before flight. During terrain/tactical flight, display on horizontal situation display (HSD). During the mission search for wires and other hazards to flight.

   b. Announce when wires/obstacles are seen and specify the direction and distance to them.

   c. Accurately determine the amount of clearance between the wires and the ground. Locate guy wires and supporting poles. Determine the method of negotiating the wires and initiate the maneuver.

      (1) Overflight. Identify the top of the pole and the highest wire. Cross near a pole to aid in estimating the highest point. Minimize the time that the aircraft is unmasked.

      (2) Underflight. When crossing under wires, the lowest point of the wire must be at least 25 feet plus hover height, above the ground. This means if hovering at 5 feet above the ground or obstacles, the lowest point of the wire must be 30 feet above the ground or obstacles. Ground speed will be as appropriate for given conditions. Ensure lateral clearance from guy wires and poles.

Note 1: Since the aircraft is approximately 13 feet in height from the skids to the top of the mast-mounted sight (MMS), there will be at least 12 feet of clearance from the lowest point of the wires to the MMS when crossing under wires.

Note 2: The crew must maintain proper scanning techniques to ensure obstacle avoidance and aircraft clearance.

Note 3: The P can use the MMS and radar altimeter as aids in determining the height of the wires.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Wires are difficult to detect at night with NVGs. For training, under flight of wires will not be performed unless the location has been checked during daylight conditions and all hazards have been identified. Both crewmembers should be focused outside the cockpit.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude, airspeed, and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1164

Perform video image crosslink operation

CONDITIONS: In an OH-58D equipped with video image cross-link operation (VIXL).

STANDARDS:

1. Capture and save the desired image to the VIXL list.
2. Transmit the desired VIXL image.
3. Receive a VIXL image.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for obstacle avoidance and clearing the aircraft. The P* will announce any maneuver or movement prior to execution.

   b. The pilot not on the controls (P) will operate the mast-mounted sight (MMS)/VIXL system. The P will announce when attention is focused inside the cockpit. Duties permitting, the P will assist the P* in clearing the aircraft.

2. Procedures.

   a. Complete a VIXL setup prior to transmitting an image (if not already done). When the MMS is on the desired image, press the image capture button. Store the image. If desired, review the image prior to transmission. Notify the receiving station of the intent to transmit. Send the image.

   b. Complete a VIXL setup prior to receiving an image (if not already done). Place the radio into secure mode and activate the enable mode when directed by the sending station. View the image and advise the sender.

> **CAUTION**
>
> When operating the VIXL the P must not distract the P* away from flying the aircraft.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. When maneuvering the aircraft to maintain the MMS on target the P* must consider obstacles and other aircraft. The P should assist the P* with obstacle avoidance and clearing the aircraft and announce when doing so.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1170

PERFORM INSTRUMENT TAKEOFF

CONDITIONS: In an OH-58D helicopter with reference to flight instruments only.

STANDARDS:

1. Set attitude indicator.
2. Maintain required takeoff power ±2 percent mast torque.
3. Maintain accelerative climb attitude ±1 bar width.
4. Maintain takeoff heading ±10 degrees.
5. Maintain aircraft in trim after effective translational lift (ETL).
6. Maintain appropriate rate of climb ±100 feet per minute.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily inside the aircraft on the instruments. The P* will follow the heading/course, altitude, issued by air traffic control (ATC)/pilot not on the controls (P). The P* will announce any deviation not directed by ATC/P and will acknowledge all navigation directives.

   b. The P will assist the P* by warning of drift or excessive roll of the aircraft. The P will verify climb and airspeed and assist the P* as necessary to prevent fixation and spatial disorientation. The P will perform duties as directed and will acknowledge any unannounced deviations. During simulated instrument meteorological conditions (IMC), the P will remain focused outside the aircraft to provide adequate warning for avoiding obstacles and hazards detected.

2. Procedures.

   a. From the ground. Align the aircraft with the desired takeoff heading. Set/confirm the attitude indicator for takeoff (approximately 4 degrees nose high). With the cyclic in the neutral position, smoothly increase the collective until the aircraft becomes light on the skids. Use outside visual references to prevent movement of the aircraft and check controls for proper response. Apply pressure and counter-pressure on the pedals to ensure the aircraft is free to ascend. While referring to the flight instruments, smoothly increase the collective to obtain takeoff power. As the collective is increased, cross-check the attitude indicators to ensure proper attitude (approximately 4 degrees nose high) and constant heading. When takeoff power is reached and the altimeter shows a positive climb, adjust to level pitch attitude for the initial acceleration. Maintain heading with pedals until airspeed increases (generally 20 to 30 knots indicated airspeed [KIAS]) and then make the transition to coordinated flight. Upon reaching climb airspeed (approximately 60 KIAS), adjust the controls as required to maintain desired climb airspeed.

   b. From a hover. On the runway or takeoff pad, align the aircraft with the desired takeoff heading. Set/confirm the attitude indicator for takeoff (approximately 4 degrees nose high). And check the controls for proper response. Establish the aircraft at 3 foot hover. Initiate the takeoff by smoothly and steadily increasing the collective until takeoff power is reached. Simultaneously adjust pitch attitude as necessary to establish initial accelerative climb attitude. Visually maintain runway clearance and alignment on takeoff until the aircraft accelerates through ETL. At that time the P* will direct attention to the flight instruments and establish an instrument cross-check.

Note 1: Takeoff power will normally be 10 percent above mast torque required for hover.

Note 2: Cross-check the vertical situation display (VSD) with the standby flight instruments throughout the maneuver.

Note 3: Practicing this task at night provides greater benefit since external cues are less visible.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1176

Perform nonprecision approach (ground-controlled approach)

CONDITIONS: In an OH-58D helicopter with reference to flight instruments only. Given the appropriate Department of Defense (DOD) flight information publication (FLIP), an approach clearance, and with before-landing check complete.

STANDARDS:

1. Perform the approach per AR 95-1, FM 1-240, and the DOD FLIP.
2. Maintain airspeed ±10 knots indicated airspeed (KIAS).
3. Maintain assigned altitude ±100 feet.
4. Maintain heading ±5 degrees.
5. Make immediate corrections issued by air traffic control (ATC).
6. Comply with descent minimums prescribed for the approach.
7. Execute the correct missed approach procedure immediately upon reaching the missed approach point (MAP) if a landing cannot be accomplished.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily inside the aircraft on the instruments and perform the approach. The P* will follow the heading/course, altitude, and missed approach instructions issued by ATC/pilot not on the controls (P) and will announce any deviation not directed by ATC/P and will acknowledge all navigation directives. If visual contact with the landing environment is not made by the MAP, the P* will announce and execute a missed approach.

   b. The P will perform duties as directed by the P* and will call out the approach procedure to the P* and will acknowledge any unannounced deviations. The P will monitor outside for visual contact with the landing environment and will complete the approach as briefed, if visual meteorological conditions (VMC) are encountered. During simulated instrument meteorological conditions (IMC), the P will remain focused outside the aircraft to provide adequate warning for avoiding obstacles and hazards detected. The P will announce when attention is focused inside the cockpit.

2. Procedures. Follow all ATC instructions. If compliance with ATC is not possible inform them. Review approach and missed approach instructions before initiating the task. Conduct copilot briefing and designate crew responsibilities for the approach.

Note 1: FM 1-240 describes approach procedures.

Note 2: IFR use of the embedded global positioning system/inertial navigation system (EGI) is not authorized; however, the crew should consider and plan for its use as an emergency backup system.

Note 3: In the initial call to ATC advise them the aircraft is not equipped with any navigational aid (NAVAID) receivers.

Note 4: Practicing this task at night provides greater benefit since external cues are less visible.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1178

Perform precision approach (ground-controlled approach)

CONDITIONS: In an OH-58D helicopter with reference to flight instruments only. Given the appropriate Department of Defense (DOD) flight information publication (FLIP), an approach clearance, and with the before-landing check complete.

STANDARDS:

1. Perform the approach per AR 95-1, FM 1-240, and the DOD FLIP.
2. Maintain airspeed ±10 knots indicated airspeed (KIAS).
3. Maintain assigned altitude ±100 feet.
4. Maintain heading ±5 degrees.
5. Make immediate corrections issued by air traffic control (ATC).
6. Comply with descent minimums prescribed for the approach.
7. Execute the correct missed approach procedure immediately upon reaching the missed approach point (MAP) if a landing cannot be accomplished.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily inside the aircraft on the instruments and perform the approach. The P* will follow the heading/course, altitude, and missed approach instructions issued by ATC/pilot not on the controls (P) and will announce any deviation not directed by ATC/P, and will acknowledge all navigation directives. If visual contact with the landing environment is not made at decision height, the P* will announce and execute a missed approach.

   b. The P will perform duties as directed by the P* and will call out the approach procedure to the P* and acknowledge any unannounced deviations. The P will monitor outside for visual contact with the landing environment and will complete the approach as briefed, if visual meteorological conditions (VMC) are encountered. During simulated instrument meteorological conditions (IMC), the P will remain focused outside the aircraft to provide adequate warning for avoiding obstacles and hazards detected. The P will announce when attention is focused inside the cockpit.

2. Procedures. Follow all ATC instructions. If compliance with ATC is not possible, inform them. Review approach and missed approach instructions before initiating the task. Conduct copilot briefing and designate crew responsibilities for the approach.

Note 1: FM 1-240 describes approach procedures.

Note 2: Use of the embedded global positioning system/inertial navigation system (EGI) as an IFR navigational system is not authorized; however, the crew should consider and plan for its use as an emergency backup system.

Note 3: In the initial call to ATC advise them the aircraft is not equipped with any navigational aid (NAVAID) receivers.

Note 4: Practicing this task at night provides greater benefit since external cues are less visible.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1180

Perform emergency global positioning system (GPS) recovery procedure

CONDITIONS: In an OH-58D helicopter with reference to flight instruments only, given a copy of the approach procedure, and the appropriate waypoints entered/selected to perform the approach.

STANDARDS:

1. Approach.

   a. Maintain cruise airspeed ±10 knots indicated airspeed (KIAS) en route and appropriate selected airspeed for conditions on final approach.

   b. Maintain altitude within ±100 feet.

   c. Intercept and maintain the final approach course within.±10 degrees of course centerline.

   d. Arrive at the minimum descent altitude (MDA) prior to reaching the missed approach point (MAP).

   e. At the MAP, execute the missed approach if unable to establish visual contact with the landing zone. If visual meteorological conditions (VMC) are encountered during the approach, determine if the flight can be continued under visual flight rules (VFR) or if a landing is required.

2. Missed approach.

   a. Immediately establish a climb and execute the missed approach procedure per the plan upon reaching the MAP, if VMC is not encountered.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will review the approach with, and brief the other crewmember before initiating the procedure. The PC will confirm with the pilot (PI) the specific approach to be flown, the correct communication frequencies are set, and the approach is entered in the navigation system as required. The PC may assign the PI to perform these duties.

   b. The pilot on the controls (P*) will focus primarily inside the aircraft on the instruments. The P* will follow the heading/course, altitude, and missed approach directives issued by ATC/pilot not on the controls (P) and will announce any deviation not directed by ATC/P and will acknowledge all navigation directives.

   c. The P will call out the approach procedure to the P* and will announce changes to ATC communication frequencies and ATC information not monitored by the P*. The P will complete the approach as briefed when VMC is encountered. During simulated instrument meteorological conditions (IMC) only, the P will remain focused outside the aircraft to provide adequate warning for avoiding obstacles and hazards detected. The P will announce when attention is focused inside the cockpit.

2. Procedures. After completing immediate inadvertent IMC procedures (airport surveillance radar [ASR]/precision approach radar [PAR] unavailable), climb to the minimum safe altitude (MSA) and turn toward the initial approach fix (IAF). Make the appropriate radio calls and set the transponder to emergency. Adjust the aircraft ground track to cross the IAF, intermediate approach fix (IF), and then the final approach fix (FAF) on the prescribed final approach course. Prior to the FAF adjust ground track and airspeed to cross it on the final approach course and at an airspeed appropriate for conditions. Over the IAF/FAF begin descent to arrive at MDA prior to the MAP. Cross-check the VSD and horizontal situation display (HSD) to remain on course.

Note 1: This procedure will only be used for training in simulated IMC or during Inadvertent IMC when ground-controlled approach (GCA) is not available**.** Use of the embedded global positioning system/inertial navigation system (EGI) as an instrument flight rules (IFR) navigational system is not authorized; however, its use should be considered and planned for as an emergency backup system.

Note 2: The MAP/landing area should be physically reconnoitered when possible.

Note 3: Practicing this task at night provides greater benefit since external cues are less visible.

Note 4: Inadvertent IMC multi-ship 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.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS. The P may be able to see the landing area through the NVGs during conditions of light obscuration. During night unaided flight, consider using the searchlight to identify the landing environment.

TRAINING CONSIDERATIONS: The P* performing this procedure will not rely on outside references to complete this task. The P will maintain orientation primarily outside the aircraft to provide warning of obstacles and other aircraft to the P*. This task will only be performed under VMC or simulated IMC.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and:
Task 1182
Unit SOP
Task 2050

TASK 1182

Perform unusual attitude recovery

CONDITIONS: In an OH-58D helicopter, with reference to flight instruments only. With an instrument flight examiner (IE), instructor pilot (IP), or unit trainer (UT).

STANDARDS:

1. Analyze aircraft attitude.
2. Without delay, use correct recovery procedures in the proper sequence.
3. Recover without exceeding aircraft limitations and with minimum loss of altitude.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused inside the aircraft during recovery if instrument meteorological conditions (IMC). The P* will advise the pilot not on the controls (P) of an unusual attitude and request assistance. The P* will be prepared to relinquish the controls, if necessary.

   b. The P is responsible for clearing the aircraft and obstacle avoidance and will monitor the aircraft attitude and the P* to help detect an unusual attitude. The P will assist in monitoring the aircraft instruments and call out attitude, torque, and trim. The P will provide adequate warning for corrective action if aircraft operating limitations may be exceeded and will be prepared to take the controls if needed. The P will report any deviation from the assigned altitude to air traffic control (ATC).

2. Procedures. Upon detecting an unusual attitude, immediately initiate a recovery to straight and level flight by—

   a. Attitude. Establishing a level bank and pitch attitude.

   b. Heading. Establishing and maintaining a heading.

   c. Torque. Adjusting the torque to the appropriate setting.

   d. Airspeed. Establishing and maintaining the appropriate airspeed.

   e. Trim. Trimming the aircraft.

Note 1: Cross-check the vertical situation display (VSD) with the standby flight instruments throughout the maneuver.

Note 2: Practicing this task at night provides greater benefit since external cues are less visible.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: IMC is not a prerequisite for an unusual attitude. Low-level ambient light may induce spatial disorientation. During NVG operations, video noise may contribute to loss of visual cues.

SNOW/SAND/DUST CONSIDERATIONS: Loss of visual contact can be induced by obscurants other than weather. At low altitudes where these conditions would be encountered it is extremely important that these procedures be initiated immediately to prevent ground contact. Communication in the cockpit is essential.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1184

Respond to inadvertent instrument meteorological conditions (IIMC)

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Maintain aircraft control and make the transition to instrument flight immediately.
2. Initiate a climb immediately.
3. Comply with all air traffic control (ATC) procedural instructions, local regulations, and standing operating procedures (SOP).

DESCRIPTION:

1. Crew actions.
   a. The pilot on the controls (P*) will—
      (1) Announce inadvertent instrument meteorological conditions (IMC).
      (2) Transition to instrument flight.
      (3) Begin recovery procedures.
      (4) Announce if disoriented and unable to recover.
   b. The P* will call out—
      (1) Desired heading.
      (2) Desired torque.
      (3) Desired airspeed.
   c. The pilot not on the controls (P) will—
      (1) Announce instrument meteorological conditions (IMC) and monitor instruments to assist in recovery.
      (2) Monitor the attitude indicator, heading, torque, and airspeed as announced by the P* and immediately alert the P* of any unusual attitude condition or deviation from the announced information. The P may need to take the controls and implement recovery procedures.
      (3) Tune the radios to the appropriate frequencies, make the appropriate radio calls, and set transponder to the appropriate code.
      (4) Request ATC assistance and acknowledge and record ATC information.
      (5) Perform any other crew tasks as directed by the P*.

Note: Use of the embedded global positioning system/inertial navigation system (EGI) as an instrument flight rules (IFR) navigational system is not authorized; however, the crew should consider and plan for its use as an emergency backup system.

2. Procedures. If inadvertent IMC are encountered by both crewmembers, perform the following:
   a. Attitude. Level the wings on the vertical situation display (VSD) or standby attitude indicator.
   b. Heading. Maintain heading; turn only to avoid known obstacles.
   c. Torque. Adjust the torque to climb power.

d. Airspeed. Adjust the airspeed to climb airspeed.
e. Trim. Maintain the aircraft in trim.
f. Set the transponder to emergency once the aircraft is under control.
g. Complete the procedure per local regulations and policies.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Entering IMC with the searchlight on may induce spatial disorientation. The NVGs may be removed or flipped up once stable flight is established. When using NVGs, it may be possible to see through thin obscuration (for example, fog and drizzle) with little or no degradation. It may be beneficial for the P not to completely remove the NVGs. The NVGs may assist in recovery by allowing the P to see through thin obscuration that would otherwise prevent seeing the landing environment.

Note 1: Once committed to IMC, do not attempt to regain visual meteorological conditions (VMC) until the aircraft is under control. Rapid changes in attitude and bank angle can induce spatial disorientation causing loss of aircraft control.

Note 2: Practicing this task at night provides greater benefit since external cues are less visible.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1188

Operate aircraft survivability equipment (ASE)/operate transponder

CONDITIONS: In an OH-58D helicopter with installed and operational AN/APR-39A(V)1, AN/ALQ-144, AVR-2, APX-100, or APX-118 CXP (as applicable).

STANDARDS:

1. Prepare equipment for operation.
2. Perform self-test, if required.
3. Identify the threat from the visual display or audio warning and take appropriate action.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for clearing the aircraft and obstacle avoidance. When maneuvering the aircraft in response to aircraft survivability equipment (ASE) indications the P* must consider obstacles and other aircraft.

   b. The pilot not on the controls (P) will operate the ASE/transponder. He will announce when his attention is focused inside the cockpit. The P should assist the P* with obstacle avoidance and clearing the aircraft and announce when doing so.

2. Procedures. Conduct preflight inspection of the AN/APR-39A(V)1, AN/ALQ-144, AVR-2, APX-100, or APX-118 CXP (as applicable). Using the check list, turn-on, self-test, and conduct operational checks. The crew will determine what effect an ASE/transponder system malfunction will have on the assigned mission. Employ the equipment as directed by unit standing operating procedure (SOP) or as briefed. In the event of a failure or partial failure of any ASE/transponder equipment inform appropriate personnel and record any discrepancies on DA Form 2408-13 (Aircraft Status Information Record). In the event of a laser or radar indication displayed by the ASE systems transmit the appropriate report in accordance with unit standing operating procedure (SOP). Upon mission completion use the check list to perform shutdown procedures.

Note: Refer to the technical manuals listed below for details about the operation of ASE/transponder currently on the aircraft.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft, cockpit procedural trainer (CPT), with computer based aircraft survivability equipment training (CBAT), or academically.
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references and:

TM 11-5841-283-12
TM 11-5865-324-12
TM 11-5841-304-12
TM 11-5895-1199-12
TM 11-5895-1733-13&P

TASK 1194

Perform refueling/rearming operations

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Ensure that refueling procedures are performed in accordance with the operator's manual, standing operating procedures (SOPs), and local directives.
2. Ensure that rearming procedures are performed in accordance with the operator's manual, SOPs, and local directives.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will verify that the proper types and quantities of ordnance are loaded to meet the mission profile. Once refueled or rearmed, the PC will determine if there will be any limitations imposed on the flight as a result of the ordnance and fuel loads. When in-ground effect (IGE) power is available, the PC will ensure another hover power check is performed after rearm/refuel checking center of gravity (CG) and controllability.
   b. The pilot on the controls (P*) will position the aircraft to the refueling point and will perform refuel and rearm procedures.
   c. The pilot not on the controls (P) will call out the applicable refuel and rearm checks and items required by unit SOP. The P will monitor the aircraft position and will provide adequate warning for obstacle avoidance.
2. Procedures. Ensure that forward arming and refueling point (FARP) personnel properly ground and refuel the aircraft. Ensure that the tank is filled to the required level. When the refueling is completed, ensure that the cap is secured and grounding cables removed. Ensure coordination between crewmembers and armament personnel prior to manipulating weapons switches during continuity checks, stray voltage checks, and when loading the 50-caliber machine gun. Make appropriate logbook entries.

Note 1: The closed circuit refuel nozzle assembly provides an indication to refuel personnel when the fuel tank is full. A visual signal from the pilot (during hot refuel) indicating a full fuel tank is not necessary. A visual signal from the pilot may be necessary only when the pilot wants to take on a certain amount of fuel.

Note 2: Risk assessment must be factored in the mission briefing when hot rearm/refuel is to be accomplished.

NIGHT OR NIGHT VISION GOGGLES (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.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and FM 3-04.140.

TASK 1300

Perform mast-mounted sight operations

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Perform all mast-mounted sight (MMS) procedures/functions without assistance in accordance with TM 1-1520-248-10.

2. Operate airborne video tape recorder (AVTR)/ Personal Computer Video Data Transfer System (PC-VDTS) in accordance with TM 1-1520-248-10.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) (right seat) is primarily responsible for obstacle avoidance and clearing the aircraft. The P* will maintain aircraft orientation and provide local security during MMS operations.

   b. The pilot not on the controls (P) (left seat) will operate the system and announce when focused inside the cockpit. The P will assist the P* to remain oriented on the target and help with obstacle avoidance and clearing the aircraft duties permitting.

> **WARNING**
>
> **Use of the laser must be conducted on an approved range/area.**

2. Procedures.

   a. MMS. Configure and operate the MMS according to TM 1-1520-248-10. Adjust the thermal imaging sensor (TIS)/thermal imaging sensor upgrade (TISU) as necessary to obtain the best picture. Enter the correct laser codes for the mission. Select the appropriate sensor and the proper field of view to search for, and acquire targets. Use the laser range finder/designator (LRF/D) to range, locate, and designate a target. Use the prepoint mode as an aid in maintaining orientation.

Note 1: The P* (right seat) may override the copilot gunner's (CPGs) (left seat) use of the MMS by pressing the fixed forward (FXD FWD) switch located on the cyclic grip controls.

Note 2: Target designation, target locate, and navigation system offset update cannot be accomplished in the ranging mode.

   b. AVTR/PC-VDTS. Configure and operate the AVTR/PC-VDTS according to TM 1-1520-248-10. During the preflight, ensure that a video tape is correctly installed into the video recorder (as applicable). The CPG/P will select the appropriate mode on the recorder and select video source to be recorded. Ensure manual unthread is accomplished before removing tape from recorder (as applicable).

CAUTION

When operating the MMS, the P must not distract the P* away from flying the aircraft.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. When maneuvering the aircraft to maintain the MMS on target, the P* must consider obstacles and other aircraft. The P should assist the P* with obstacle avoidance and clearing the aircraft and announce when doing so.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft or cockpit procedural trainer (CPT).
2. Evaluation will be conducted in the aircraft.

REFERENCE: Appropriate common references.

TASK 1304

OPERATE AVIATOR'S NIGHT VISION IMAGING SYSTEM DISPLAY SYMBOLOGY SUBSYSTEM

CONDITIONS: In an OH-58D helicopter and given an aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS).

STANDARDS:

1. Perform checks and operate the system according to TM 1-1520-248-10.
2. The crew will perform operational checks and brief the other crewmember on the status of the ADSS.

DESCRIPTION:

Procedures. Visually inspect the optical display assembly (ODA) prior to use. Any discrepancy should be reported as directed by the unit standing operating procedure (SOP). During runup as per the checklist, turn on the ODA using the pilots cyclic ODA switch. Access the ADSS test page and adjust the brightness. Select the desired mode and declutter level.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1402

Perform tactical flight mission planning

CONDITIONS: Before a tactical flight in an OH-58D helicopter and given a mission briefing, navigational maps, an aviation mission planning system or a navigational computer, and other materials as required.

STANDARDS:

1. Analyze the mission using the factors of mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC).
2. Perform a map/photo reconnaissance using the available map media, air mission planning system video map terminal, or photos. Ensure that all known hazards to terrain flight are plotted on the map or into the air mission planning system.
3. Select the appropriate terrain flight modes.
4. Select appropriate primary and alternate routes and enter all of them on a map, route sketch, or into the air mission planning system.
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 ±25 pounds and reserve in accordance with AR 95-1.
7. Obtain and evaluate the weather briefing.
8. Perform risk assessment per unit standing operating procedure (SOP).
9. Conduct a thorough crew mission briefing per the unit SOP and Task 1000 (participate in a crew mission briefing).

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will ensure that all necessary tactical flight information is obtained and will conduct a thorough crewmember briefing in accordance with the unit SOP and Task 1000. The PC may delegate mission planning tasks to the other crewmember but retains overall responsibility for mission planning. The PC will analyze the mission in terms of METT-TC.

   b. The pilot (PI) will perform the planning tasks directed by the PC/air mission commander (AMC).

2. Procedures. Analyze the mission using the factors of METT-TC. Conduct a map or aerial photo reconnaissance. Obtain a weather briefing that covers the entire mission. Include sunset and sunrise times, density altitudes, ceilings, winds, and visibility restrictions. If the mission is to be conducted at night, the briefing should also include moonset and moonrise times, ambient light levels, and an electro-optical forecast, if available. Determine primary and alternate routes, terrain flight modes, and movement techniques. Determine time, distance, and fuel requirements using the navigational computer or air mission planning system. Annotate the map, overlay, or air mission planning system with sufficient information to complete the mission. Include waypoint coordinates that define the routes for entry into the air mission planning system. 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, limitations on visual sensors, and weapons employment.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: More detailed flight planning is required when the flight is conducted in reduced visibility, at night, or in the NVG flight environment. TC 1-204 contains details on night navigation.

TRAINING AND EVALUATION CONSIDERATIONS: This task specifically considers the tactical flight planning aspects of mission planning. The standards of this task may be achieved through exclusive manual means or air mission planning system automation. Evaluation of this task will be accomplished academically since actual tactical planning—even for training missions—is normally a collective event with unit members planning separate components of the mission.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and:
Task 1000
Task 1004
Task 1010

TASK 1404

Perform electronic counter measures/electronic counter-countermeasures procedures

CONDITIONS: In an OH-58D helicopter and given signal operation instructions.

STANDARDS:

1. Operate secure communications equipment (KY-58, if installed) and avionics.
2. Maintain radio discipline at all times.
3. Use signal operation instructions (SOI)/automated net control device (ANCD).
4. Recognize and respond to all threat electronic warfare actions.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will assign radio frequencies per SOI and mission requirements during the crew briefing.

   b. The pilot on the controls (P*) will announce mission information not monitored by the pilot not on the controls (P) and any deviation from directives.

   c. The P will announce information not monitored by the P*.

2. Procedures.

   a. Voice communication. Voice communication in a tactical environment should only be used when absolutely necessary. If voice communication is required, the best method is to operate in the secure voice mode. To eliminate confusion and reduce transmission time, 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, transmissions should be kept under ten seconds). A unit or an individual must not be identified by name during nonsecure radio transmissions.

   b. Digital communication. If the enemy is not jamming, use the lowest frequency modulated (FM) power setting required, the lowest block selection (single), and the highest baud rate.

   c. Communication considerations.

      (1) Authentication. Use proper SOI procedures to authenticate all in-flight mission changes and artillery advisories when entering or departing a radio net or when challenged.

      (2) Meaconing, interference, jamming, and intrusion (MIJI) procedures. Keep accurate and detailed records of any MIJI incidents suspected to be intentional interference. Use a secure communication means to report the incident as soon as possible.

      (3) Selective identification feature (SIF)/identification, friend or foe (radar) (IFF) usage. During radio checks, select the appropriate transponder mode on the selector and test the system. Monitor the SIF/IFF reply indications during the flight.

(4) Antijamming procedures. To overcome jamming reconfigure the improved data modem (IDM). Change the block selection to double and lower the baud rate. In addition, use FM frequency hopping, Have Quick, or change the FM power setting to high. Changes must be coordinated with other aircraft per the unit SOP to ensure uninterrupted reception.

d. Radio silent operations. Combat operations may require crews to fly missions without the use of radios.

e. Visual methods. The unit SOP and SOI describe these methods.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1405

Transmit tactical reports

CONDITIONS: In an OH-58D helicopter and given sufficient information to compile a tactical report.

STANDARD: Transmit appropriate report using the proper format.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for aircraft control and obstacle avoidance. The P* will coordinate with the pilot not on the controls (P) as to who will make the report. When maneuvering the aircraft to maintain the mast-mounted sight (MMS) on target, the P* must consider obstacles and other aircraft.

   b. The P will prepare the information for the report and coordinate with the P* prior to sending it. The P should assist the P* with obstacle avoidance and clearing the aircraft and announce when doing so.

2. Procedures. Reports must be timely and concise. To save time, reduce confusion, and ensure completeness, information should be reported according to an established format. Standard formats for four different types of reports are given below:

   a. Spot report. A spot report is used to report information about the enemy and area of operations.

      (1) Call sign of observer.

      (2) SALT-W.

         (a) S--size.

         (b) A--activity.

         (c) L--location.

         (d) T--time.

         (e) W—what you are doing about it.

   b. Battle damage assessment (BDA). Submit a BDA following naval gunfire, artillery fire (if requested), or a tactical air strike.

Alpha: Call sign of observing source.

Bravo: Location of target.

Charlie: Time strike started and ended.

Delta: Percentage of target coverage (pertains to the percentage of projectiles that hit the target area).

Echo: Itemized destruction.

Foxtrot: Remarks. May be omitted; however, they may contain additional information such as the direction the enemy may have taken in leaving the target area.

   c. Enemy shelling, bombing, or chemical, biological, radiological, and nuclear (CBRN) warfare activity report. Submit this report following enemy shelling, bombing, or CBRN warfare activity.

Alpha: From (unit call sign) and type of report.

Bravo: Position of observer (grid coordinates in code).

Charlie: Azimuth of flash, sound, or groove of shell (state which) or origin of flight path of missile.

Delta: Time from (date-time of attack).

Echo: Time to (for illumination time).

Foxtrot: Area attacked (either azimuth and distance from observer in code or grid coordinates in the clear).

Golf: Number and nature of guns, mortars, aircraft, or other means of delivery, if known.

Hotel: Nature of fire (barrage, registration, and so on) or NBC-1 type of burst (air or surface) or type of toxic agent.

India: Number and type of bombs, shells, rockets, and so on.

Juliet: Flash-to-bang time in seconds.

Kilo: If NBC-1, damage (in code) or crater diameter.

Lima: If NBC-1, fireball width immediately after shock wave (do not report if data was obtained more than five minutes after detonation).

Mike: If NBC-1, cloud height (state top or bottom) ten minutes after burst.

November: If NBC-1, cloud width ten minutes after burst.

Note: State units of measure used, such as meters or miles. For additional information, see FM 3-11. As a minimum, an NBC-1 report requires lines A, B, C, D, H, and J; and either L or M.

d. Meaconing, interference, jamming, and intrusion (MIJI) report. Once jamming is discovered, report the interference as soon as practicable to higher headquarters.

Line 1: Type of report (meaconing, intrusion, jamming, or interference).

Line 2: Affected unit (call sign and suffix).

Line 3: Location (your grid location).

Line 4: Frequency affected (frequency).

Line 5: Type of equipment affected (UHF, VHF, FM, and so on).

Line 6: Type of interference (type of jamming and signal).

Line 7: Strength of interference (strong, medium, or weak).

Line 8: Time interference started and stopped (if continuing, so state).

Line 9: Effectiveness of interference (estimate percent of transmission blockage).

Line 10: Operator's name and grade.

Line 11: Remarks (list anything else that may be helpful in identifying or locating source of interference, and send it to higher headquarters by an alternate, secure means).

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and:

FM 3-11
FM 2-0

TASK 1407

PERFORM TERRAIN FLIGHT TAKEOFF

CONDITIONS: In an OH-58D helicopter with hover power and before-takeoff checks completed and the aircraft cleared.

STANDARDS:

1. Properly complete the ground reconnaissance and select a suitable takeoff path.
2. Perform a hover power check as required and complete the before-takeoff check without error.
3. Maintain takeoff heading ±10 degrees.
4. Maintain takeoff flight path until clear of obstacles.
5. Maintain power as required to clear obstacles safely while not exceeding aircraft limitations.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused primarily outside the aircraft during the maneuver. The P* will direct the other crewmember to maintain visual reference outside the aircraft to assist in clearing and will ensure that the aircraft is cleared and select reference points to assist in maintaining takeoff flight path. The P* will announce initiating the takeoff and whether the takeoff is from the ground or from a hover and will also announce intentions to abort or alter the takeoff.

   b. The pilot not on the controls (P) will maintain visual reference outside the aircraft, acknowledge when ready for takeoff and provide adequate warning of any obstacles or hazards in the flight path.

2. Procedures. Prior to takeoff perform a ground reconnaissance to determine the suitability of the area for ground operations. Determine the takeoff direction by analyzing the tactical situation, wind, long axis of the takeoff area, and the lowest obstacles. Select reference points to assist in maintaining the takeoff flight path. Complete the before takeoff check and, if required, perform a hover power check. Coordinate the collective and cyclic controls as necessary to establish a climb angle that will clear any obstacles in the takeoff path. Maintain heading with the pedals and once the obstacles are cleared, smoothly adjust the flight controls to transition to the terrain flight mode (nap of the earth [NOE], contour, or low level).

Note 1: Hover OGE power is required for terrain flight takeoffs.

Note 2: When this maneuver is performed from a confined area, repositioning the aircraft downwind will minimize the power requirements on takeoff.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS:

1. Before the aircraft leaves the ground, determine if the landing or searchlight is required.
2. Treat visual obstacles, such as shadows, the same as physical obstacles.
3. Maintain proper scanning techniques to avoid becoming spatially disoriented.
4. In the absence of obstacles, perform a normal takeoff as described in Task 1040. If sufficient illumination does not exist to view obstacles, an altitude-over-airspeed takeoff should be performed.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

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 all barriers, accelerate to climb airspeed and trim the aircraft.

Note 1: In some cases, applying collective to blow away loose snow/sand/dust from around the aircraft is beneficial before performing this maneuver.

Note 2: The P* should be prepared to transition to instruments if ground reference is lost.

Note 3: At night, use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust.

Note 4: The P should have vertical situation display (VSD) selected and also be prepared to transition to instruments if ground references are lost to aid the P* as necessary.

MUD/MUSKEG/TUNDRA CONSIDERATIONS: Smoothly increase the collective until the crew confirms that the landing gear is free. Adjust controls as necessary to perform a VMC takeoff.
Note: Before performing operations in a mud/muskeg/tundra environment, it is important to understand dynamic rollover characteristics.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1408

PERFORM TERRAIN FLIGHT

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Terrain flight mode.
   a. Nap of the earth (NOE) flight.
      (1) Fly as close to the earth's surface as vegetation, obstacles, and ambient light will permit.
      (2) Maintain airspeed appropriate for the terrain, enemy situation, weather, and ambient light.
   b. Contour flight.
      (1) Maintain an altitude that allows safe clearance of obstacles while generally conforming to the contours of the earth.
      (2) Maintain airspeed appropriate for the terrain, enemy situation, weather, and ambient light.
      (3) Maintain the aircraft in trim.
   c. Low-level flight.
      (1) Maintain altitude ±50 feet.
      (2) Maintain airspeed ±10 knots indicated airspeed (KIAS).
      (3) Maintain aircraft in trim.
2. Terrain flight navigation.
   a. During NOE flight—
      (1) Know the en route location within 200 meters.
      (2) Identify all check points.
      (3) Locate the final objective within 100 meters.
   b. During low-level or contour flight—
      (1) Know the en route location within 500 meters.
      (2) Identify all check points.
      (3) Locate the final objective within 100 meters.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will 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 and any deviation from instructions given by the P.

   b. The P will provide adequate warning to avoid obstacles detected in the flight path or identified on the map. Duties permitting, the P will assist with clearing the aircraft and obstacle avoidance and will announce when his attention is focused inside the cockpit.

2. Procedures. Terrain flying involves flight close to the earth's surface. The modes of terrain flight are NOE, contour, and low-level. The crew will seldom perform pure NOE or contour flight. Instead, they will alternate techniques while maneuvering over the desired route. During terrain flight, the crew's primary concern is the threat and obstacle avoidance.

a. Terrain flight mode. Terrain flight is conducted at one of, or a combination of, three distinct modes of flight as described below:

(1) NOE flight. NOE flight is conducted at varying airspeeds and altitudes as close to the earth's surface as vegetation, obstacles, and ambient light will permit.

(2) Contour flight. Contour flight is characterized by varying altitude and relatively constant airspeed, depending on vegetation, obstacles, and ambient light. It generally follows the contours of the earth.

(3) Low-level flight. Low-level flight is usually performed at a constant airspeed and altitude. It generally is conducted at an altitude that prevents or reduces the chance of detection by enemy forces.

Note: Out-of-ground effect (OGE) hover power is required for NOE flight.

b. Terrain flight navigation. Terrain flight navigation requires the crew to work as a team. Remain primarily focused outside the aircraft. Acknowledge commands for heading and airspeed changes necessary to navigate the desired course. Announce significant terrain features and other cues to assist in navigation. Announce any verified or perceived hazards to flight and provide instructions and perform actions for obstacle/hazard avoidance. Change aircraft heading and airspeed as appropriate to navigate the desired course. Announce all plotted hazards prior to approaching their location. 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 avoid hazards.

(1) During NOE flight, the crew identifies prominent terrain features that are located some distance ahead of the aircraft and which lie along or near the course. Using these points to key on, maneuver the aircraft to take advantage of the terrain and vegetation for concealment. If general navigational techniques do 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.

(2) Contour navigation is less precise than NOE navigation because the contour route is more direct. An effective technique to combine the use of terrain features and rally terms when giving directions. This will allow the P* to focus attention outside the aircraft.

(3) For low-level navigation, verify time and distance to fly specific headings and airspeeds.

Note 1: If the area permits, the crew should navigate at least 20 kilometers during NOE flight training or 40 kilometers during low-level or contour flight training.

Note 2: The aircrew should incorporate the use of the air mission planning system resources in coordination with this task. Consideration should be given to the crew utilizing air mission planning system produced strip maps and when possible, the crew should review the air mission planning system digital projections of the proposed routes prior to conducting the flight. All known terrain flight hazards should be input into the aircraft's navigation system, via the air mission planning system loaded data transfer cartridge (DTC)/data transfer module (DTM), personal computer data transfer system (PC-DTS), personal computer video data transfer system (PC-VDTS),prior to the execution of this task.

Note 3: 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. Navigation instructions toward a distant, unseen terrain feature are appropriate when few changes are anticipated. When forward visibility is restricted and frequent changes are necessary, controlled turning instructions are more appropriate. As a general rule, clock headings by themselves should be avoided. However, clock headings are recommended when associated with a terrain feature and with controlled turning instructions.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS:

1. Terrain flight modes. Wires and other hazards are difficult to detect with the NVG. The crew must use proper scanning techniques to ensure obstacle avoidance. Clear communication in the cockpit is required. Each crewmember must know and understand what the other is doing.

2. Terrain flight navigation. Conducting the flight in reduced visibility or at night (aided or unaided) requires more detailed flight planning and map preparation. TC 1-204 contains details on night navigation. NVG navigation with standard maps can be difficult because of map colors and symbology. The crew must use proper scanning techniques to ensure obstacle avoidance.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude, airspeed, and altitude.

OVERWATER CONSIDERATIONS: Overwater flight, at any altitude, is characterized by a lack of visual cues and therefore has the potential of causing spatial disorientation. Be alert to any unannounced changes in the flight profile and be prepared to take immediate corrective actions. The radar altimeter low altitude warning should be set to assist in altitude control. Hazards to terrain flight (for example, harbor lights, buoys, wires, and birds) must also be considered during overwater flight. When possible both crewmembers should be focused outside the cockpit.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1409

PERFORM TERRAIN FLIGHT APPROACH

CONDITIONS: In an OH-58D helicopter with the before-landing check completed.

STANDARDS:

1. Perform a landing area reconnaissance and select a suitable landing area.
2. Maintain an approach angle to clear obstacles.
3. Maintain ground track aligned with the selected approach path with minimum drift.
4. Maintain the appropriate rate of closure.
5. Make a smooth, controlled termination at the intended landing area.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will maintain visual reference outside the aircraft throughout the approach and landing (to include the go-around, if required). The P* will direct the pilot not on the controls (P) to maintain visual reference outside the aircraft to assist in clearing and announce intent to land, abort, or alter the approach. The P* will announce beginning of the approach when intercepting an angle that assures obstacle clearance. The P* will select a touchdown point in the forward one-third of the landing area and announce if the approach will terminate to a hover or to the ground, his intended landing area, and any deviation to the approach.

   b. The P will remain focused outside the aircraft and confirm suitability of the area. The P will announce adequate warning to avoid obstacles or hazards detected in the flight path or identified on the map and will also announce if attention is focused inside the aircraft. If a go-around is required, the P will focus outside the aircraft to assist in obstacle avoidance, unless focus inside is required to monitor the aircraft instruments.

2. Procedure. Determine the landing direction by analyzing the tactical situation, wind, long axis of the landing area, and the lowest obstacles. Maneuver the aircraft as required (straight-in or circle) to intercept the desired approach path. Adjust the flight path and airspeed as necessary and maintain orientation of the landing area. Coordinate the collective and cyclic as necessary to maintain an approach angle to ensure obstacle clearance and control the rate of closure.

Note 1: The decision to terminate at a hover, to the ground with zero forward speed, or with a run-on landing will depend on aircraft loading, environmental conditions, and surface conditions at the landing area. A go-around should be made before descending below obstacles or decelerating below effective translational lift (ETL) or when visual contact with the approach point is lost on final.

Note 2: If at anytime during the approach the P* loses visual contact or it becomes apparent visual contact will be lost with the intended landing area, the P* will inform the P and request assistance. If the P still has the intended landing area in sight, the P will take the controls and complete the approach. If the P does not have the intended landing area in sight, the P* will perform a go-around.

Note 3: Hover OGE power is required prior to a terrain flight approach.

Note 4: 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. If disorientation occurs, apply sufficient power and execute an instrument takeoff. If a takeoff is not feasible, attempt to maneuver the aircraft forward and down to the ground to limit the possibility of touchdown with sideward or rearward movement.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Proper scanning techniques are necessary to avoid spatial disorientation. Before descending below obstacles, determine the need for use of the searchlight.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude, airspeed, and altitude.

SNOW/SAND/DUST CONSIDERATIONS:

1. Termination to an out-of-ground effect (OGE) hover. Terminate to a stationary OGE hover over the touchdown area. This approach requires OGE power and may be used for most snow landings and some sand/dust landings. Slowly lower the collective and allow the aircraft to descend. The descent may be vertical or with forward movement. The rate of descent will be determined by the rate in which the snow/sand/dust is blown from the intended landing point. During the descent, remain above the snow/sand/dust cloud until it dissipates and the touchdown point can be seen. Both crewmembers should be focused outside the cockpit. Be prepared to execute a takeoff.

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. Maintain the minimum rate of closure that ensures that the snow/sand/dust cloud remains behind the pilot's station. When the skids contact the snow/ground, lower the collective and allow the aircraft to settle. Apply slight aft cyclic at touchdown to prevent snagging the skid toes. The P should keep the P* informed of the location of the snow/sand/dust cloud. Be prepared to execute a go round.

3. Termination to the surface with little or no forward speed. This termination should be made to landing areas where slopes, obstacles, or unfamiliar terrain preclude a landing with forward speed. It is not recommended when new or powder snow or fine dust is present because whiteout/brownout conditions may occur. The termination is made directly to a reference point on the ground with no forward speed. The P should keep the P* informed of the location of the snow/sand/dust cloud. Be prepared to execute a go round.

Note 1: When landing in deep snow, the aircraft skids may settle at different rates and the aircraft will normally terminate in a tail-low attitude.

Note 2: 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 3: At night, use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust.

Note 4: The P should have VSD selected and also be prepared to transition to instruments if ground references are lost to aid the P* as necessary.

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 may be conducted in the aircraft.
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references.

TASK 1410

PERFORM MASKING AND UNMASKING

CONDITIONS: In an OH-58D helicopter, and out-of-ground effect (OGE) power available.

STANDARDS:

1. Perform a map reconnaissance.
2. Mask the aircraft from enemy visual and electronic detection.
3. Ensure that exposure time does not exceed 10 seconds when unmasking the aircraft.
4. When using the mast-mounted sight (MMS), unmask the MMS only.
5. Maintain a sufficient distance behind obstacles to allow for safe maneuvering.
6. Move to a new location, if available, before subsequent unmasking.

DESCRIPTION:

1. Crew actions.

   a. The pilot in command (PC) will assign observation sectors to the other crewmember to maximize the areas scanned during the time unmasked. The PC will also ensure observations are reported.

   b. The pilot on the controls (P*) will remain focused outside the aircraft. The P* is responsible for clearing the aircraft and obstacle avoidance and will announce the type of masking and unmasking before executing the maneuver. The P* may elect to utilize the heading hold mode during the maneuver. The primary concern will be aircraft control while viewing the assigned sector.

   c. The pilot not on the controls (P) will initially focus attention inside the aircraft. The P will perform a map reconnaissance to identify natural and man-made features before the unmasking (may be accomplished in premission planning or in the aircraft), brief the P* and announce when ready. Visually the P will primarily view the assigned sector, overlap the P* sector, and warn the P* of obstacles or unanticipated drift and altitude changes. The P will announce when focused inside the cockpit. When operating the MMS, the P will scan the primary sector using all sensors as appropriate.

2. Procedures.

   a. Masking in flight. Fly to the destination with the aid of the navigation system or a map. Take maximum advantage of terrain and vegetation to prevent exposure of the aircraft to enemy visual observation or electronic detection. Maintain orientation at all times and look far enough ahead on the map for hazards.

   b. Unmasking in flight. Keep aircraft exposure time to a minimum to prevent enemy visual observation or electronic detection. Radar can lock onto a target within two to nine seconds. Depending on mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC), only the MMS may need to be exposed.

c. Unmasking at a hover (vertically). Ensure that sufficient power is available to unmask. Heading hold may be used during the maneuver. Apply collective until sufficient altitude is obtained to either see or expose the MMS 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. Keep aircraft exposure time to a minimum.

Note: There is a common tendency to move forward or rearward while vertically unmasking and remasking.

d. Unmasking at a hover (laterally). Unmasking may be accomplished by moving laterally from the mask. Hover the aircraft sideward to provide the smallest silhouette possible to enemy observation or fire. Keep aircraft exposure time to a minimum.

Note: When unmasking the helicopter, select a new location that is a significant distance from the previous location and where the target area can still be observed. If the target area is a long distance (2,000 to 3,000 meters) away, moving only 100 meters will still keep the aircraft in the same field of view from the target. However, if the target area is close to the unmasking position, a drift of 100 meters will make a significant difference.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Maintaining altitude and position is more difficult when hovering above 25 feet without aircraft lights. Use the radar altimeter to assist in maintaining altitude and the position box to assist in maintaining aircraft position. Use references such as lights, tops of trees, or man-made objects above and to the front and sides of the aircraft. By establishing a reference angle to these objects, the P* can detect altitude changes by changing the viewing perspective. Hovering near ground features, such as roads, provides ideal references for judging lateral movement. However, the P* may become spatially disoriented when alternating viewing perspective between high and low references. Therefore, the P* must rely on the P for assistance if disoriented. Regardless of the mission the P* must fly the aircraft first and then observe the sector.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references plus computer based aircraft survivability equipment training (CBAT) program and aviation mission planning system.

TASK 1411

PERFORM TERRAIN FLIGHT DECELERATION

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Maintain heading ±10 degrees.
2. Maintain tail rotor clear of all obstacles.
3. Decelerate to the desired airspeed or to a full stop ±50 feet of the selected location.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) remains focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will announce 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) will provide adequate warning to avoid obstacles detected in the flight path and will announce when attention is focused inside the cockpit.

   c. The crew must clear the area below the aircraft before descending.

2. Procedures: Consider variations in the terrain and obstacles when determining tail rotor clearance. With terrain and obstacle considerations made, increase the collective just enough to maintain the altitude of the tail rotor. (Initially increasing the collective may not be necessary at higher airspeeds.) Apply aft cyclic to slow down to the desired airspeed/ground speed or come to a full stop while adjusting the collective to maintain the altitude of the tail rotor. Maintain heading with the pedals and make all control movements smoothly. If the attitude of the aircraft is changed too much or too abruptly, returning the aircraft to a level attitude will be difficult and over controlling may result.

Note 1: Out-of-ground effect (OGE) hover power is required for terrain flight decelerations during nap of the earth (NOE) flight.

Note 2: Closely monitor the pedals if heading hold is used during the maneuver.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Because of the limited field of view (FOV) of the NVG, avoid making abrupt changes in aircraft attitude. An extreme nose-high attitude limits the forward FOV. Maintain proper scanning techniques to ensure obstacle avoidance and tail rotor clearance. If possible, both crewmembers should focus outside the cockpit.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1413

PERFORM ACTIONS ON CONTACT

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Use correct actions on contact consistent with the tactical situation.
2. Perform evasive maneuvers (if necessary) appropriate for the type of threat.

DESCRIPTION:

1. Crew actions. The first crewmember to recognize the threat will immediately announce enemy contact (visual or electronic), type (hostile fire), and location of threat.

a. The pilot on the controls (P*) will remain focused outside the aircraft and is responsible for clearing the aircraft and obstacle avoidance. The P* will deploy to cover or position the aircraft to return suppressive fire if necessary/briefed. The P* will announce the direction of flight to evade detection and will direct the pilot not on the controls (P) to remain focused outside the aircraft for clearing.

b. The P will remain oriented on threat location and assist clearing the aircraft and will announce warning to avoid obstacles and when attention is focused inside the aircraft.

c. The crew will transmit a report, as required.

2. Procedures. Actions on contact are a series of combat actions taken on contact with the enemy to develop the situation. Obstacles are treated like enemy contact since they are assumed to be covered by fire. The element making contact initiates these actions and they occur at each level of command, often simultaneously. Units perform these actions whether or not the enemy has detected the presence of the scout. Actions on contact are as follows:

- Deploy to cover and report.
- Maintain contact and develop the situation.
- Recommend or execute a COA.

a. Deploy to cover and report. Upon encountering an obstacle or enemy force, the element of the troop making contact deploys to a covered position affording observation and fields of fire. If necessary, the element uses direct fire to suppress the enemy, allowing freedom to maneuver. An immediate contact report is submitted with whatever information is available. The immediate contact report is first transmitted to team members and then to the appropriate commander. An example format for an immediate contact report is as follows;

- Target- brief description of the target.
- Azimuth – azimuth either magnetic or clock direction from the observing aircraft.
- Range – distance from the observing aircraft in meters.
- "Contact, BMP, 090 degrees, 500 meters. Breaking right."

b. Maintain contact and develop the situation. The leader of the element in contact develops the situation to define the threat being faced, using various reconnaissance techniques as appropriate. These techniques range from stealthy dismounted reconnaissance, mounted reconnaissance, and reconnaissance by fire-both direct and indirect. The troop or squadron commander continues the mission with other elements to a designated limit of advance. Doing so helps to develop the situation across the front and provides more maneuver space to execute subsequent action. Once a clearer picture of the situation is developed, detailed spot reports are forwarded.

c. Recommend or execute a COA. Once the leader in contact has gathered enough information to make a decision, the leader selects a course of action. Once the leader has selected a course of action, the leader reports it to the commander. The commander approves or disapproves the course of action based upon its impact on the overall mission. The standing operating procedure (SOP) may provide automatic approval of certain actions to avoid unnecessary delay. If the higher commander assumes responsibility to continue developing the situation, the leader in contact supports actions as ordered. The course of action should adhere to the intent of the commander, be within the capability of the unit, and allow the unit to resume the mission as soon as possible. For enemy contact, courses of action consist of the following:

(1) Hasty attack. A hasty attack is executed if sufficient combat power is available, and it will not detract from mission accomplishment. A hasty attack is executed by at least a troop, which can mass adequate combat power.

(2) Bypass. The enemy may be bypassed if sufficient combat power is not available, or if an attack will jeopardize mission accomplishment. The unit requests permission to bypass unless stated in orders. The commander must keep a minimum force in contact with the bypassed enemy.

(3) Hasty defense. If a hasty attack is not possible or a bypass is not feasible, the leader establishes a hasty defense or screen. The unit will conduct a hasty defense if it can defend against an enemy force. If the enemy contact exceeds the unit's capability to defend, it may elect to establish a screen and maintain contact through observation. The unit concentrates on maintaining contact with the enemy and fixing it in place with indirect or possibly direct fire until additional combat power can be brought to bear from supporting units.

3. If an evasive maneuver is required to evade enemy fire, use the procedures described below for the type weapon encountered.

a. Tanks 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 unequal intervals and small changes in altitude to provide the best protection until beyond the effective range of hostile weapons. If the situation permits, employ immediate suppressive fire.

b. Large caliber, antiaircraft fire (radar-controlled). Immediately execute a 90-degree turn. Do not maintain a straight line of flight or the same altitude for more than ten seconds before initiating a second 90-degree turn (ensure this turn is away from the threat). An immediate descent to nap of the earth (NOE) altitude will reduce the danger.

c. Fighters. When in an area where threat fighters are known or suspected to be operating, fly the helicopter at NOE altitude as much as possible. Upon sighting or sensing a fighter, try to mask the helicopter. If the fighter is alone and executes a dive, turn the helicopter toward the attacker, gain airspeed quickly and descend. This maneuver will cause the fighter pilot to increase attack angle. Make an approximately 60-degree-course change away from the attacker. As soon as the attacker is committed to follow the turn, make an approximately 60-degree-course change in the opposite direction. The fighter pilot will then have to break off the attack to recover from the maneuver. Once the fighter breaks off his attack, maneuver the helicopter to take advantage of terrain, vegetation, and shadow for concealment. If the engaging fighters are a multiple element, the P* and P must maintain contact with all the fighters as they maneuver to ensure that countering one fighter attack does not make them an easy target for the second fighter.

d. Helicopters. Use the appropriate terrain flight maneuvers to break contact with or to evade threat helicopters.

e. Heat-seeking missiles. Try to keep helicopter heat sources away from the threat. If a missile is sighted, turn the tail of the helicopter away from the missile and mask the helicopter.

f. 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 the flight path or altitude to evade it.

g. Artillery. Depart the impact area and determine chemical, biological, radiological, and nuclear (CBRN) requirements.

Note: If hit by hostile fire, rapidly assess the situation and determine an appropriate course of action. The most important consideration in an emergency is aircraft control. Therefore, the first step is to assess aircraft controllability. Then check all instruments and warning and caution messages. If a malfunction is indicated, initiate the appropriate emergency procedure. If continued flight is possible, take evasive action. Make a radio call (Mayday or Pan) 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. Then land and inspect the aircraft to determine the extent of damage and whether flight can be continued to a medical or maintenance facility.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Threat elements will be harder to detect. Rapid evasive maneuvers will be more hazardous. Crewmembers must maintain situational awareness. Aircraft control is the primary concern.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and:
FM 17-95
FM 1-114

TASK 1416

Perform weapons initialization procedures

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Prepare the selected weapon system(s) for operation.
2. Determine the status of the weapon system(s).

DESCRIPTION:

1. Crew actions. The crew will perform weapon system initialization procedures on all tactical flights/missions, or as directed by the commander. These procedures determine the status and operation of each weapon system. The air mission planning system may be used to program the weapon systems or the data may be manually entered into the system. Crewmembers will coordinate manipulation of armament switches and announce when they have completed weapons initialization procedures. The crew will determine what effect a weapon system malfunction will have on the assigned mission.

Note: Crews should evaluate the contents of the air mission planning system mission (on the air mission planning station [AMPS]) prior to arriving at the aircraft. Aircrews can verify how their weapons will initialize when the data transfer cartridge (DTC)/data transfer module (DTM), personal computer data transfer system (PC-DTS) is loaded. Air mission planning system premission weapons verification will reduce the weapon's page inputs that would otherwise be required in the aircraft.

2. Procedures. Perform weapons initialization procedures in accordance with the operator's manual.

WARNING

The weapons systems will fire with the weapons override (ORIDE) ON when the WPN FIRE switch is pressed.

The initialization of the weapon systems begins during pre-mission planning with the programming of the data transfer cartridge (DTC)/data transfer module (DTM), personal computer data transfer system (PC-DTS). Selections for the default power-up configuration of each weapons system should be entered or verified for the mission load.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft or cockpit procedural trainer (CPT).
2. Evaluation will be conducted in the aircraft.

REFERENCES: Appropriate common references and FM 3-04.140.

TASK 1422

PERFORM FIRING TECHNIQUES

CONDITIONS: In an OH-58D helicopter with aircraft weapons initialization procedures completed, and given a target to engage.

STANDARDS:

1. Determine the range to the target.
2. Determine the ordnance and method of engagement to be used.
3. Employ terrain flight firing techniques and procedures.

DESCRIPTION:

1. Crew duties.

   a. The pilot on the controls (P*)/pilot not on the controls (P) will determine the range to the target. This can be done with the mast-mounted sight (MMS), navigation system, or visually using map reconnaissance or distance estimation techniques.

   b. The pilot in command (PC) will evaluate the situation using the applicable factors of mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC). The PC will select or supervise the selection of the appropriate weapon system and type of fire.

   c. The copilot-gunner (CPG) will focus attention outside the aircraft to assist with obstacle avoidance.

2. Procedures.

   a. Running fire. Running fire is an effective weapons delivery technique to use during terrain flight, especially in regions of the world where cover, concealment, and environmental conditions hamper or limit stationary weapons delivery techniques. Running fire is performed at airspeeds above effective translational lift (ETL) and offers a good mix of aircraft survivability and weapons accuracy. Proper crew coordination and section/team briefings are essential to producing continuous fires on the target.

      (1) Select an initial point that provides standoff and security. Use of the "two thirds" rule for the weapon system used, will aid in initial point selection, weapon release point, and egress point. The initial point should be a terrain feature that can be readily confirmed during day or night vision goggle (NVG) operations.

      (2) Approach the initial point and enter into a terrain flight orbiting pattern, preferably performing a pattern that is parallel to the aircraft target run-in heading. Environmental conditions and tactical situation will determine the time outbound from and inbound to the initial point.

      (3) Fly a holding pattern in a secure area. Be aware that predictable actions will make it simple for threat forces to engage and defeat attack helicopter assets.

      (4) Select an altitude and airspeed appropriate for the environmental conditions as well as the tactical situation. Select the appropriate weapon system for the target. Select a weapons release point based on weapons parameters, threat acquisition and employment, and target disposition. Select an egress route from the target area back to the initial point.

      (5) With preengagement planning completed, perform a final weapons systems check, aircraft survivability equipment (ASE) checks, and a review of the target run-in and egress

plans. Prepoint the mast-mounted sight (MMS) to the target area. When ready for execution, depart the initial point at a terrain flight altitude and airspeed appropriate for the environmental conditions and tactical situation.

(6) Perform a cyclic climb (as appropriate) to unmask the MMS (or entire aircraft) and acquire the target. Level the aircraft and maintain nose-to-tail trim. Apply cyclic and directional control as required to obtain weapon system launch constraints. Release weapon(s) at maximum stand-off ranges.

(7) Egress the target area at the selected egress point or prior to threat acquisition or weapons range. Return to the initial point and re-enter the terrain flight holding pattern. Assess the previous attack or prepare for re-attack or abort.

Note 1: Suggested minimum aircraft speed for weapons delivery and maneuver should be at or near predicted maximum rate of climb airspeed. This will provide for a stable delivery platform while maintaining optimum power settings. In an emergency, or during evasive maneuvers, the aircrew should have sufficient power available to accelerate and depart the area.

Note 2: Abort target run-in anytime target area intervisibility is lost or target confirmation is questionable to avoid fratricide.

b. Diving Fire. Diving fire offers advantages of reduced vulnerability to small arms fire, increased armament load, improved accuracy, and better target acquisition and tracking capabilities. The forward airspeed used in the maneuver adds stability to the helicopter and increases the delivery accuracy of weapon systems, particularly rockets. Use of a vertical component in the maneuver results in a smaller beaten zone in the target effect area. The entry altitude, entry airspeed, dive angle, and recovery altitude will depend on the threat, tactical mission profile, ambient weather conditions, aircraft gross weight, and density altitude. The PC will establish the entry altitude and airspeed and determine the minimum recovery altitude.

(1) During weapons initialization, rocket cueing can be set as manual 1000 meters. During day flight an aerial ballistic reference mark (ABRM) (windscreen mark) may be used. Night engagements will require an AIM-1 laser or an ABRM bold enough that can be seen through the NVGs.

(2) Where possible, aircraft systems should be used that can enhance situational awareness. If a good target location can be entered or stored into the aircraft systems, both the horizontal situation display (HSD) and weapon (WPN) sparse vertical situation display (VSD) can be used for distance estimation/orientation. Navigation (NAV) (direct waypoint or next fly-to waypoint) can be used as a driver for rocket cueing.

(3) Upon detecting a target or target hand-over from ground units, the crew will perform actions on contact. Once the crew determines that diving fire is the best course of action, they will develop an attack plan and an attack direction that will provide optimal terrain masking. The PC will select the appropriate weapon system(s) to engage the target. Appropriate airspeed and altitude that will facilitate the attack will be selected. The PC/team lead will brief the attack plan. (Which may include as required: target description, target location, weapon selected, priority of targets, fire distribution, sequence of firing, desired target effect, abort criteria, and post attack actions.)

(4) The crew will align the aircraft with the target area using airspeed and terrain as necessary to maintain aircraft security and to initially set up for the maneuver. Once the aircraft is aligned with the target area, maintain airspeed and torque setting. The P* will ensure the appropriate weapons VSD page is selected and announce the selection to the CPG. The CPG will ensure the master switch and the gun switch, if appropriate, are in the standby and safe position. At a predetermined distance from the target the P* will apply aft cyclic as necessary to an altitude that will ensure intervisibility with the target and desired attack angle. Maintain aircraft power settings during the climb.

(a) As the aircraft reaches the crest of the climb and intervisibility with the target area is attained, the P* will orient the weapon systems on the target. (Use of the four T's—target, torque, trim (both vertically and yaw) and target—will aid in target effects.) During the climb the CPG can place the gun switch in the armed position (if use is anticipated) and notify the P*.

(b) Once the aircraft is oriented on the target the CPG will place the master switch in the armed position. The P* will engage the target area until target effect is achieved, ammunition or range limitations are reached, or the engagement must be terminated for security or other reasons.

(c) Complete the engagement at 300 meters from the target; copilot/ gunner (CPG) will safe the weapons system as the P* is breaking away from the target. Aircraft will be outbound by 200 meters and the target will not be over flown. Crew/team will report target effects and other targets/threats in the engagement area. If subsequent engagements are necessary, the crew/team should consider alternate attack routes and brief a new attack plan.

Note 1: Aircraft systems (horizontal situation display [HSD], rotorcraft mapping system [RMS], target locate, target store, direct waypoint, and prepoint) can be used to assist the crew in maintaining situational awareness.

Note 2: Recommended airspeed and altitude for training is 60 to 80 knots indicated airspeed (KIAS) and altitude as necessary for mission requirements.

Note 3: Crew must have a good understanding of running/diving fire per FM 3-04.140.

Note 4: Crew must have a good understanding of diving flight in accordance with FM 1-203 (will be revised as FM 3-04.203). Crew must understand rate of closure versus recovery altitudes and plan recovery appropriately.

Note 5: Crew must understand maneuvering flight and power available versus power required. Crew must avoid excessive maneuvering that might exceed aircraft maneuvering limitations.

Note 6: Prior to live fire, crew should practice dry fire engagements, if possible, to familiarize themselves with switchology, dive recovery procedures, aircraft performance, and crew coordination.

Note 7: Crew must understand surface danger zones, burst radius, and lethality radius of munitions.

c. Hover fire. Hover fire is conducted with the aircraft normally unmasked below effective translational lift (ETL). When using this technique, station time or armament load may need to be reduced because of power limitations. Because the aircraft is less stable at a hover, the accuracy of some weapon systems is reduced. When possible, move the aircraft between engagements and use point-type weapons as the preferred method of attack. Deliver fires from a firing or attack by fire (ABF)/support by fire (SBF) position after the helicopter is unmasked.

(1) Select a suitable combat position or ABF/SBF position and confirm or verify that there is adequate power available to complete the engagement.

(2) Select a minimum maneuver altitude that will ensure obstacle clearance while masked. The CPG will prepoint the MMS to the target area (for example, engagement area [EA] or NAI). After establishing the aircraft over the pertinent hover fire position, perform a crew briefing and develop egress procedures. Complete final weapons systems checks, ASE checks, and prepare the video tape recorder (VTR), personal computer data transfer system (PC-DTS), personal computer video transfer system (PC-VDTS) for operation.

(3) Unmask the aircraft, or MMS, by either lateral or vertical means and select a minimum safe altitude that provides for minimum exposure while allowing sufficient altitude for lateral and directional movement. Once a target has been detected, classified, or positively identified, the appropriate weapon VSD is selected by the P*. The P* aligns the aircraft to obtain weapons system launch/firing constraints and fires the weapon(s) at maximum stand-off ranges. In accordance with mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC), remask the aircraft.

Note: Movement of the aircraft either forwards or backwards helps stabilize the platform and greatly reduces angular rate errors due to pedal inputs and/or winds.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS:

1. The crew must consider ambient light levels and available contrast, as well as the factors of METT-TC, when selecting the type of fire. Difficulty in determining aircraft altitude and rate of closure and detecting obstacles will increase the fatigue level of the aircrew. The crew must use proper scanning techniques to avoid obstacles and to prevent spatial disorientation.

2. During NVG operation use of the AIM-1 laser and/or the infrared (IR) light (from the trail aircraft) will greatly increase first round target effects. When the AIM–1 or the IR light is established on the target weapon firing should begin. In regards to the IR light, the trail aircraft can illuminate the target area while the lead aircraft is in the climb phase of the maneuver.

3. Due to the effects of muzzle flash and rocket motors under NVG conditions, rates of closure, distance estimation, and depth perception are more difficult to determine than in the day. Crew should consider this when selecting altitudes and airspeeds for each engagement.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and:

Task 1416
Task 2010
Task 2127
Task 2128
Task 2129
FM 3-04.140
TM 1-1520-248-10

TASK 1456

Engage target with the 50-caliber machine gun

CONDITIONS: In an OH-58D helicopter on an approved range or simulated tactical environment.

STANDARDS:

1. Place the system into operation.
2. Engage the target using the appropriate techniques.

DESCRIPTION:

1. Crew actions. While maneuvering the aircraft to align weapons symbology, the pilot on the controls (P*) may divert attention inside the cockpit. The P* must coordinate with the pilot not on the controls (P) prior to doing so. Each crewmember must know where the other is focused during the weapon engagement.

   a. The P* will remain focused outside the aircraft and oriented on the target and is responsible for clearing the aircraft and obstacle avoidance. The P* will acknowledge that P is ready to engage the target and maneuver the aircraft to align the gun symbology on the multifunction display (MFD). The P* will announce firing, and will coordinate with the P when remasking or repositioning the aircraft, and will announce whether inside or outside the aircraft.

   b. The P will keep the mast-mounted sight (MMS) on target, prepare the gun system, and announce when ready to engage or ready for each firing and when the laser is on. The P will assist the P* by monitoring aircraft instruments and by clearing the aircraft duties, permitting. The P will monitor rounds impact, assist the P* to adjust them on target, record battle damage assessment (BDA) data, and can visually check the ammunition chute for rounds. The P will announce whether focused inside or outside the aircraft, and in the event of a malfunction may troubleshoot the gun as briefed.

2. Procedures.

   a. To engage the target, place the armament control panel (ACP) master arm switch in the arm position and the gun switch in the armed position. On the sparse weapons VSD the range information is displayed if the target has been lased. Align the line of sight (LOS) cue with the gun reticle. Pressing the weapons fire switch to the first detent causes the gun to fire until the burst limit is reached. Pressing the weapons fire switch to the second detent causes the gun to fire until the weapons fire switch is released or the ammunition supply is depleted.

   b. AIM 1/2 Laser Engagement: The AIM 1/2 Laser (if installed) may be used to assist in engaging targets. Place the ACP master arm switch in the arm position and the gun switch to the armed position. Turn on the AIM 1/2 Laser by pressing and holding the laser switch located on the Pilots collective. The laser spot can only be seen thru Night Vision Goggles. Fly the aircraft to move the laser spot to the target and engage by depressing the weapons fire switch. The AIM 1/2 Laser is boresighted to the .50-caliber machine gun at 1,000 meters.

   c. Aerial ballistic reference mark (ABRM) (windscreen mark) Engagement:

      (1) Prior to flight:
      Pilot/Co-pilot measures from the bottom seam of the windscreen (where the riveted metal strip meets the windscreen) and marks a point 24 inches up with a grease pencil. Then measure from the center seam of the windscreen outward 12 inches. This is the center point of the ABRM. Mark the point and make parallel 3/8ths inch wide by 3 inch long

horizontal and vertical lines. It should look like the outline of a plus sign. To improve visibility during NVG operations fill the outlined ABRM with "red" grease pencil.

(2) In Flight:
Place the ACP master arm switch in the arm position and the gun switch to the armed position. Fly the aircraft to move the ABRM to the target and engage by depressing the weapons fire switch. Note the impact point of the rounds in relation to the target. Reposition the aircraft so the ABRM is adjusted to effectively place rounds on target.

Note: Live fire is not necessary to complete this task.

Note 2: During periods of high illumination the laser spot may be difficult to see.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. Firing of the weapon system may cause the NVGs to momentarily shut down.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCE: Appropriate common references plus FM 3-04.140.

TASK 1458

Engage target with the Hellfire

CONDITIONS: In an OH-58D helicopter on an approved range or simulated tactical environment.

STANDARDS:

1. Select the appropriate missile delivery mode (lock-on before launch [LOBL], lock-on after launch [LOAL]).
2. Select the appropriate designation techniques (remote or autonomous).
3. Select the proper launch mode (manual, normal, or ripple [RIPL]).
4. Select and configure an appropriate constraints driver for the delivery mode and designation technique.
5. Engage targets with the Hellfire missile system based on the operational parameters of the missile and the tactical situation.

DESCRIPTION:

1. Crew actions. While maneuvering the aircraft into constraints the pilot on the controls (P*) may divert attention inside the cockpit. The P* must coordinate with the pilot not on the controls (P) prior to doing so. Each crewmember must know where the other is focused during the weapon engagement.

   a. The P* will remain focused outside the aircraft and oriented on the target. The P* is responsible for clearing the aircraft and obstacle avoidance and will acknowledge that P is ready to engage the target and maneuver the aircraft into constraints. The P* will announce launching the missile and will coordinate with the P when remasking or repositioning the aircraft.

   b. The P will keep the mast-mounted sight (MMS) on target, prepare the missile system, and announce when ready to engage. The P will announce if the engagement is a single target or multiple targets and will announce ready for each firing and when the laser is on. The P will assist the P* into constraints and clear the aircraft duties permitting and will announce missile impact and record battle damage assessment (BDA) data.

2. Procedures.

   a. Launch Modes

      (1) Manual launch mode.

         (a) The system selects, codes, and readies one missile at a time on the primary code. It will allow the system to step between missiles. These engagements may be employed for autonomous or remote engagements and for LOBL or LOAL engagements.

      (2) Normal launch mode.

         (a) The firing of multiple missiles (in flight simultaneously) with the same laser code is called rapid fire. Normal mode is used to service multiple targets quickly. These engagements may be employed for autonomous or remote engagements and for LOBL or LOAL engagements.

         (b) If two or more missiles are loaded with the primary code, the recommended time interval between missile launches is 8 seconds. Determine the time of flight, maximum delay, laser turn-on time, and laser-on-target time.

(c) During normal mode engagements, the remote Hellfire electronics (RHE) will automatically select, spin-up, and encode all primary coded missiles, until the inventory is exhausted. The RHE will not recode alternate coded missiles.

(3) Ripple launch mode.

(a) The firing of multiple missiles (in flight simultaneously) with two separate laser codes is called ripple fire. Ripple fire engagements require two laser designators. It is employed during autonomous and remote or double-remote missions using LOBL, LOAL, or some combination thereof. As with any remote Hellfire engagement, close coordination is required with the remote designator (air or ground). This coordination will ensure that the launcher designator angle (LDA), designator safety fan, laser code, and laser designation time requirements are met.

(b) Ripple fire engagements can be accomplished automatically if RIPL is selected as the launch mode. In ripple fire engagements, selection of the initial missile code is vitally important. The primary and alternate coded missiles are automatically toggled without any action from the crew. The firing order is selected by the RHE.

Note: Live fire is not necessary to complete this task.

b. **Autonomous missile engagements.** Track the target with the MMS, and designate the target with the laser.

(1) In LOBL mode, primary coded missiles will slave to the MMS line of sight (LOS) when the laser range finder/designator (LRF/D) is armed on the same code as the primary coded missiles. The laser is the constraints driver.

(2) For LOAL autonomous missile engagements- The LOAL constraint driver may be either the MMS Line of Sight (LOS) or the target location entered into the navigation system as a direct waypoint (DIR WPT). To use the MMS LOS as the constraint driver the MMS mode selector switch must be rotated to prepoint (PREPT). The HSD DIR WPT will provide constraint information provided the MMS mode select switch is not in the PREPT position. When the missile system is ready, maneuver the aircraft within launch constraints and verify that all engagement conditions are met before the missile is launched. The range to the target may be obtained by using the laser, the horizontal situation display (HSD) DIR WPT, or the improved data modem (IDM).

c. **Remote Missile Engagements**. Coordinate with the remote designator to ensure that the launcher designator angle (LDA), safety fan, laser code, and laser designation time requirements can be met. Code the missile to the remote designator's laser code. LOBL/LOAL remote constraints drivers are the same as autonomous missile launches. When the missile system is ready, maneuver the aircraft within launch constraints and verify that all engagement conditions are met before the missile is launched. If the MMS is Fixed Forward while using PREPT as the constraint driver the Hellfire system may indicate an in constraint condition regardless of aircraft orientation. Ensure the aircraft is oriented in the proper direction prior to launch. Figure 4-2 shows the standard voice remote Hellfire call for fire.

REMOTE HELLFIRE CALL FOR FIRE

Designator	"D25 this D15 remote hellfire, over."
Shooter	"D25 this D15 remote hellfire, out."
Designator	"Grid FV-1234-5678, over."
Shooter	"Grid FV-1234-5678, out."
Designator	"1 BMP stationary in the open, over."
Shooter	"1 BMP stationary in the open, out."
Designator	"1 missile, LOBL, code 1158, FV 2345-6789 **or** LTL 257°, range 3000m, altitude 250', over."
Shooter	"1 missile, LOBL, code 1158, FV 2345-6789 **or** LTL 257°, range 3000m, altitude 250', out."
Shooter	"Accept or Reject, over."
Designator	"Accept or Reject, out."
Shooter	"Ready, time of flight 20 seconds, over."
Designator	"Ready, time of flight 20 seconds, out."
Designator	"Fire, over."
Shooter	"Shot,over."
Designator	"Shot,out."
Designator	"End of mission, 1 BMP destroyed, FV-1234-5678, over."
Shooter	"End of mission, 1 BMP destroyed, FV-1234-5678, out."

Figure 4-2. Voice Remote Hellfire call for fire

The following checklist (see figure 4-2(a)) is an example of a standardized procedure for analyzing Hellfire engagements for the shooter to ensure that all items are systematically verified. This procedure can be used for remote or autonomous engagements, and LOAL or LOBL shots. Some steps are not required for some types of engagements as noted.

1. Analyze the mission — Assuming the tactical decision to employ a Hellfire has already been assessed, the crew will determine if the particular target is a feasible Hellfire target based on the following technical parameters:

   a. Launcher/designator angle—Determine if the angle created by drawing a line between the observer/designator to the target and then back to the shooter is equal to or less than the maximum allowable. If the tactical situation allows, the shooter may have to reposition to meet requirements to accept the mission. (Remote engagements only, N/A for autonomous engagements).

b. Number of missiles—Determine if the number of missiles requested or required are available. For a remote engagements if the requested number exceeds the number available, the mission may still be accepted with the number of missiles the shooter has available transmitted to the requestor in the accept message.

c. Min/Max range—Determine if the range to the target is within the allowable range for the type of shot to be performed. If the tactical situation allows, the shooter may have to reposition, or may adjust the type of shot (LOAL direct/low/high or LOBL) to meet requirements to accept the mission.

d. Safety fan—The safety fan is predetermined, based on an angle either side of a line from shooter to target. Ensure that the designator is not within the shooters safety fan. If the tactical situation allows, the shooter may have to reposition to ensure the designator is outside the safety fan. Figures 4-2(b) and 4-2(c) are aids that can be utilized to determine the designator safety fan. Instructions for use of each chart are located below each chart respectively.

e. Obstacle clearance—Determine if the missile can clear any obstacles on the gun target line for the type of shot to be performed. The shooter may have to reposition, if the tactical situation allows, or may adjust the type of shot (LOAL low/high) to meet requirements to accept the mission.

f. Cloud height—The crew should attempt to determine if the missile will remain out of the clouds for the type of shot to be performed. This can be accomplished by visually confirming the cloud ceiling, based on the forecast. If cloud ceiling is a concern, the lowest trajectory can be achieved by shooting LOAL direct with maximum laser delay.

Note: If the shooter must reposition to meet the requirements to accept the mission, the accept message may be sent prior to moving.

2. Accept or reject mission—Based on the analysis of tactical considerations and technical parameters. For remote engagements, this is done by sending the accept or reject message, the accept message will include all changes made to meet the technical parameters verified in the analysis.

3. Missile set-up—The following items must be verified:

a. Laser codes—Ensure the missile(s) is/are coded to the match the laser code of the lasing participant.

b. Launch mode—Choose manual, normal, or ripple based on the mission requirements.

c. Delivery mode—Choose LOAL direct, LOAL low, LOAL high, or LOBL based on the mission requirements.

4. Choose and set constraints driver(s)—The constraints driver(s) is what the weapon system uses to determine if the Hellfire missile is correctly pointed at the target. For LOAL shots the choices for the azimuth constraints drivers include the MMS or navigation systems, for LOBL the properly coded laser energy will drive the in-constraints or out-of-constraints indication.

5. Arm the armament control panel master arm switch if not already armed.

6. Constraints—Verify on the pilot's sparse Hellfire vertical situation display (VSD) that there is an in constraints (solid box) indication.

7. The Hellfire is now ready to be fired. For remote engagements the ready command can be sent. After the ready command the shooter must wait for the fire command from the observer. The observer must be prepared to LASE when the fire command is sent.

8. Shoot the mission—After the fire command is received the launch aircraft will transmit voice "Shot, Over" and will launch the missile(s) only upon receipt of a "Shot, Out" from the designator.

9. Standby—Reset switches (master arm, launch mode, laser) as required by the situation. Recode remaining Hellfire missiles as necessary. Remove unnecessary constraints drivers (direct waypoint/prepoint and so forth).

Note 1: Launch aircraft must be prepared to fire additional missiles due to a miss, malfunction, or multiple targets. Designator will transmit "Repeat, Over" to launch aircraft if another missile is required. If more than one additional missile is desired, the call should include the number of missiles and missile separation time (for example, "repeat, three missiles, 20 seconds, over").

1. Analyze the mission.
   a. LDA.
   b. Number of missiles.
   c. Min/max range.
   d. Safety fan.
   e. Obstacle clearance.
   f. Cloud height.
2. Accept or reject mission (based on analysis).
3. Missile set-up.
   a. Laser codes.
   b. Launch mode.
   c. Delivery mode.
4. Choose and set constraints driver(s).
5. Master arm switch – arm.
6. Constraints – verify.
7. Ready.
8. Shoot the mission.
9. Standby, reset hellfire missile codes, remove constraints drivers.

Figure 4-2 (a). Sample of a Hellfire Engagement checklist

SAFETY FAN CHART

OFFSET ANGLE

SHOOTER RANGE TO TARGET	10	15	20	25	30	35	40	45	50	55	60
8	6223	5657	5222	4883	4619	4414	4257	4141	4062	4015	4000
7.5	5834	5303	4895	4578	4330	4138	3991	3882	3808	3764	3750
7	5445	4950	4569	4273	4041	3862	3725	3623	3554	3513	3500
6.5	5056	4596	4243	3968	3753	3586	3459	3365	3300	3262	3250
6	4667	4243	3916	3662	3464	3310	3193	3106	3046	3011	3000
5.5	4278	3889	3590	3357	3175	3034	2926	2847	2792	2761	2750
5	3889	3536	3264	3052	2887	2758	2660	2588	2539	2510	2500
4.5	3500	3182	2937	2747	2598	2483	2394	2329	2285	2259	2250
4	3111	2828	2611	2442	2309	2207	2128	2071	2031	2008	2000
3.5	2723	2475	2284	2136	2021	1931	1862	1812	1777	1757	1750
3	2334	2121	1958	1831	1732	1655	1596	1553	1523	1506	1500
2.5	1945	1768	1632	1526	1443	1379	1330	1294	1269	1255	1250
2	1556	1414	1305	1221	1155	1103	1064	1035	1015	1004	1000

1. During a remote Hellfire, the designator will give the target GRID, LTL, and DISTANCE to the target.
2. Enter the target grid to determine your HEADING and DISTANCE to the target.
3. Subtract your heading to the target (GTL) from the designator's heading to the target (LTL) to determine the OFFSET ANGLE.
4. Enter the top of the chart at the OFFSET ANGLE and follow the column down to intercept the designators range to target. If the exact range is not depicted on the chart, always round down to the nearest range. From that range follow the row to the outside of the chart to determine the shooters maximum distance in kilometers, from the target that the shooter can be to ensure the designator will remain outside of the 30 degree safety fan.

Figure 4-2 (b). Hellfire Remote-Engagement Safety Fan Chart

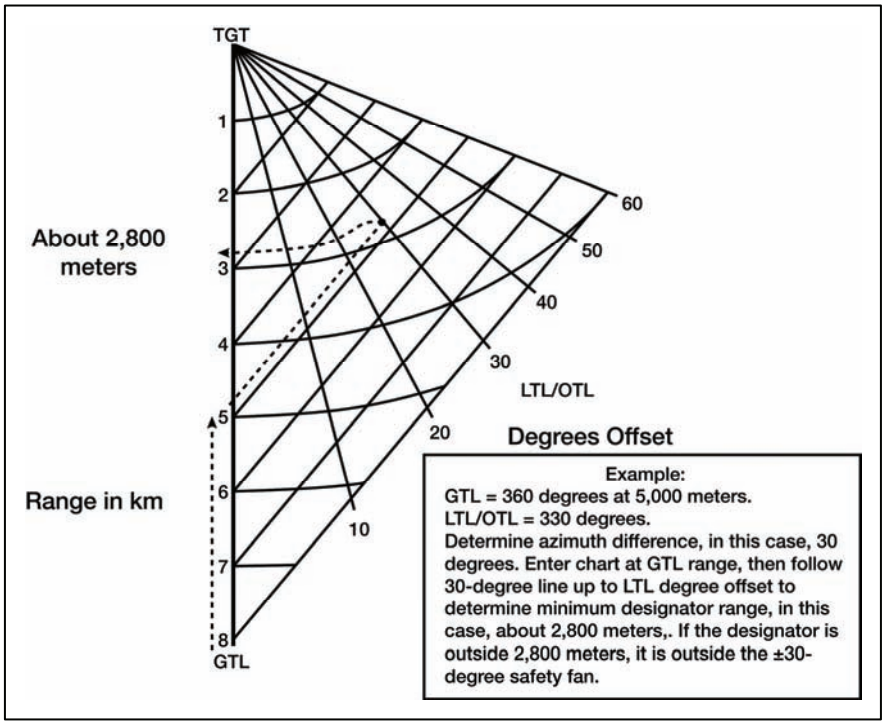


Figure 4-2 (c). Hellfire Remote-Engagement Safety Fan Chart

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. Firing of the weapon system may cause the NVGs to momentarily shut down.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and FM 3-04.140.

TASK 1462

Engage target with rockets

CONDITIONS: In an OH-58D helicopter on an approved range or in a simulated tactical environment.

STANDARDS:

1. Place the system into operation.
2. Engage the target using the appropriate techniques.

DESCRIPTION:

1. Crew actions. While maneuvering the aircraft to align symbology, the pilot on the controls (P*) may divert attention inside the cockpit. The P* must coordinate with the pilot not on the controls (P) prior to doing so. Each crewmember must know where the other is focused during the weapon engagement.

   a. The P* will remain focused outside the aircraft and oriented on the target and is responsible for clearing the aircraft and obstacle avoidance. The P* will acknowledge that the P is ready to engage the target and maneuver the aircraft to align the rocket symbology on the multifunction display (MFD). The P* will announce firing the rockets, will coordinate with the P when remasking or repositioning the aircraft, and will announce whether focused inside or outside the aircraft.

   b. The P will keep the mast-mounted sight (MMS) on target, prepare the rocket system and announce when ready to engage or ready for each firing and when the laser is on. The P will assist the P* by monitoring aircraft instruments and clear the aircraft duties permitting. The P will announce rocket impact and record battle damage assessment (BDA) data, and keep track of the number of rockets fired, and announce whether focused inside or outside the aircraft.

2. Procedures.

   a. To engage the target, place the armament control panel (ACP) master arm switch in the arm position. From the sparse weapons vertical situation display (VSD) verify and change as necessary the rocket firing mode, volley mode, fuse timing, cueing information, and selected zone. The pitch attitude cue driver is selectable between laser information, navigation system range to waypoint, or a manually entered distance. Turn the aircraft to align the heading with the rocket steering cue.

   b. AIM 1/2 Laser Engagement: The AIM 1/2 Laser (if installed) may be used to assist in engaging targets. Place the ACP master arm switch in the arm position. Turn on the AIM 1/2 Laser by pressing and holding the laser switch located on the Pilots collective. The laser spot can only be seen thru Night Vision Goggles. Fly the aircraft to move the laser spot to the target and engage by depressing the weapons fire switch. The AIM 1/2 Laser is boresighted to the rockets at 1,000 meters.

   c. Aerial ballistic reference mark (ABRM) (windscreen mark) Engagement:

      (1) Prior to flight:

      Pilot/Co-pilot measures from the bottom seam of the windscreen (where the riveted metal strip meets the windscreen) and marks a point 24 inches up with a grease pencil. Then measure from the center seam of the windscreen outward 12 inches. This is the center point of the ABRM. Mark the point and make parallel 3/8ths inch wide by 3 inch long horizontal and vertical lines. It should look like the outline of a plus sign. To

improve visibility during NVG operations fill the outlined ABRM with "red" grease pencil.

(2) In Flight:

Place the ACP master arm switch in the arm position. Fly the aircraft to move the ABRM to the target and engage by depressing the weapons fire switch. Note the impact point of the rocket in relation to the target. Reposition the aircraft so the ABRM is adjusted to effectively place the rockets on target.

Note: Live fire is not necessary to complete this task.

Note: During periods of high illumination the laser spot may be difficult to see.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. Firing of the weapon system may cause the NVGs to momentarily shut down.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and FM 3-04.140.

TASK 1471

Perform target handover

CONDITIONS: In an OH-58D helicopter or classroom environment.

STANDARD: Use the proper communications procedure to accomplish a target handover.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for aircraft control and obstacle avoidance. The P* will coordinate with the pilot not on the controls (P) as to who will make the handover.

   b. The P may use the mast-mounted sight (MMS) to locate and identify the target and will prepare the information for the handover and coordinate with the P* prior to sending it. The P will assist in clearing the aircraft and obstacle avoidance as duties permit.

2. Procedures.

   a. **Target handover call for fire.** (See Figure 4-3) The target handover call for fire is a voice target handover to an attack aircraft. The standard elements for the target handover call for fire are:

      (1) Observer identification and warning order. This identifies the requesting aircraft and alerts the attack aircraft of the upcoming mission (for example, "K13, this is K06, fire mission (gun or rockets), over).

      (2) Target, location, description, and mark (if applicable). This gives the location and description of the target, and the type of mark used by the target handover aircraft. For target location, the target handover aircraft may reference from a known point (the target reference line or the engagement area), use grid coordinates, or spot with a laser (for example is "120 degrees at 2,800 meters" or "offset left 030 degrees [code].").

      (3) Execution. Gives the command to initiate the attack. The two commands are as follows:

         (a) At my command. The attack aircraft engages when commanded to "fire"

         (b) When ready. The attack aircraft fires when ready.

Target Handover call for fire	
a.	Observer identification and warning order
	(1) Observer: D25 this is D15, fire mission rockets, over.
	(2) Shooter: D15 this is D25, fire mission rockets, out.
b.	Target location, description and mark (if applicable)
	(1) Observer: Grid FA 123456, 1 BMP stationary, over.
	(2) Shooter: Grid FA 123456, 1 BMP stationary, out.
c.	Execution
	(1) Observer: When ready, over
	(2) Shooter: When ready, out

Figure 4-3. Target Handover call for fire

b. **Close Combat Attack (CCA) call for fire**. (See Figure 4-3(a)) The CCA call for fire is used as a hasty or deliberate attack brief from a ground maneuver element. It provides clear and concise information in a logical sequence that enables attack/recon aircraft to rapidly employ their weapon systems in close proximity to friendly forces. The normal CCA call for fire consists of five elements. The five elements, in the sequence in which they are transmitted, are discussed below.

(1) Observer identification and warning order. This identifies the ground maneuver element and alerts the attack/recon aircraft of the upcoming mission.

(2) Friendly location and position mark. This provides the attack/recon aircraft the location of the ground maneuver element and the method of marking friendly position.

(3) Target location. This gives the attack/recon aircraft the target location. The target location is generally transmitted by the direction (in degrees magnetic) and distance (in meters) from the ground maneuver element to the target location; however, a TRP or Grid may be used in lieu of direction and distance to the target.

(4) Target description and target mark. This describes the target and relays to the attack/recon aircraft the type of mark (if any) that will be used to identify the target.

(5) Remarks. This is for any extra information needed for the attack aircraft (for example, Threats, Danger Close Clearance, Restrictions, At My Command, Egress Direction, and so forth).

Close Combat Attack call for fire

1) Observer identification and warning order

(a) Observer: D25 this is Panther 03, fire mission, over

(b) Shooter: Panther 03 this is D25, fire mission, out.

2) Friendly location and position mark

(a) Observer: My position is FA 13458765 (TRP, grid), marked by strobe (Strobe, IR Pointer, Smoke), over.

(b) Shooter: Your position is FA 13458765, marked by strobe, out.

3) Target location

(a) Observer: Target, 270 degrees, 1200 meters, over. (Bearing (Magnetic) & Range (meters) TRP, Grid, ETC)

(b)Shooter: Target, 270 degrees, 1200 meters

4) Target description and target mark

(a) Observer: 1 mortar team in the open, marked by IR pointer (IR pointer, tracer), over.

(b) Shooter: 1 mortar team in the open, marked by IR pointer out.

5) Remarks

(a) Observer: (Any Threats, Danger Close Clearance, Restrictions, At My Command, etc)

Figure 4-3 (a). Close Combat Attack call for fire

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in the aircraft, cockpit procedural trainer (CPT), or academically.
2. Evaluation may be conducted in the aircraft or academically.

REFERENCES: Appropriate common references.

TASK 1472

Perform aerial observation

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Detect the target using visual search techniques and mast-mounted sight (MMS).
2. Identify the target.
3. Locate the target.
4. Report the target as briefed.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for clearing the aircraft and obstacle avoidance. The P* will maintain aircraft orientation and perform reconnaissance of the assigned sector as duties permit.

   b. The pilot not on the controls (P) will operate the MMS, navigation, and communications systems. When scanning the area, he should concentrate on avenues of approach while periodically scanning adjoining terrain. The P can use the prepoint mode to aid orientation and will select mutually supportive fields of view when working with other aircrews. (This will ensure coverage of "dead spaces" that may exist in front of the aircraft.) The P will perform reconnaissance of his assigned sector and announce when attention is focused inside the cockpit. Duties permitting, the P will assist the P* in clearing the aircraft.

2. Procedures.

   a. Visual/sensor search is the systematic search of a given area so that all parts of the area are observed or scanned. The purpose of visual/sensor search is to detect objects (targets) or activities.

      (1) Detection. Detection requires determination 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. Determining the exact location of targets is the objective of the mission. Depending on the nature of the targets, the P may be able to locate the center of mass or the boundaries of the entire area with the laser range finder/designator (LRF/D).

      (4) Reporting. Spot reports provide commanders with critical information during the conduct of 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.

   b. The ability of a crewmember 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 of survivability considerations.

      (2) Airspeed. Selection of the airspeed is determined by the altitude, the terrain, the threat, and meteorological conditions.

      (3) Terrain and meteorological conditions. The size and details of the area that can be effectively covered largely depend on the type of terrain, such as dense jungle or barren

wasteland. 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 for camouflage will differ from the color of natural foliage. Color cannot be detected with the MMS.

(b) Texture. Smooth surfaces, such as glass windows or canopies, will shine when reflecting light. Rough surfaces will not.

(c) Shadows. Man-made objects cast distinctive shadows characterized by regular shapes and contours, as opposed to the random patterns, which occur naturally. The thermal imaging sensor (TIS) level may be increased to search in shadows.

(d) Trails. Trails leading into an area should be observed for cues as to the type and quantity of traffic, and how recently it passed. Vehicle trails, especially at night, can often be detected with the TIS for some time after a vehicle has passed.

(e) Smoke. Smoke should be observed for color, smell, and volume. The TIS can be used to determine the cause of the smoke.

(f) Movement and light. The most easily detectable sign of enemy activity is movement and, at night, light. Movement may include disturbance of foliage, snow, soil, or birds.

(g) Obvious sightings. The enemy is skillful in the art of camouflage. The P*/P must be aware that obvious sightings may be intentional because of high concentrations of antiaircraft weapons.

(h) Heat. Heat, especially at night, is normally a sign of man-made objects. The TIS can be used to detect heat from standoff ranges and through some obscurations.

c. The techniques that provide systematic methods for conducting visual aerial observation, with or without the use of the MMS, are motive and stationary. The technique used will depend 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 at airspeeds of generally 10 knots indicated airspeed (KIAS) or faster. The entire area on either side of the aircraft is divided into two major sectors: the nonobservation sector and the observation work sector. The nonobservation sector is the area where the crewmember's field of vision is restricted by the physical configuration of the aircraft. 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 and recognition sectors.

(a) The acquisition sector is the forward 45-degree area of the observation work sector. This is the primary area of search.

(b) The recognition sector is the remainder of the observation work sector. In using the motive technique, the crewmember looks forward of the aircraft and through the center of the acquisition sector for obvious sightings. The crewmember then scans through the acquisition sector, gradually working back toward the aircraft.

(2) Stationary technique. This technique is used at NOE altitudes with the helicopter hovering in a concealed position. When using the stationary technique, the crewmember makes a quick overall search for sightings, unnatural colors, outlines, or movements. The crewmember starts scanning to the immediate front, searching an area approximately 50 meters in depth. The crewmember continues to scan outward from the aircraft, increasing

the depth of the search area by overlapping 50-meter intervals until the entire search area is covered.

d. During terrain flight the MMS can be used to clear terrain and detect targets. Depending on the factors of mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC), the aircraft may initially be unmasked so the area can be quickly scanned for obvious sightings. After the area has been scanned, remask the aircraft, move to a new position, and unmask only the MMS (Task 1410 describes masking and unmasking procedures). Once the MMS is unmasked then scan the area using the wide field of vision (WFOV) feature of the television sensor (TVS) or TIS.

(1) The MMS has the following search capabilities, which should be used to the fullest advantage. They are—

(a) Forward-manual search. The TIS WFOV white hot/black hot (WHOT/BHOT) is normally used to initially scan the desired viewing area for obvious enemy sightings.

(b) Area track. This allows for viewing likely avenues of approach or target areas.

(c) Prepoint mode. Prepoint mode allows the MMS to be oriented on specific points on avenues of approach while periodically scanning the adjoining terrain. It can also be used as an aid in orienting the MMS. The MMS can prepoint to any waypoint stored in the waypoint list.

(d) Search mode. This is used to search large open areas, target areas, or avenues of approach in a predetermined search pattern.

(2) The crew can use four techniques to display the MMS sensors on the multifunction displays (MFDs). They are--

(a) Single screen. The crewmember can use any of the MMS modes/sensors as desired. The TIS is the quickest mode for detecting targets, which give off heat.

(b) Dual screen daytime. One MFD should be in the TIS mode and properly adjusted for maximum target detection. The other MFD should be in the TVS mode. This allows the crewmember to maintain battlefield orientation with one MFD while searching for hot spots with the other. This technique is especially useful when searching for targets in dense vegetation.

(c) Dual screen nighttime. Both MFDs may be operated in the TIS mode.

(d) Split screen. Split screen may be used in a similar fashion to dual screen daytime. The MMS symbology is only displayed on the active sensor's video image (TVS/ TIS/TISU). Except for line of sight (LOS), only the active sensor's controls may be manipulated. The fields of view (wide or narrow) and the magnification are independently selectable between the two sensors. Some individuals may experience visual reference problems when using split screen with both sensors in the same field of view. If visual reference problems are encountered, one sensor should be operated in wide field of view and the other sensor in narrow field of view.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. Transfer of controls should be covered in detail. When maneuvering the aircraft the P* must consider obstacles and other aircraft. The P should announce when attention is focused inside or outside the cockpit and should ensure that the P* maintains attention outside the cockpit. All crewmembers must avoid fixation by using proper scanning techniques.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and TB MED 524.

TASK 1473

Call for indirect fire

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Remain oriented on the target while repositioning the aircraft.
2. Mask and unmask the aircraft, as required.
3. Transmit and process an indirect fire mission request.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for clearing the aircraft and obstacle avoidance and will focus primarily outside the aircraft. The P* will announce any maneuver or movement before execution and inform the pilot not on the controls (P) if visual contact is lost with other aircraft. The P* will coordinate with the P as to who will make the call for fire.

   b. The P will operate the mast-mounted sight (MMS) and assist the P* as necessary. The P will announce when attention is focused inside the cockpit and will coordinate with the P* as to who will make the call for fire.

2. Procedure. Acquire and locate the target and relocate the aircraft as necessary. Prepare and transmit the fire order, including the laser code if for Copperhead (CPHD). Continue to relocate the aircraft as necessary while remaining oriented on the target. Field artillery will respond with a message to observer, which should include the time of flight of the rounds. The "splash" call should come five seconds before impact. LASE the target for the appropriate amount of time before the CPHD impacts.

   a. Call-for-fire elements (conventional or CPHD).

      (1) Observer identification (“Y33 this is B06 over”).

      (2) Warning order – adjust fire, fire-for-effect, suppression, immediate suppression.

      (3) Method of target location. Target location is transmitted—

      (a) As a specific grid coordinate to the nearest 10 meters (for example, grid FV 12345678). (The target locate is the most accurate means of obtaining this information.)

      (b) As a known point (for example, those preplanned targets using the target designator [Target AB 1002]).

      (c) As a shift from a known point (from target AB 1002, direction 030 degrees, right 400, add 400).

      (4) Target description (“infantry in the open”).

      (5) Method of engagement.

      (a) Type adjustment. Unless precision fire is specified, area fire will be used.

      (b) Danger close.

      (c) Mark.

      (d) Trajectory. Unless high angle is requested low angle will be fired.

(e) High explosive (HE), CPHD, variable time-fuse (VT), improved conventional munitions (ICM), dual purpose improved conventional munitions (DPICM), Smoke.

(f) Distribution. Converged or open sheaf.

(6) Method of fire and control (at my command, cannot observe, time on target, continuous illumination, repeat).

Note: All CPHD missions are "at my command."

b. If adjustment is needed, send in corrections using either the original adjustment line or a new adjustment line.

(1) Direction – "045 degrees, left 150, add 200, over."

After the correction send fire for effect or repeat, as required. When the target is neutralized request to, "record as target," if desired. Send an "end of mission" message with a battle damage assessment (BDA) or an "unable to observe" message.

c. Methods to compute adjustment.

(1) Sight-width method. This method can be used when the target locate function is not operational. It is the least accurate method of the three but is the fastest manually. To make an add or a drop correction, compute the difference between the range to the target and the range to the point of impact. To make a lateral correction, calculate the field of view of the sensor. Once the width of the screen is determined in meters, place the target on the edge of the screen. Then compare it with the point of impact of the round to make adjustments.

(2) Observer-target (OT)-360 method. To use this method, all subsystems, except the IDM, must be accurate and functional. The CPG target locates the point of impact and then subtracts the easting and northing coordinates of the point of impact from the coordinates of the target.

Note 1: The P* should not unmask the aircraft in the same place twice.

Note 2: The OT-360 line is always 360 degrees.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. When maneuvering the aircraft to maintain the MMS on target, the P* must consider obstacles and other aircraft. The P should assist the P* with obstacle avoidance and clearing the aircraft and announce when doing so.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and FM 6-30.

TASK 1474

RESPOND TO NIGHT VISION GOGGLE FAILURE

CONDITIONS: In an OH-58D helicopter given an oral or visual cue that the night vision goggles (NVG) have failed.

STANDARDS:

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 illumination of the 30-minute low-voltage warning indicator. It also may be indicated by one or both tubes flickering or blanking.

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft and 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" and transfer the controls to the pilot not on the controls (P).

   b. If the P's NVGs fail or indicate impending failure, the P will announce "GOGGLE FAILURE." 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, with a copilot, and with the copilot gunner (CPG) cyclic engaged, the P* will-

      (1) Immediately announce "GOGGLE FAILURE" and begin a climb at a rate that will ensure obstacle avoidance.

      (2) Transfer the flight controls, if necessary.

      (3) Discontinue the mission 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 NOE or contour flight with a copilot, and with the CPG cyclic disengaged, the P* will—

      (1) Immediately announce "GOGGLE FAILURE" and begin a climb at a rate that will ensure obstacle avoidance.

      (2) Look underneath the goggles and use aircraft lighting as appropriate to make the transition to unaided flight.

      (3) Discontinue the mission 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.

   During low-level flight or flight conducted at higher altitude, use the procedure described in paragraph 2b above. A climb is not required.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and TM 11-5855-263-10.

TASK 2010

PERFORM MULTIAIRCRAFT OPERATIONS

CONDITIONS: In an OH-58D helicopter and given a unit standing operating procedure (SOP).

STANDARDS:

1. Participate in a formation flight briefing in accordance with unit SOP and the mandatory items per the multi-aircraft operations briefing checklist.
2. Perform formation flight and techniques of movement as briefed.
3. React to loss of visual contact in accordance with the unit SOP.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will focus primarily outside the aircraft, maintaining contact with the other aircraft in the formation. The P* will announce any maneuver or movement before execution and inform the pilot not on the controls (P) if visual contact is lost with other aircraft. If visual contact is lost with other the aircraft, the crew will immediately notify the flight and begin reorientation procedures. If instrument meteorological conditions (IMC) are encountered execute IIMC breakup as briefed.

   b. The P will provide adequate warning of traffic or obstacles detected in the flight path and/or identified on the map. The P will assist in maintaining aircraft separation. He will inform the P* if visual contact is lost with other the aircraft, and if threat elements are detected or sighted. The P will perform duties as briefed and will notify the P* when attention is focused inside the aircraft. The P should frequently assist the P* by communicating his situational awareness perceptions and formation/multi-ship observations. Additionally the P should assist the P* by monitoring aircraft systems, operating the navigation system, and by scanning the air route for possible enemy activity or other hazards and obstacles that could impact the integrity and security of the flight.

Note: The most important consideration when an aircraft has lost visual contact with the flight is immediately notify the flight and execute reorientation procedures. Except for enemy contact, all mission requirements are subordinate to this action.

2. Procedures**.** Maneuver into the flight formation, changing position as required. Maintain horizontal and vertical separation for the type of formation being flown. If the tactical situation requires, perform techniques of movement as briefed. The following procedures will be performed unless otherwise established in unit SOPs.

   a. **Takeoff:** All helicopters should leave the ground simultaneously. The trailing aircraft must remain at a level altitude or stack up 1-10 ft vertically to remain out of the disturbed air of the aircraft in front of them. In the event an aircraft in the flight loses visual contact with the formation they will immediately make a radio call to the formation and the P* will initiate a climb above the briefed cruise altitude and attempt reorientation of the formation.

   b. **Cruise:** Free cruise formation should be employed when operating at terrain flight altitudes or in a combat environment. This will allow the individual aircraft more flexibility to move within the formation avoiding terrain, obstacles and enemy threat. During periods of degraded visibility, crews are more susceptible to losing other aircraft in the formation. Crews should consider flying a close formation to maintain orientation on the flight. In the event an aircraft in the flight loses visual contact with the aircraft they are following, they will immediately make a radio call to lead. Lead will announce; heading, altitude and airspeed. Lead must maintain this

heading, altitude and airspeed until all aircraft have rejoined the flight. The aircraft that has lost visual contact with the flight will immediately assume the flights heading and airspeed in order to maintain horizontal separation as briefed. If enemy and terrain allow, the aircraft that has lost visual contact will also maintain vertical separation by initiating a climb to a briefed altitude. When a flight becomes separated immediate altitude separation is a quick and efficient way to prevent an accident. Unit SOPs must state the procedures for reestablishing contact with the flight. Considerations should include but are not limited to rallying to an in-flight link-up, rallying to a known point, use of covert/overt lighting, and ground rally. METT-TC, power available and ambient light will influence how contact is reestablished. When a flight rallies to a known point, the point may be an ACP along the route, position sent by lead, or a terrain feature. Situations may occur when an aircraft rejoins the flight in another position than briefed. Mission commanders should use altitude, a WPT/TGT, cardinal direction or other method (manmade or natural features) to maintain separation. Only after the entire flight is formed should the mission commander proceed with the mission.

c. **Approach:** The lead aircraft must maintain a constant approach angle so other aircraft in the formation will not have to execute excessively steep, shallow, or slow approaches. Aircraft should not descend below the aircraft ahead of them in the formation and entering their rotor-wash. This could result in an over-torque, loss of aircraft control, or entering a settling with power condition. In the event an aircraft in the flight loses visual contact with the formation, they will immediately make a radio call to the formation and execute a go around in the briefed direction**.**

d. **Aircrew Briefing:** All multi-aircraft operations will be briefed using a unit approved multi-aircraft/mission briefing checklist. The following are mandatory briefing items and must be included in all multi-aircraft briefings.

MULTI-AIRCRAFT OPERATIONS BRIEFING CHECKLIST
1. Formation type(s): Takeoff, Cruise, Approach 2. Altitude 3. Airspeed: Outbound to SP, Cruise, Inbound from RP 4. Aircraft lighting 5. Loss communications procedures 6. Lead change procedures 7. Loss of visual contact/in-flight link-up / rally points 8. Actions on contact 9. IIMC procedures 10. Downed aircraft procedures / Personnel Recovery / CSAR

Table 4-1. Multi-aircraft operations briefing checklist

NIGHT OR NIGHT VISION DEVICE (NVD) CONSIDERATIONS: Increase the interval between aircraft to a minimum of three to five rotor disks. Keep changes in the formation to a minimum. All crewmembers must avoid fixation by using proper scanning techniques.

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. Lighting will be in accordance with AR 95-1 and unit SOP.

2. NVG. When conducting NVG formation flight, the crew should use the formation lights and if equipped the IR anti-collision and position lights to maintain the aircraft's position in the formation.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 2043

Perform downed aircraft procedures

CONDITIONS: In an OH-58D helicopter, or classroom.

STANDARDS:

1. Without delay, zeroize all data in the control and display subsystem (CDS) and improved data modem (IDM) in accordance with operator's manual.
2. Without delay, remove, secure, or destroy critical items such as maps, signal operation instructions (SOI), ordnance, and special equipment.
3. Properly administer first aid to injured personnel.
4. Accurately report the situation using the prescribed elements of information.
5. From memory, know the procedure for destroying the aircraft.

DESCRIPTION:

1. Crew actions. The actions to be taken by the crew of a downed aircraft will depend on the intensity of the threat and the capabilities of the aviation unit. In combat operations the recovery of downed aircraft is secondary to mission accomplishment by the total force.
2. Procedures.

a. Low threat environment. If the aircraft is downed in a low threat environment, the crew should—

(1) Zeroize the CDS and IDM in accordance with the operator's manual.

(2) Remove, secure, or destroy critical items (such as classified material, ordnance, and sensitive equipment).

(3) Administer first aid to injured personnel.

(4) Use the fastest means available to report the situation to the aviation commander. Elements of information to include in the report are—

(a) Identification.
(b) Location.
(c) Personnel injured and personnel able to continue the mission.
(d) Condition of the aircraft.
(e) Evidence of chemical, biological, radiological, and nuclear (CBRN) contamination.
(f) Enemy situation, to include the air defense threat.
(g) Accessibility to the downed aircraft.
(h) Intentions.

b. High threat environment. If the aircraft is downed in a high threat environment, the crew should accomplish the actions described in a. In addition, the crew should—

(1) Secure the immediate area around the aircraft.

(2) Prepare the aircraft for destruction on order or as specified in the unit SOP or mission briefing.

(3) Move to a rendezvous point or follow the escape and evasion plan in the unit SOP or mission briefing.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and:
FM 1-400
TM 750-244-1-5
Unit SOP

TASK 2050

Develop an emergency GPS recovery procedure

> **WARNING**
>
> **This procedure is designed strictly for recovery under VMC and for inadvertent instrument metrological conditions (IIMC). This procedure will not be used for a planned IFR flight unless approved by USAASA. This emergency recovery procedure is only authorized to be flown when the situation prevents the use an approved instrument procedure.**

Note: This task should be selected for instrument examiners.

CONDITIONS: With a tactical or aeronautical map with current obstruction information. A mission planning system with digital maps and recent CHUM may be used to aid in developing this procedure.

STANDARDS:

1. Select a suitable recovery/landing area and coordinate, if required, airspace de-confliction.
2. Select an approach course (degrees magnetic), a missed approach course, Final Approach Fix (FAF), Missed Approach Point (MAP), Intermediate Approach Fix (IF), Initial Approach Fix (IAF) and Missed Approach Holding Fix (MAHF).
3. Determine obstacle clearance for the Final, MAHF, Missed, Intermediate, Initial segments, and the MSA.
4. Determine altitudes based on obstacle clearance for FAF, MAHF, MAP, IF, IAP, and MSA.
5. Determine the appropriate obstacles in the missed approach segment and determine 20:1 slope penetration.
6. Establish a 3 NM holding pattern at the MAHF.
7. Prepare an emergency recovery procedure diagram per the example.
8. Complete a suitability/flyability check, to include loading waypoints, under VMC to validate the procedure.

Note: All altitudes are in feet MSL, all waypoints are LAT/LONG, all distances are NM and visibility is SM. All obstacles are MSL unless otherwise noted. The FIH has the necessary conversion tables.

> **WARNING:**
>
> **Ensure coordinates for maps and GPS are the same datum (such as WGS-84) or points on the ground may be off significantly and obstacle clearance will be questionable.**

Note: PPS refers to the GPS precise positioning service. It is DOD policy that military aircraft operate with the GPS in the PPS mode.

Note: Complete the enclosed figures for determining approach criteria. The width cannot be adjusted.

DESCRIPTION:

1. **Select The Most Suitable Recover/Landing Area.**
   a. Select an area based on METT-TC and obstacles. Ensure proper coordination for airspace de-confliction has been accomplished.
2. **Final Approach Segment (Fig 4-4(e)):**
   a. Final Approach Segment – The final approach segment begins at the FAF and ends at the MAP.
   b. Determine the MAP (normally associated with the landing area or threshold).
   c. Determine the FAF. The minimum distance is 3 NM from the MAP. The maximum length is 10 NM. The optimum length is 5 NM. The width is 2.4 nm (1.2nm on either side of centerline).
3. **Determine the Missed Approach Holding Fix (MAHF)**
   a. Determine the MAHF for the landing area.
   b. The minimum distance is 3 NM and the maximum distance is 7.5 NM from the MAP. The optimum distance is 5 NM. The holding pattern leg will not exceed 3 NM. The width is 4 nm (2nm on either side).

Solution: (A) _____ (rounded up nearest 100 ft) + (B) 1000' = (C) _____ (MAHF Altitude)

(A) = Highest obstacle within 10nm centered on the MAHF

Figure 4-4. MAHF Altitude Calculation Diagram.

4. **Missed Approach Segment (Fig 4-4(f)):**
   a. The missed approach segment will start at the MAP and ends at a holding point designated by a MAHF.
   b. Optimum routing is straight ahead (within 15 degrees of the final approach course) to a direct entry. A turning missed approach may be designated if needed for an operational advantage, but is not discussed in this task due to the complexity of determining obstacle clearance.
   c. The area of consideration for missed approach surface and the 20 to 1 obstacle clearance evaluation for all rotary-wing.
5. **Intermediate Approach Segment (Fig 4-4(d))**
   a. The intermediate segment begins at the IF and ends at the FAF.
   b. Determine the IF. The minimum distance is 3 NM and the maximum distance is 5 NM from the IF to the FAF. The width is 4 nm (2nm on either side).

6. **Initial Approach Segment (Fig 4-4(c))**
   a. The initial approach segment begins at the IAF and ends at the IF.
   b. Determine the IAF. Up to three IAFs are allowed. The minimum distance is 3 NM from the IF and the maximum distance is 10 NM. The width is 4 nm (2nm on either side).

7. **Determine The MSA For The Landing Area.**
   a. Use the Of f Route Obstacle Clearance Altitude (OROCA) or Off Route Terrain Clearance Altitude (ORTCA) elevation from the Enroute Low Altitude (ELA) chart for the area of operations, if available.
   b. Select the highest altitude within 30 NM of the MAP.
      (1) If an ELA is not available, the minimum sector altitude will be determined by adding 1000 feet to the Maximum Elevation Figures (MEF). When a MEF is not available, apply the 1000 feet rule to the highest elevation within 30 NM of the MAP.
      (2) Minimum Sector Altitudes can be established with sectors not less than 90° and with sector obstacle clearance having a 4 NM overlap. Use the figure below for determining MSA.

Solution: (A) _____ (rounded up nearest 100 ft) + (B) 1000' = (C) _____ (MSA)

(A) = Highest obstacle within 30nm centered on the MAP

Figure 4-4 (a). MSA Calculation Diagram.

8. **The Procedures Diagram.**
   a. 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 as outlined in the example to execute the procedure.
   b. The Plan View. The plan view will include the following.
      (1) The highest obstacle altitude (MSL) in BOLD.
      (2) 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."
   c. Minimums section. The minimums section will include the following. The minimum descent altitude, visibility, and the height above landing (HAL). Use Table 1 to compute the landing visibility minimum based on HAL.
   d. Landing area sketch. The landing area sketch includes a drawing/diagram of the landing area and the elevation of the highest obstacle within the landing area (if applicable).
   e. Prior to publication, the diagram will include, as a minimum, all items included in the example diagram.

HAL	250 – 475 ft	476 – 712 ft	713 – 950 ft
Landing Visibility Minimum (SM)	½	¾	1.0

Figure 4-4 (b). Height Above Landing (HAL) Diagram.

10. **Flight Check**. Complete a flight check under VMC in an aircraft to finalize the procedure and validate the diagram. Once a successful flyability/suitability check has been completed, the diagram will be validated by the developer in the lower marginal data area. Once validated by the developer the procedure must be approved by the appropriate authority in the lower marginal data area prior to publication. The flight should validate the following:

    Locations – IAF, IF, FAF, MAP, and MAHF.

    Obstacles.

    Approach course.

    Obstacle clearance.

    Altitudes – MDA, FAF, IF, IAF, MSA/Holding pattern altitude.

Note: All waypoints (IAF, IF, FAF, MAP, and MAHF) will be verified by two separate GPS NAV systems, such as DGNS, EGI, PLGR. At least one will have PPS. If unable to complete a suitability/flyability check due to the operational environment, the commander should consider an elevated risk when using this recovery procedure.

REFERENCES:

FAA Handbook 8260.3 (TERPS Manual)
FAA Order 8460.42A (Helicopter GPS Nonprecision Approach Criteria)
FAA Order 7130.3 (Holding)

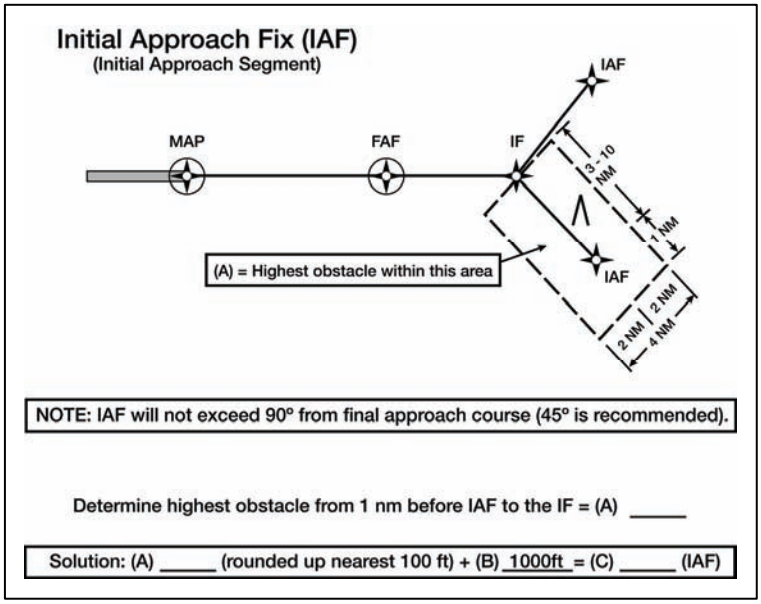


Figure 4-4 (c). Initial Approach Segment

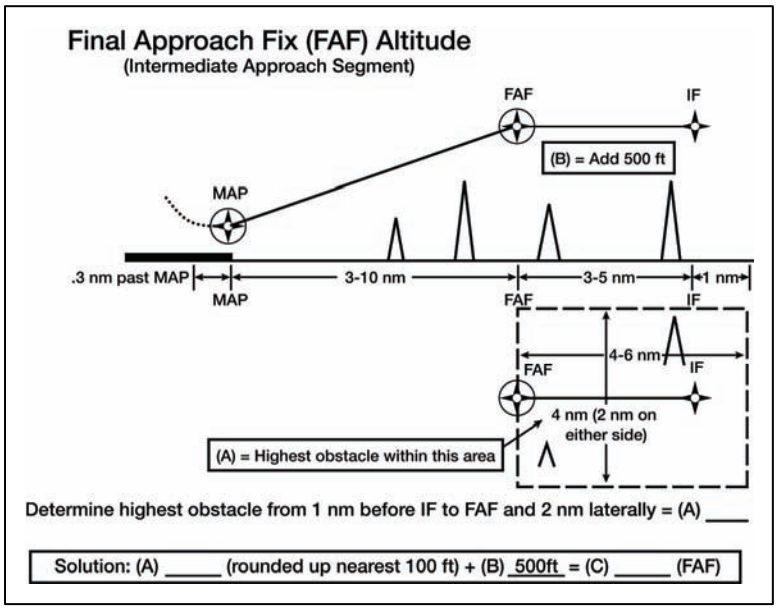


Figure 4-4 (d). Intermediate Approach Segment

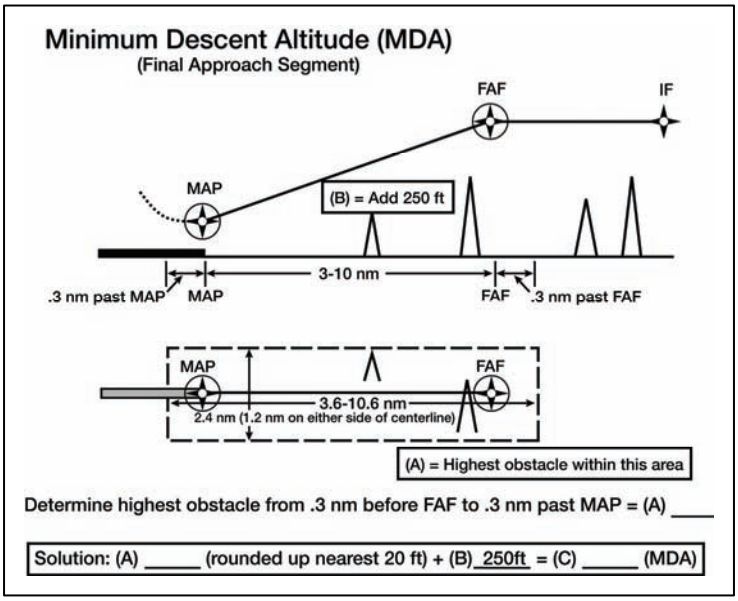


Figure 4-4 (e). Final Approach Segment

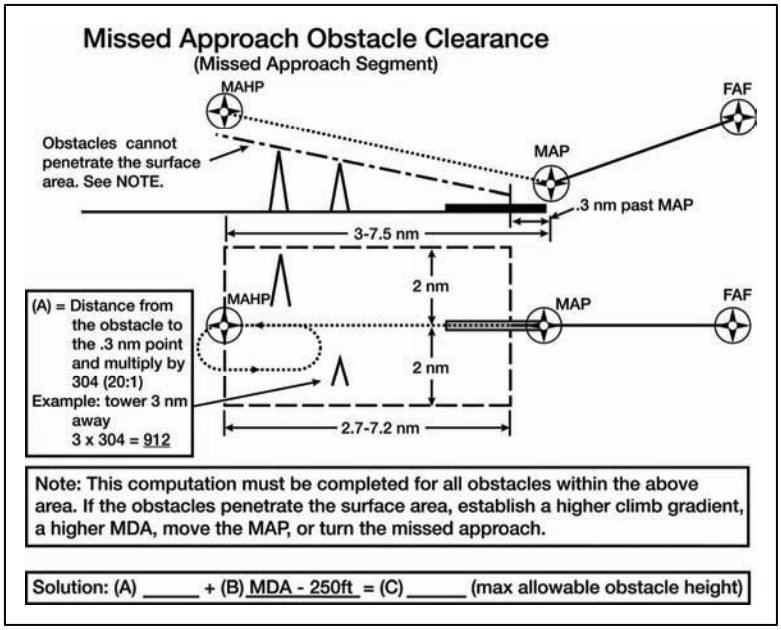


Figure 4-4 (f). Missed Approach Segment

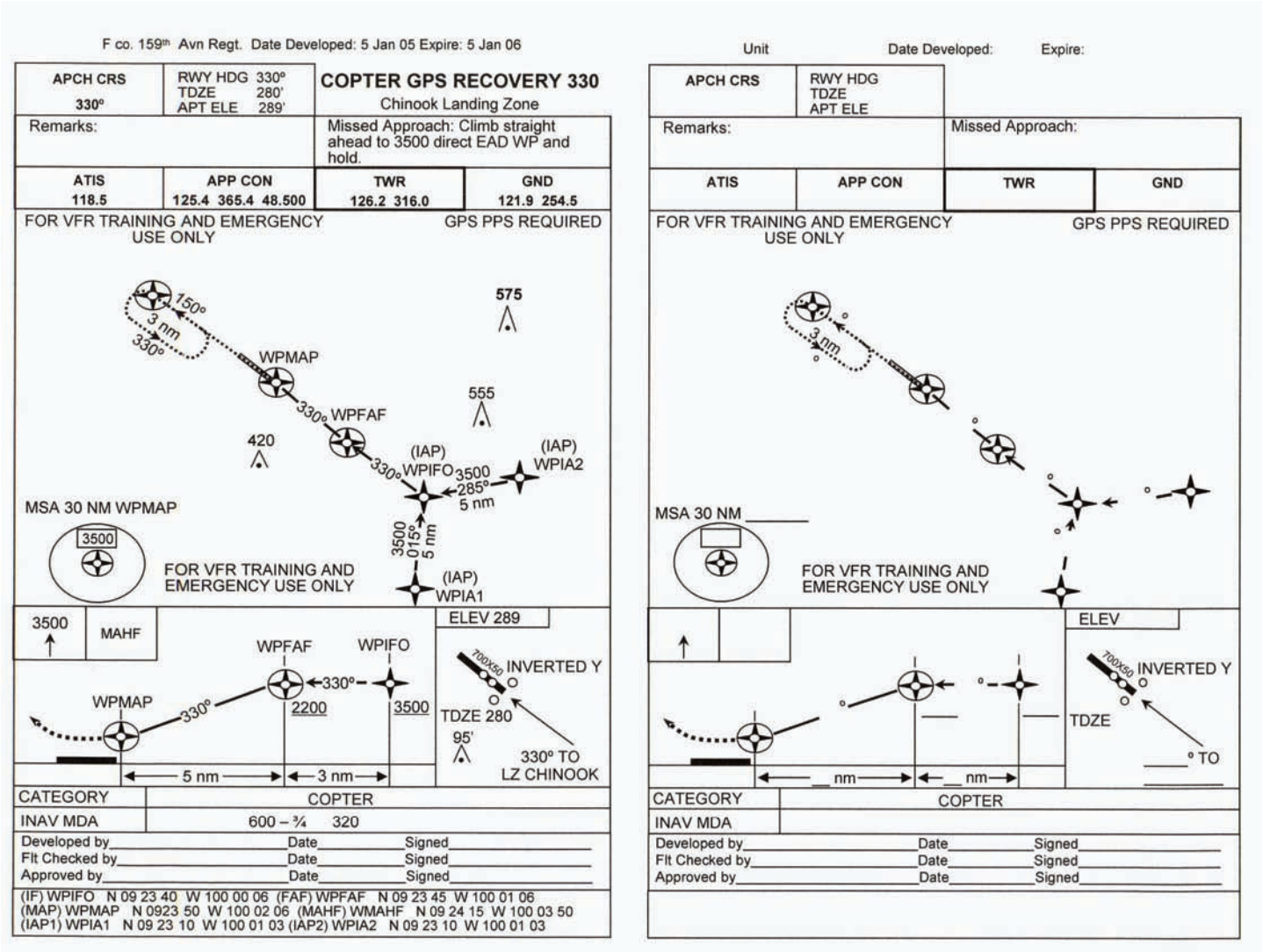


Figure 4-4 (g). Sample of Emergency GPS Diagram

TASK 2067

Select landing zone/pickup zone/holding area

> **WARNING**
>
> **Not all hazards will be depicted 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 OH-58D helicopter, or academically.

STANDARDS:

1. Landing zone/pickup zone.
   a. Perform map, photo, or visual reconnaissance of the assigned area.
   b. Determine that the landing zone/pickup zone (LZ/PZ) is suitable for the mission (size, number of aircraft, type cargo).
   c. Provide accurate and detailed information to organic or supported unit.
2. Holding area. Confirm suitability of a holding area.

DESCRIPTION:

1. Crew actions.
   a. The crew will confirm location of plotted hazards and call out the location of unplotted hazards. They will perform the reconnaissance using the appropriate aircraft sensors or visual means. The pilot in command (PC) will confirm suitability of the area.
   b. The pilot on the controls (P*) will remain focused outside the aircraft to avoid obstacles and will remain oriented on the proposed holding area or landing zone. The P* is responsible for clearing the aircraft and obstacle avoidance.
   c. The pilot not on the controls (P) will assist in reconnaissance of the LZ/PZ/holding area (HA), aircraft orientation, and obstacle avoidance. The P will announce when attention is focused inside the aircraft, will operate the airborne video tape recorder (AVTR), personal computer video data transfer system (PC-VDTS), mast-mounted sight (MMS), and take notes as necessary to accomplish the reconnaissance.
2. Procedures.
   a. Landing zone/pickup zone. The initial selection or reconnaissance of an LZ/PZ/HA begins with the analysis of maps, photos, and intelligence preparation of the battlefield (IPB). If maps or photos are unreliable, in accordance with mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC), a fly-by may be performed while using the video recorder to allow for a detailed analysis of the area. When a fly-by is executed, the aircrew should not loiter or make more than one pass over the area. Determine the suitability of the LZ/PZ/HA by considering applicable tactical, technical, and meteorological elements. The fly-by video and aircrew debrief can be used to strengthen the premission analysis. The reconnaissance data should be recorded on a worksheet. Target store can be used to record primary and secondary routes for approach and departure.

(1) Tactical.

(a) Mission. Whether the LZ or PZ will facilitate the supported unit's ability to accomplish the mission.

(b) Location. If conducting a reconnaissance for an insertion mission, consider distance of LZ/PZ/HA from supported unit or objective, and supported unit's mission, equipment, and method of travel to and from the LZ/PZ/HA.

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

(2) Technical characteristics (utilizing the acronym LONGLASSV) of the LZ or PZ include:

(a) Landing formation. Determine if the shape and size of the LZ/PZ/HA are suitable for the formation to be flown.

(b) Obstacles. Hazards within the LZ/PZ that cannot be eliminated must be plotted.

(c) Number of aircraft. Determine if the size of the LZ/PZ/HA will support the type and amount of aircraft that will be landing to the ground or hovering, as part of multi-ship operations. It may be necessary to provide an additional LZ/PZ nearby, or land aircraft at the same site in successive flights.

(d) Ground slope of the landing area. Normally if ground slope is greater than 15 degrees, helicopters cannot land safely.

(e) Load suitability. When high density altitude/gross weight (GWT) operations are conducted, determine if the LZ/PZ/HA shape, size, vertical obstacles, and actual landing area surface condition will support operations by aircraft at/near their maximum operational GWT.

(f) Approach or departure direction. The direction of approach or departure should be over the lowest obstacles and generally into the wind with METT-TC considered.

(g) Size of landing zone or holding area. The area around the LZ/PZ/HA should be clear of obstacles that could cause aircraft damage. Situation depending, consideration should be given to plotting obstacles. Target locate and target store may be used to determine the size of the LZ/PZ/HA.

(h) Surface conditions. Consider 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. If the area is wet, consider the effects of mud and aircraft weight

(i) Vulnerability. Consideration must be given to the vulnerability of ground troops in the LZ/PZ during air assault operations and to helicopters in the HA.

(3) Meteorological.

(a) Ceiling and visibility. Must be considered in order to prevent inadvertent instrument meteorological conditions (IMC).

(b) Winds. Determine approach and departure paths.

(c) Density altitude. High density altitude may limit loads and therefore require more sorties.

b. Holding area. Holding areas are usually selected primarily by the map reconnaissance and it may not be feasible to conduct a reconnaissance by aircraft prior to arrival. If it is determined to be unsuitable for use after arrival, an alternate area may be chosen. The following items will be considered when selecting a holding area.

(1) Cover and concealment.

(2) Obstacles within the holding area.

(3) Key terrain.

(4) Avenues of approach and departure.

(5) Security.

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

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: 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 should be treated the same as physical obstacles. LZ/PZ/HA will require a larger area at night. Details of the landing area will be more difficult to see.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

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

SNOW/SAND/DUST CONSIDERATIONS: Be prepared for possible whiteout/brownout upon entry into the LZ/PZ/HA. Evaluate surface conditions for the likelihood of the using unit encountering a whiteout/brownout and IMC recovery. Determine a suitable path for a go-around.

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

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 2125

PERFORM PINNACLE OR RIDGELINE OPERATIONS

CONDITIONS: In an OH-58D helicopter with before-landing check completed.

STANDARDS:

1. High reconnaissance.
   a. Establish entry altitude ±100 feet.
   b. Establish entry airspeed ±10 knots indicated airspeed (KIAS).
2. Approach.
   a. Without deviation, maintain ground track alignment with the selected approach path.
   b. Maintain a constant approach angle.
   c. Maintain an appropriate rate of closure.
   d. Properly perform a low reconnaissance.
   e. Execute a smooth and controlled termination in the forward one-third of the landing area.
3. Takeoff.
   a. Without error, perform a hover power check and complete a before-takeoff check.
   b. Properly clear the aircraft.
   c. Perform an airspeed-over-altitude takeoff while maintaining heading ±10 degrees.
   d. Maintain appropriate airspeed ±10 KIAS.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will remain focused outside the aircraft to evaluate suitability of the terrain throughout the approach and landing. The P will announce termination of the approach to a hover or to the ground and will announce any deviation from the tentative flight path.

   b. The pilot not on the controls (P) will assist the P* in performing the high reconnaissance. The P will confirm suitability of the area, assist in clearing the aircraft, and provide adequate warning of obstacles. The P will announce when attention is focused inside the aircraft.

2. Procedures.

   a. Approach. Select a flight path, an airspeed, and an altitude that afford best observation of the landing area. When practical, position the aircraft on the windward side of the pinnacle or ridgeline. Remain focused outside the aircraft to evaluate suitability of the area, evaluate the effects of wind, and clear the aircraft throughout the approach and landing. Select a touchdown point in the forward one-third of the landing area and announce termination of the approach to a hover or to the ground. Announce any deviation from the approach and a tentative flight path for the departure. The approach angle can vary from a shallow to a steep angle, depending on the wind, density altitude, gross weight (GWT), and availability of forced landing areas. Continue the reconnaissance on the final approach to confirm suitability of the area and effects of wind. Reduce airspeed to slightly above effective translational lift (ETL) until the rate of closure can be determined and then adjust the rate of closure to no faster than a brisk walk. Execute a go-around before going below ETL if the reconnaissance reveals that a safe landing cannot be accomplished.

Note: To successfully operate into small areas, it may be necessary 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 final approach. The P must assist the P* in providing information on aircraft position in the landing area.

b. Touchdown. Perform a ground reconnaissance and clear the aircraft. After touchdown, conduct a stability check before lowering the collective to the full-down position. Accomplish this by slowly moving the cyclic and pedals while lowering the collective. If movement is detected, reposition the aircraft.

c. Takeoff. Perform the before-takeoff check and verify a hover power check if required. Clear the aircraft during takeoff. Announce the intent and the direction of takeoff. Execute an airspeed-over-altitude takeoff and announce the intent to abort or alter the takeoff. If the takeoff requires clearing obstacles, use power as necessary to clear the obstacles while maintaining a constant climb angle and ground track. After clearing the obstacles, adjust attitude to gain forward airspeed.

Note: Hover out-of-ground effect (OGE) power is required for pinnacle or ridgeline operation.

NIGHT OR NIGHT VISION GOGGLES (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, reduce airspeed to approximately 40 to 45 knots until apparent ground speed and rate of closure appear to be increasing. Progressively decrease the rate of descent and forward speed until termination.
2. Use proper scanning techniques to avoid spatial disorientation.
3. Treat visual obstacles, such as shadows, the same as physical obstacles.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude, airspeed, and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 2127

PERFORM COMBAT MANEUVERING FLIGHT

CONDITIONS: In an OH-58D in an approved training area or simulated tactical environment, and aircraft cleared.

STANDARDS:

1. Establish entry altitude ± 100 feet.
2. Establish entry airspeed ± 10 KIAS.
3. Maintain the aircraft in trim.
4. Maintain aircraft within limits and flight envelope.
5. Correctly perform crew coordination actions.

CAUTION

Do not exceed airspeed and maneuvering limits outlined in TM 1-1520-248-10 Chapter 5 section IV.

Do not allow high sink rates to develop, as recovery altitude may not be available. This is aggravated as helicopter GWT and density altitude increase.

Note: The PC should consider the effects of an engine failure during combat maneuvering flight and be prepared for a failure.

DESCRIPTION:

1. Crew actions.

   a. The P* will remain primarily focused outside the aircraft throughout the maneuvers. The P* will make smooth and controlled inputs. Desired pitch and roll angles are best determined by referencing aircraft attitude with the outside horizon and/or flight symbology. The P* will only momentarily divert focus during critical portions of the maneuver to ensure trim, torque, and rotor control are maintained. He will announce the maneuver to be performed and any deviation from the maneuver. He also will announce recovery from the maneuver.

   b. The P will provide adequate warning to avoid enemy, obstacles, or traffic detected in the flight path and any deviation from the parameters of the maneuver. He will also announce when his attention is focused inside the cockpit; for example, when monitoring airspeed, altitude, attitude, or rotor RPM.

2. **Procedures.**

   a. **Decelerating Turn.** The decelerating turn is used to rapidly change the direction of the aircraft at low level altitudes while trading energy to maintain safe operational altitude. The angle of bank, airspeed, gross weight, and environmental conditions at the initiation of the maneuver will determine the amount of deceleration necessary to maintain altitude. During flight with lower forward airspeed, typically below maximum rate of climb airspeed, the deceleration will require an increase of collective, resulting in an increase in torque. While at airspeeds

greater than maximum rate of climb, the airspeed may be traded off while adjusting collective to maintain torque within limits and maintain altitude.

Apply directional cyclic to initiate turn. As aircraft begins to move about the roll axis, apply aft cyclic as necessary to maintain altitude by trading airspeed. Apply pedal as necessary to maintain aircraft in trim. Adjust collective as necessary to maintain altitude and rotor within limits. To recover apply opposite and forward cyclic while adjusting collective to maintain torque within limits as the rotor system unloads.

Note: For initial training enter the maneuver at 80 KIAS and appropriate torque.

CAUTION

CAUTION 1: Most transient over-torques occur as the aircraft unloads during maneuver recovery, for example as coning dissipates with left cyclic applied.

CAUTION 2: Close attention must be paid to rotor RPM to prevent rotor over-speed. This is aggravated by high gross weight, high DA, and high G-loading.

CAUTION 3: Rapid collective application with NG<78% may result in NR droop activating Low Rotor RPM warning message and audio.

b. **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 maneuver against small arms, radar directed ADA, or to employ weapons.

At cruise altitudes apply directional cyclic to initiate turn. As roll rate and angle increases the nose will begin to fall. Allow this to occur while maintaining trim with pedals. Recovery is affected by applying opposite cyclic when reaching desired heading. Once the aircraft is wings level in roll, apply collective and aft cyclic when reaching desired airspeed/altitude.

At terrain flight altitudes initiate with aft cyclic to ensure adequate obstacle clearance followed immediately by directional cyclic. Angles of bank are much lower than those utilized during cruise flight, as much less recovery altitude is available. Adjust collective as necessary to maintain altitude and compensate for transient torque. Maintain trim with pedals. Do not allow the nose to fall far below the horizon, as this is conducive to sink rate build up. Consider desired direction of turn before initiating and seek masking terrain if evading enemy fire. To recover apply opposite and forward cyclic.

Note: Maneuver is typically initiated at airspeeds of 40 to 90 KIAS. For initial training enter the maneuver at 80 KIAS at terrain flight altitudes and 50 KIAS at cruise altitudes.

CAUTION

CAUTION 1: Excessive bank angles at terrain flight altitudes may not allow sufficient recovery time. Airspeed (kinetic energy) may not be available to trade for lift and must be evaluated prior to and during the maneuver. This is aggravated as helicopter gross weight and DA increase.

CAUTION 2: Do not allow high sink rates to develop, as recovery altitude may not be available. This is aggravated as helicopter gross weight and DA increase. Prior to initiating the maneuver the P* must ensure adequate power is applied to maintain level flight. Collective positioning will be crucial in preventing unwanted high rates of descent.

CAUTION 3: Most transient over-torques occur when initiating break turns to the left or during recovery from a break turn to the right.

c. **Cyclic Climb to a Push-Over Break**. This maneuver is used in conjunction with complex terrain or close-range running fire engagements to rapidly reposition the aircraft when receiving small arms fire and reorient the aircraft weapons on the enemy. Initiate the maneuver from cruise airspeed. Apply aft cyclic to attain sufficient altitude for intervisibility with target. Adjust collective as necessary to compensate for transient torque and main rotor loads while maintaining trim with pedals. Upon attaining intervisibility with target, adjust the controls to align aircraft with target and maintain required torque. Initiate a break turn in the desired direction, upon completing or aborting engagement to mask aircraft from threat fires or reorient on appropriate gun-target line.

Note: Initiate the maneuver for training 80 KIAS.

CAUTION

In flight attitudes with high nose-up pitch angles and airspeeds below 35 knots, recovery shall be with forward or forward lateral cyclic. Applications of aft cyclic and/or pedal input could result in damage to the aircraft.

d. **Pitch Back Turn.** Pitch back turn is employed to rapidly enable aircraft longitudinal alignment for maneuvering engagement when targets are acquired substantially off the nose of the aircraft. It may be initiated from terrain flight or tactical cruise altitudes. It improves the efficiency of off-axis engagements and decreases the aircrew's vulnerability to enemy fire. The forward airspeed at maneuver initiation is again attained at maneuver completion. The maneuver adds stability to the helicopter and reduces engagement times of weapon systems, particularly rockets. Use of the vertical component in the maneuver results in negligible energy loss and a smaller beaten zone in the target area. This maneuver can also be used as an alternate dive entry technique to align the aircraft with an off axis target. This allows inter-visibility with target and dive angle assessment throughout the maneuver.

The maneuver is initiated from the appropriate airspeed (greater than max rate climb/ max endurance airspeed) based on tactical requirements. Initiation airspeeds less than 50 knots may not provide sufficient energy to perform this maneuver at terrain flight altitudes. Lower airspeeds result in a reduced climb out, as available energy is lost sooner. This is best accomplished by directing the turn to an easily distinguishable terrain feature, target, or manmade structure.

Initiate the maneuver with aft cyclic to attain the desired climb-out angle. As airspeed approaches current Max Endurance/Max Rate of Climb airspeed, apply cyclic in the desired direction of turn while maintaining trim with pedals. As bank angle is increased the nose will begin to fall. Adjust cyclic to place aircraft in desired dive angle while continuing the turn to the desired heading. Maintain trim with pedals. Once the desired heading is attained, roll out on selected target. Allow airspeed to build to maneuver initiation airspeed while adjusting controls to keep aircraft on target. Terminate maneuver as in recovery from diving flight.

Note: For initial training initiate from 70 KIAS while using 90 degrees for the target heading change. As proficiency is gained, initiate from 90 KIAS (DA permitting) and use 180 degrees as the target heading change.

CAUTION

CAUTION 1: In flight attitudes with high nose-up pitch angles and airspeeds below 35 knots, recovery shall be with forward or forward and lateral cyclic. Applications of aft cyclic and/or pedal input could result in damage to the aircraft.

CAUTION 2: Excessive nose down attitudes will significantly add to recovery altitude required. This is aggravated by high gross weight and high DA.

CAUTION 3: Most transient over-torques occur as the aircraft unloads at the top of the maneuver or during the roll recovery from a pitch back turn to the right.

CAUTION 4: Do not allow the airspeed to slow below ETL as this may result in backwards movement or insufficient energy to accomplish the turn. This may very well result in excessive tailboom loads and damage to tail rotor components. In addition, it provides a momentary, predictable stationary target for enemy gunners.

e. **Dive Recovery Techniques.** Straight ahead dive recovery is rarely tactically feasible. By incorporating a left or right turn into the dive recovery, descent arrest occurs with a change of aircraft direction thereby avoiding target over-flight. Prior to pulling aft or lateral cyclic causing G loading, the P* will lead with an increase in collective to avoid Nr increase. This maneuver is accomplished by turning the aircraft simultaneously as dive pull out is being accomplished. During minimum available power dive recovery, aft cyclic input is reduced as g-loading builds and the aircraft is allowed to fly out of a dive as opposed to attempting to establish a climb. Furthermore, a turn can be combined with a descent to terrain flight altitudes, if masking is desired due to enemy situation.

Note: Excessive bank angles during recovery offset lift from weight and may require additional recovery altitude for recovery.

NVG CONSIDERATIONS:

Rapid evasive maneuvers will be more hazardous due to division of attention and limited visibility. Be particularly aware of aircraft altitude and 3-dimensional position in relation to threat, obstacles, and hazards. Proper sequence and timing is critical in that the P* must announce prior to initiating any maneuvers that might cause spatial disorientation.

As airspeed increases, altitude above the obstacles should also increase. Bank angles should be commensurate with ambient light and altitude above the terrain. During use of NVGs without ODA symbology, greater crew coordination will be required to monitor torque, airspeed, trim, and rates of descent.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training. Initial training will be conducted by an IP and evaluated in the aircraft. Continuation training may be conducted by qualified crewmembers in the aircraft.
2. Evaluation. Evaluations will be conducted in the aircraft.

Note: Crew members will ensure that the appropriate authority has authorized any training flights.

REFERENCES: Appropriate common references and the following:
Tasks 1000, 1010, 1012, 1052, 1182, 1411, 1413, 1422, 1456, 1462
Unit SOP
The Army Aviator's Handbook for Maneuvering Flight and Power Management

TASK 2128

PERFORM CLOSE COMBAT ATTACK

CONDITIONS: In an OH-58D helicopter, or academically.

STANDARDS:

1. Participate in a close combat attack (CCA) briefing for the mission.
2. Develop and transmit or receive a CCA briefing.
3. Correctly identify friendly locations.
4. Transmit to team member the attack plan using unit standing operating procedure (SOP).

DESCRIPTION:

1. Crew actions.

   a. Throughout the close combat attack mission, the pilot on the controls (P*) will remain focused outside the aircraft to avoid obstacles.

   b. The pilot not on the controls (P) will assist the P* as necessary and will announce when his attention is focused inside the cockpit.

   c. The crew will establish communications with ground forces in contact on a predetermined frequency and receive or request information in accordance with unit SOP.

   d. The crew will positively identify friendly unit locations.

   e. The crew will formulate an attack plan and transmit it to other team members. As a minimum, techniques, munitions, and ranges will be briefed and understood.

2. Procedures. Using Army attack/armed recon aircraft to support a ground maneuver element in contact is considered a close combat attack. In today's world, this could take place anywhere on the battlefield in close or deep operations and in any terrain. Friendly ground troops that are within 1,000 meters of the enemy are doctrinally considered to be in contact with the enemy. Attacking enemy forces that are within 1 kilometer (km) of the friendly forces requires special procedures to minimize fratricide. During any operation in close proximity to troops, it is imperative that you understand who you are working with and have direct communication with the troops on the ground.

   a. Danger-close is defined as a probability of incapacitation ([PI] = 0.1 percent) or a 1 in 1,000 chance of friendlies being wounded. The ground commander must be informed that he assumes responsibility for friendly casualties when a target is danger-close, and must approve danger-close fires. The following "risk estimate distances" are for PI of 0.1 percent. They are for combat only and assume shooting parallel to friendly front lines:

      - High explosive rockets (HE RKTS) 240 meters
      - Hellfire 105 meters

   Note: Shooting perpendicular to friendly locations exposes ground forces to great risk due to the likelihood of rounds landing short or long, and the danger of ricochets.

   b. The air mission commander must have direct communication with the ground commander on the scene to provide direct fire support. After receiving the CCA brief from the ground troops, the pilots must be able to positively identify the location of the friendlies prior to shooting. Methods for marking the location of friendlies and the enemy include, but are not limited to: laser handover, tracer fire, marking rounds (flares or mortars), smoke grenades, signal mirrors, VS-17 panels, infrared (IR) strobe lights, laser pointers, or chemical sticks (can be tied on to a string and swung over head, "buzz saw").

Note 1: If the troops in contact do not have a CCA briefing checklist, the CAS briefing (9-line) minus the first 4 lines will suffice. Pilots must also be prepared to request the information when working with inexperienced ground personnel.

Note 2: When throwing smoke, the pilot will call out the color of the smoke and the ground commander will confirm. Never call the color of the smoke before it is thrown.

c. Once the crew has identified both the enemy and friendly locations, flight lead will formulate a plan and brief the other team members. Using the unit SOP will aid in conveying the plan to other team members.

(1) Techniques. Techniques of fire include running, diving, or hover fire. Type of threat, terrain, visibility, winds, density altitude, gross weight of the aircraft, and the proximity to friendly troops will be considered when selecting a mode of fire. Another technique could be running fire with a cyclic climb to acquire targets.

(2) Patterns include, but are not limited to: race track, cloverleaf, or figure 8 pattern. Direction of turns and direction of breaks must be briefed also.

Munitions. Munitions selected must be appropriate for the target and provide the most standoff capability. Accuracy and reliability must be considered when firing near friendly troops. Collateral damage could be another consideration in some areas of operation.

(3) Range. When briefing range, include distance from target where inbound engagement will initiate and at what range the break will be executed to prevent over flying the target and staying outside of the enemy's engagement range.

Note: Critical to the success of the CCA mission, aircrews must have a clearly defined "endstate" for any engagement. Crews must understand the target, threat, and desired effects to develop an attack plan that best meets the desired end-state while minimizing risk to the aircrews and collateral damage around the target.

NIGHT/NIGHT VISION GOGGLE (NVG) CONSIDERATIONS: Situational awareness becomes very critical, and marking of friendly troops becomes harder to accomplish. Night vision goggles (NVG) will aid in identifying friendlies. Every effort must be made to avoid fratricide. If a grid coordinate to the friendly location is entered into the aircraft, extreme care must be taken so the location is not inadvertently used for targeting. The crew must exercise care when observing the impact of rounds because the flash signature may momentarily degrade the capability of the NVG. When firing the gun, rockets, missiles, or adjusting indirect fire, the crew must follow procedures to protect their night vision.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and the following:
Unit SOP
Task 1000, 1012, 1052, 1182, 1411, 1413, 1422, 1456, 1462, 1471, 1458, 2127

TASK 2129

PERFORM COMBAT POSITION OPERATIONS

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Apply the proper criteria in selecting the combat position.
2. Enter the combat position keeping the aircraft masked from visual or electronic detection.
3. Acquire/engage the target/objective as appropriate.
4. Egress the combat position keeping the aircraft masked from visual or electronic detection.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) will maintain visual reference outside the aircraft to ensure that the aircraft is clear of all obstacles and will maintain orientation toward the objective. The P* will announce any maneuver/movement prior to execution.

   b. The pilot not on the controls (P) will direct the P* to position the aircraft to maintain visual/mast-mounted sight (MMS) reference on the objective by announcing, "slide right," "slide left," "come up," or "come down." If visual/MMS contact can be maintained, The P will announce "HOLD." If duties permit, the P will assist clearing the aircraft.

2. Procedures.

   a. A combat position is a specified point within the battle area which is occupied by reconnaissance/attack helicopters. Select the position based on the tactical mission requirements. This position is a concealed position that provides observation and fields of fire into an objective area. Selection of the combat position should be based on the following considerations:

      (1) Background. The combat position should be located so that the helicopter will not be silhouetted.

      (2) Range. The combat position should be located so that the kill zone is within the last one-third of the weapon range.

      (3) Altitude. The combat position should be level with or higher than the target area, if possible.

      (4) Sun or full moon. The combat position should be located so that the sun or full moon is behind or to the side of the helicopter.

      (5) Shadow. When possible, the combat position should be within an area covered by shadow.

      (6) Concealment. Vegetation surrounding the combat position should allow the helicopter to remain masked.

      (7) Rotor wash. The location of the combat position should be such that the effect of rotor wash on surrounding debris, trees, snow, and dust is reduced.

      (8) Maneuver area. The area surrounding the combat position should permit easy ingress and egress.

      (9) Field of fire. The combat position should permit target visibility throughout the kill zone.

b. The crew will enter the combat position, acquire/observe/engage the enemy/objective, leave the combat position without being detected, and reposition the aircraft to an alternate location as briefed.

Note 1: Live fire is not needed to complete this task.

Note 2: Hover out-of-ground effect (OGE) power is required for combat position operations.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Maintaining altitude and position is more difficult when hovering above 25 feet without aircraft lights. Use the radar altimeter to assist in maintaining altitude and the position box to assist in maintaining aircraft position. Use references such as lights, tops of trees, or man-made objects above and to the front and sides of the aircraft. By establishing a reference angle to these objects, the P* can detect altitude changes by changing viewing perspective. Hovering near ground features, such as roads, provides ideal references for judging lateral movement. However, the P* may become spatially disoriented when alternating his viewing perspective between high and low references. Therefore, the P* must rely on the P for assistance if disoriented. Regardless of the mission the P* must fly the aircraft first and then observe the sector.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 2132

ENGAGE TARGET WITH THE AIR-TO-AIR STINGER

CONDITIONS: In an OH-58D helicopter on an approved range or in a simulated tactical environment.

STANDARDS:

1. Place the system into operation.
2. Engage the target using the appropriate techniques.

DESCRIPTION:

1. Crew actions. While maneuvering the aircraft to align weapons symbology the pilot on the controls (P*) may divert attention inside the cockpit. The P* must coordinate with the pilot not on the controls (P) prior to doing so. Each crewmember must know where the other is focused during the weapon engagement.

   a. The P* is responsible for clearing the aircraft and obstacle avoidance and will acknowledge that P is ready to engage the target and maneuver the aircraft to align the air-to-air Stinger (ATAS) symbology on the multifunction display (MFD). The P* will announce "engaging" just prior to firing and will coordinate with the P when remasking or repositioning the aircraft. The P* will announce whether focused inside or outside the aircraft.

   b. The P will keep the MMS on target, prepare the ATAS system and announce when ready to engage. He will announce ready for each firing. The P will assist the P* by monitoring aircraft instruments and clear the aircraft duties permitting. He will monitor missile impact, and record battle damage assessment (BDA) data, and will announce whether focused inside or outside the aircraft.

2. Procedures. To engage the target, place the armament control panel (ACP) master arm switch in the arm position. From the sparse weapons vertical situation display (VSD), verify and change as necessary the seeker slaving mode and uncage mode. When the target is being tracked, press the missile activate switch. Verify the proper indications of missile activation, spin-up, and cool down. At the same time maneuver the aircraft to place the mast-mounted sight (MMS) line of sight (LOS) cue near the center of the MFD. If the target is within operational parameters, press the weapons fire switch to the first detent; this will allow the missile to uncage if the seeker acquires infrared (IR) energy (in the auto uncage mode). If the seeker acquires the target, the track reticle and the super elevation cue are displayed. Continue to maneuver the aircraft to keep the tracking box in the middle of the display. If the track reticle nears the edge of the MFD and starts to flash, the seeker is nearing its field of vision [FOV] limits. Confirm the tracking box and MMS LOS cue are in coincidence and a solid tone is present. Then maneuver the aircraft to place the super elevation cue on top of the aircraft reference symbol, and press the fire switch to the second detent. The selected missile will fire and the sparse weapons VSD missile symbology will disappear. The next missile to fire will go "solid" and start to cool down. To interrupt the sequence, the missile activate switch is pressed. The active display goes away and missile activation is deselected. If the first detent is released before the selected missile is fired, the missile will recage and cease tracking on an active target.

Note: Live fire is not necessary to complete this task.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. Firing of the weapon system may cause the NVGs to momentarily shut down.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and FM 3-04.140.

TASK 2133

ENGAGE TARGET WITH THE M4 SERIES CARBINE.

> **WARNING**
>
> **Observe all safety precautions for uploading ammunition in accordance with appropriate operators manual.**
>
> **To prevent accidental firing, ensure the weapon is on safe and properly stowed when not in use.**

CONDITIONS: In an OH-58D helicopter with an M4 series carbine, crew doors removed on an approved range or in a simulated/actual tactical environment with rifle marksmanship Phase I-III training completed.

STANDARDS:

1. Place system into operation.
2. Engage the target using the appropriate techniques.

DESCRIPTION:

1. Crew actions.

   While maneuvering the aircraft each crewmember must know where the other is focused during the weapon engagement.

   a. The P* will remain focused outside the aircraft and oriented on the target and is responsible for clearing the aircraft and obstacle avoidance. The P* will acknowledge that the P is ready to engage the target and maneuver the aircraft as necessary to allow the P to obtain line of sight with the target.

   b. The P will secure and prepare the weapon system and announce prior to each engagement and when the engagement is complete. The P will coordinate with P* to maneuver aircraft in order to allow the P to obtain line of sight with the target and remain within the maximum effective range of the weapon system.

2. Procedures.

   Prior to flight the P/P* will PMCS their respective M4 series carbine to ensure that the weapon is loaded, safed, and properly secured into the approved weapons mount. To engage a target the P will remove the M4 from its mount and ensure it is secured to himself throughout the engagement in order to prevent accidental weapon loss. The P will ensure line of sight to the target is clear of all obstructions and aircraft components. The P* will avoid excessive maneuvering in order to prevent the possibility of causing the P to fire into any aircraft components or any other undesired locations. The P will conduct weapon engagements in accordance with the mission briefing, ROE, and crew brief. The P will also ensure that the target is within the weapons maximum effective range. The P will perform immediate action steps in the event of a weapons malfunction in accordance with operators manual. After target engagement is complete the P will safe the weapon system and properly return the M4 into its mount.

Note:

1. Consideration must be given to maintaining intervisibility with friendly and enemy positions in order to preclude any undesirable collateral damage or fratricide incidents.
2. Crews should conduct a thorough post-flight, to ensure brass is clear of all flight controls.
3. During non-NVG firing both crewmembers should use their visors to prevent injury from ejected brass.
4. Live fire is not necessary to complete this task.
5. Primary use of the M-4 is for personal protection. However, the M-4 can be used against targets of opportunity based on the tactical situation, rules of engagement, and situational awareness.

CAUTION

P must maintain situational awareness of aircraft attitude in relation to the target to prevent firing into aircraft components (such as rotor system, aircraft weapons systems, or skids). Additionally, the P must remain aware of possible interference with the flight controls due to the M4 or any restraining straps.

NIGHT OR NVG CONSIDERATIONS:

1. A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial.
2. During night or NVG operations, range estimations will be more difficult which will require proper scanning technique utilization.
3. Use of aiming lasers, such as the AN/PAQ-4-series and the AN/PEQ-2A, emit a highly collimated beam of IR energy that allows for quick "point and shoot" capability at night. Even though the aiming lasers provide a quick and easy means of engaging the enemy at night special attention must be given to the following:
    a. A 10 meter boresight /25 meter zeroing procedure should be accomplished in accordance with FM 3-22.9
    b. Momentary target loss due to muzzle flash or tracers.
    c. During periods of high illumination the laser spot may be difficult to see.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and FM 3-22.9.

TASK 2164

Call for a tactical air strike

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Transmit a spot report and a request for a tactical air strike.
2. Perform a close air support (CAS) briefing on the mission.
3. Coordinate laser codes for laser-guided munitions, if applicable.
4. Transmit a battle damage assessment (BDA).

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) is responsible for clearing the aircraft and obstacle avoidance and will focus primarily outside the aircraft. The P* will announce any maneuver or movement before execution and inform the pilot not on the controls (P) if visual contact is lost with other aircraft. The P* will coordinate with the P as to who will coordinate with tactical air (TACAIR).

   b. The P will operate the mast-mounted sight (MMS) and assist the P* as necessary. The P will announce when his attention is focused inside the cockpit. He will coordinate with the P* as to who will coordinate with TACAIR.

2. Procedure. Acquire and locate the target. Relocate the aircraft as necessary; prepare and transmit the target information. Remain oriented on the target. The crew will establish contact with the forward air controller on a predetermined frequency and provide the following information:

   a. Line One: Initial point.
   b. Line Two: Heading (magnetic).
   c. Line Three: Distance (NM).
   d. Line Four: Target elevation (feet).
   e. Line Five: Target description.
   f. Line Six: Target coordinates.
   g. Line Seven: Target marks (laser code, smoke, and so forth).
   h. Line Eight: Friendly location.
   i. Line Nine: Egress direction (magnetic).

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: A thorough crew briefing should be conducted prior to NVG operations; crew coordination is crucial. When maneuvering the aircraft to maintain the MMS on target, the P* must consider obstacles and other aircraft. The P should assist the P* with obstacle avoidance and clearing the aircraft and announce when doing so.

Note: The aviator's night vision imaging system (ANVIS) display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references and FM 90-21.

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Chapter 5
Maintenance Test Pilot Tasks

This chapter describes the tasks that are 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, along with training and evaluation requirements is also provided. Tasks described in this chapter are to be performed by qualified OH-58D maintenance test pilots (MTPs) in accordance with AR 95-1. This chapter contains tasks and procedures to be used by contractor MTPs in accordance with AR 95-20 volume 1, (DLAM 8210.1) section 3.4 (publications). If discrepancies are found between this chapter and TM 1-1520-248-MTF, the maintenance test flight (MTF) takes precedence.

5-1. TASK CONTENTS

a. **Task number and title.** Each aircrew training manual (ATM) task is identified by a number and title that corresponds to the MTP tasks listed in chapter 2 (table 2-4).

b. **Conditions.** The conditions specify the situation in which the task will be performed. They describe the important aspects of the performance environment. References to OH-58D helicopters apply to all OH-58D design helicopters. Reference will be made to a particular helicopter within a design series when necessary. All conditions must be met before task iterations can be credited.

(1) Common conditions are—

(a) In a mission aircraft with mission equipment and crew, items required by AR 95-1, required publications (operator's manual, checklist, navigational and terrain maps), and special test flight equipment required by the appropriate technical manuals.

(b) Under visual meteorological conditions.

(c) Day, night, and night vision device employment.

(d) In any terrain or climate.

(e) In chemical, biological, radiological, or nuclear (CBRN) environment with mission protective posture equipment used.

(f) In an electromagnetic environment.

(2) Common training/evaluation conditions are

(a) When a 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.

(b) Unless otherwise specified in the conditions, all in-flight training and evaluation will be conducted under visual meteorological conditions (VMC).

(c) When night vision goggles (NVG) are utilized during any of the tasks, the standards will be the same as those described for performance of the task without using NVGs.

c. **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 following common standards apply to all MTP tasks:

(1) Perform procedures and checks in sequence per TM 1-1520-248-MTF, as required.

(2) Brief the RCM or NCM (if applicable) on the procedures and applicable warnings, cautions, and notes 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) If the RCM or NCM is available, use the call and response method when performing checks and announce check completion.

(6) Upon completion of all tasks (except Task 4000), record required data on the MTF check sheet.

d. **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. These define the portions of a task to be performed by each crewmember to ensure safe, efficient, and effective task execution. The pilot on the controls (P*) indication does not imply PC or MTP duties. When required, P* or MTP responsibilities are specified. All tasks in this chapter are to be performed only by qualified MEs, MTPs, or student maintenance test pilots undergoing qualification training as outlined in AR 95-1. The MTP is the PC in all situations, except when undergoing training or evaluation by a ME. For all tasks, MTP actions and responsibilities are applicable to MEs. When two MEs are conducting training/evaluation together, or two MTPs are jointly performing test flight tasks, the mission brief will designate the aviator assuming PC responsibilities.

(2) Procedures. This section describes the actions that the MTP/ME performs or directs the RCM/NCM to perform in order to execute the task to standard.

e. **Considerations.** This section defines training, evaluation, and other considerations for task accomplishment under various conditions.

(1) HOVER WORK AT NIGHT OR WITH NIGHT VISION GOGGLES (NVG): Movement over areas of limited contrast, such as tall grass, water, or desert tends to cause spatial disorientation. To avoid spatial disorientation and unanticipated drift, seek hover areas that provide adequate contrast with good references and apply proper scanning techniques. When possible designate a specific area clear of obstacles or hazards that far exceeds the required space to perform the hover checks. Hovering out-of-ground effect (OGE) reduces available ground references and may increase the possibility of spatial disorientation. Use of the IR searchlight in areas of low contrast may be necessary if tactical conditions permit. When use of the white light is anticipated, its positioning should be taken into consideration to ensure the P* does not focus his attention directly where the light is pointed. Hover Bob Up and Heading Hold may be used to assist the P* in maintaining a constant position during selected tasks. Be prepared to transition to instruments and execute an instrument takeoff if ground reference is lost. The crewmember not on the controls should assist in completing all required checks. Visual obstacles, such as shadows, should be treated the same as physical obstacles.

(2) INFLIGHT WORK AT NIGHT OR WITH NIGHT VISION GOGGLES (NVG): All crewmembers must be focused primarily outside for obstacle avoidance. Due to the intensity of crew coordination required during certain checks, a qualified RCM or NCM must be utilized to record the numerical data gathered and perform airspace surveillance duties as required. Due to the speeds involved while performing these checks; select altitudes that allow for obstacle avoidance. Use of proper scanning techniques will minimize the probability of disorientation. Identification of forced landing areas during certain checks is highly recommended. To better maintain aircraft control during certain maneuvers, unaided flight is recommended when altitude is available.

(3) SNOW/SAND/DUST: If visual references deteriorate to an unacceptable level, apply sufficient power and execute a takeoff. If a takeoff is not feasible, try to maneuver the aircraft forward and down to the ground to limit the possibility of touchdown with sideward or rearward

movement. To avoid spatial disorientation and unanticipated drift, seek hover areas that provide adequate contrast with good references and apply proper scanning techniques. The P should keep the P* informed of the location of the snow/sand/dust cloud. Consider the effects of the snow/sand/dust cloud on personnel and equipment in/around the landing area. Use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust.

Note: The ANVIS display symbology subsystem (ADSS) should be used as an aid to detect drift and help in maintaining attitude and altitude but is not required.

Note: Use of in-cockpit supplemental lighting to acquire specific measurements may be required.

f. **Common single pilot considerations.** The following common single pilot considerations apply to all tasks in this chapter where specific single pilot considerations have not been identified:

(1) Single pilot NVG MTF flight operations are prohibited.

(2) When a NCM is on board, the MTP will brief and assign duties appropriate to the proficiency level.

(3) Except for rated aviator duties, the RCM crew actions described in the task may be accomplished by the NCM at the direction of the MTP.

(4) The MTP will periodically scan the surrounding area to ensure the aircraft remains clear through out all checks.

(5) If the MTP is the only RCM on board, the MTP will land the aircraft prior to comparing aircraft data to chart data, for example power assurance data.

g. **Training and evaluation requirements.** Some of the tasks incorporate more than one check from TM 1-1520-248-MTF. The evaluator may select additional checks for evaluation.

(1) Training and evaluation requirements define whether the task will be trained or evaluated in the aircraft, simulator, or academic environment.

(2) Training and evaluations will be conducted only in the listed environments, but they may be done in any or all combinations. Listing only “aircraft” under evaluation requirements does not preclude the ME from evaluating elements of the task academically to determine depth of understanding or planning processes. However, the evaluation must include hands-on performance of the task in the listed environment(s). If one or more checks are performed unsatisfactorily, the task will be graded unsatisfactory. However, when the task is reevaluated, only those unsatisfactory checks must be reevaluated.

h. **References.** The references are sources of information relating to that particular task. In addition to the common references listed in chapter 4, the following references apply to all MTP tasks:

(1) Aircraft logbook and historical records.

(2) TM 1-1500-328-23.

(3) DA Pam 738-751.

(4) TM 1-1520-248-10.

(5) TM 1-1520-248-CL.

(6) TM 1-1520-248-MTF.

(7) TM 1-1520-248-23 series manuals.

(8) TM 55-2840-256-23&P.

(9) TM 1-2840-263-23&P.

(10) TM 11-1520-248-23 series manuals.

(11) TM 1-6625-724-13&P.

(12) Applicable airworthiness directives or messages from aviation and missile command (AMCOM).

5-2. TASKS

a. **Standards versus descriptions.** MTPs and MEs are reminded that task descriptions may contain required elements for successful completion of a given task. For example, when part of the description for the task is to "brief the RCM on the conduct of the maneuver," those crew actions specified in the description are required. Attention to the use of the words will, should, or may throughout the text of a task description is crucial.

b. **Critical tasks.** The following numbered tasks are OH-58D and OH-58D(R) maintenance test pilot critical tasks. Unless noted in conditions, the series designator OH-58D applies to all versions.

TASK 4000

Perform prior to maintenance test flight checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS:

1. Perform the preflight inspection of the aircraft, logbook and/or laptop computer, armament, personal flight gear, and special test fight equipment (if installed) in accordance with the appropriate technical manuals.
2. Determine the suitability of the aircraft for flight and the mission to be performed.
3. Determine required maintenance operational checks (MOCs) and/or maintenance test flight (MTF) checks to be completed.

DESCRIPTION:

1. Crew actions.

a. The MTP will ensure that a thorough preflight inspection is conducted. The TM 1-1520-248-CL may be used to conduct the preflight inspection; however, the inspection will be conducted to the detail level in TM 1-1520-248-10, chapter 8. The MTP may direct the RCM if available, to complete such elements of the aircraft preflight inspection as are appropriate, but will verify that all checks have been completed. The MTP will ensure that the aircraft logbook and/or laptop computer forms and records are reviewed and appropriate entries made as per DA Pam 738-751. The MTP will determine the required maintenance operational checks (MOCs) and/or maintenance test flight (MTF) checks to be completed. The MTP will brief the RCM or NCM and any additional support personnel concerning operation on or around the helicopter during ground operations and will ensure that ground communication capability is adequate. Additionally, the MTP will stress any applicable ground or airborne safety considerations or procedures during the briefing and will ensure that a final walk-around inspection is completed prior to flight.

b. The RCM should complete the assigned elements and report the results to the MTP.

2. Procedures.

Review the aircraft logbook and/or laptop computer forms and records to determine the necessary checks and tasks to be performed. Use additional publications and references as necessary. Conduct a risk assessment of the mission. Preflight the aircraft with special emphasis on areas or systems where maintenance was performed. Verify all test equipment is correctly installed and secured as applicable. Brief the RCM or NCM, if available, on crew coordination responsibilities and conduct of the mission. Emphasize safety procedures to be performed during maintenance tasks or maneuvers the RCM or NCM may be unfamiliar with.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply the appropriate common considerations. A white lens flashlight should be used if performing the preflight inspection during the hours of darkness. Hydraulic leaks, oil leaks, and other defects are difficult to see using a flashlight with a colored lens. If circumstances permit, accomplish preflight inspection during daylight hours.

SNOW/SAND/DUST CONSIDERATIONS: If the aircraft preflight has been conducted any time other than immediately prior to flight, consideration should be given to reinstalling aircraft covers to prevent accumulation of snow/sand/dust in aircraft and equipment. Ensure all ice/snow accumulations are removed from the aircraft before starting engine.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4084

Perform before starting engine checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM, NCM and/or ground support personnel if available. Additionally the MTP will brief all Warnings, Cautions, and Notes that may impact upon the checks to be performed. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Brief the RCM, NCM and/or ground support personnel as necessary, if available. Perform the required checks in sequence. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply the appropriate common considerations. Before starting the engine, ensure that all internal and external lights are operational and properly set. Internal lighting levels must be high enough so the can easily see the instruments.

SNOW/SAND/DUST CONSIDERATIONS: Ensure all rotating components, inlets and exhausts are clear of ice and/or snow prior to starting engine.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4088

Perform starting engine checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM, NCM and/or ground support personnel, if available. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Brief the RCM, NCM and/or ground support personnel as necessary, if available. Ensure the fireguard is posted. The MTP will ensure the area surrounding the aircraft is clear before engine start. Perform the required checks in sequence. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply the appropriate common considerations. Before starting the engine, ensure that all internal and external lights are operational and properly set. Internal lighting levels must be high enough so the can easily see the instruments and the aviator can start the engine without exceeding operating limitations. The crewmember not on the controls should assist in clearing the aircraft and assist in completing all required checks.

SNOW/SAND/DUST CONSIDERATIONS: Ensure all rotating components and inlets/exhausts are clear of ice and/or snow prior to starting engine.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4090

Perform engine run up checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM, NCM and/or ground support personnel, if available. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Brief the RCM, NCM and/or ground support personnel as necessary, if available. Perform the required checks in sequence. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply the appropriate common considerations. The MTP will periodically scan the surrounding area to ensure the aircraft remains clear through out the checks.

SNOW/SAND/DUST CONSIDERATIONS: Ensure a build up of ice and/or snow has not occurred directly affecting the aircraft.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4094

Perform system checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM, NCM and/or ground support personnel, if available. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Brief the RCM, NCM and/or ground support personnel as necessary, if available. Perform the required checks in sequence. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply the appropriate common considerations. The MTP will periodically scan the surrounding area to ensure the aircraft remains clear through out the checks.

SNOW/SAND/DUST CONSIDERATIONS: Ensure a build up of ice and/or snow has not occurred directly affecting the aircraft.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4128

Perform before takeoff checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM, NCM and/or ground support personnel, if available. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Brief the RCM, NCM and/or ground support personnel as necessary, if available. Perform the required checks in sequence. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply the appropriate common considerations. The MTP will periodically scan the surrounding area to ensure the aircraft remains clear through out the checks.

SNOW/SAND/DUST CONSIDERATIONS: Ensure a build up of ice and/or snow has not occurred directly affecting the aircraft.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4132

Perform takeoff-to-a-hover checks

CONDITIONS: In an OH-58D helicopter with before-hover checks completed.

STANDARDS: Appropriate common standards plus the following:

Maintain a 3-foot hover altitude, ±1 foot.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM intention to bring the aircraft to a hover. Confirm the aircraft maneuver area is sufficient and clear. Bring the aircraft to a stabilized 3 ± 1 foot hover and check the following:

a. Cyclic, collective and pedal control response and that no excessive control displacement is required.

b. Apparent center of gravity is normal (cyclic and pedal positions are normal for the conditions).

c. Verify that all system instruments are in the normal ranges for conditions and verify corresponding changes of information on CPG MFD as appropriate.

d. Check for correlation and function on flight instruments.

e. Before proceeding to the test flight hover area, check the parking area for indications of fluid leakage from the aircraft or FOD.

f. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. If sufficient illumination or NVG resolution does not exist creating a reduction in visual references during the takeoff and throughout the ascent, the MTP should perform an altitude-over-airspeed takeoff to ensure obstacle clearance and reposition to an area that provides better contrast. The crew should know the surface wind direction and velocity to maintain the desired ground position.

SNOW/SAND/DUST CONSIDERATIONS: As the aircraft leaves the surface, maintain heading with the pedals and a level attitude with the cyclic to maintain a vertical ascent. In some cases, applying collective to blow away loose snow/sand/dust from around the aircraft is beneficial before performing this maneuver. The MTP should be prepared to transition to instruments if ground reference is lost at night, use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust. The RCM and/or NCM should be prepared to transition to instruments if ground references are lost to aid the MTP as necessary.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4140

Perform power assurance check

CONDITIONS: In an OH-58D helicopter with takeoff-to-a-hover check completed.

STANDARDS: Appropriate common standards plus the following:
Maintain a 3-ft. hover altitude, ±1 ft.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear. With aircraft at approximately 3 ± 1 foot hover into the wind with engine gas generator speed (Ng) stabilized, check the following:

a. Verify the heater (HTR) and engine (ENG) anti-ice switches are OFF.

b. Perform manual or automatic power assurance check.

c. Record the free air temperature (FAT), turbine gas temperature (TGT), pressure altitude (PA), and engine torque (TQ) and engine torque factor (ETF).

d. Determine if the readings are within normal limits by comparing the aircraft data to the appropriate power assurance chart. If initial results indicate a NO-GO, repeat the check twice to verify results. Refer to appropriate TM/AWR (airworthiness release) for actions required.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4142

Perform hover power check

CONDITIONS: In an OH-58D helicopter, and power assurance check completed.

STANDARDS: Appropriate common standards plus the following:

Maintain a 3-foot hover altitude, ±1 foot.

DESCRIPTION:

1. Crew actions.

a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. The MTP will ensure the results of the checks are recorded to include any specific readings.

b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear. With aircraft stabilized at 3 ± 1 foot hover into the wind, check the following:

a. Record the mast torque (TQ), turbine gas temperature (TGT), and engine gas generator speed (Ng). Confirm that readings are normal for the conditions

b. Compare the recorded data with the performance planning card (PPC) in accordance with the pilot hover power check.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4156

Perform hovering control rigging check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

1. Hovering turns.
   a. Maintain a 3-foot hover altitude, ±1 foot.
   b. Turns not to exceed the rate of 22.5 degrees in 1 second. (90 degrees 4 seconds)
2. Sideward flight checks.
   a. Maintain heading into the wind.
   b. Maintain a 3-foot hover altitude, ±1 foot.
   c. Limit ground speed to a maximum of 5 knots. (9 knots per hour)
3. Forward hovering flight checks. Maintain an approximate 5-foot altitude during check.

DESCRIPTION:

1. Crew actions.
   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. The MTP will ensure the results of the checks are recorded to include any specific readings.
   b. The RCM or NCM should assist the MTP as directed.
2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

a. Hovering turns. Establish a stabilized 3-foot hover into the wind and reference the aircraft heading. Make a smooth and controlled pedal turn 90 degrees from the initial heading at a constant rate of turn. Smoothly return the aircraft to the initial heading. During the maneuver monitor that excessive pedal input, relative to current wind conditions, is not required during the maneuver. Repeat the check in the opposite direction. Announce when check is complete.

b. Sideward hovering flight checks. Re-establish as necessary, a stabilized 3-foot hover into the wind. Smoothly initiate sideward flight to either side. During the maneuver observe that no excessive control inputs are required relative to current wind conditions and that desired aircraft response is achieved. Neutralize the cyclic and observe the aircraft should drift to a stop. Repeat the check to the opposite side.

c. Forward hovering flight checks. Establish an approximate 5-foot hover into the wind. While maintaining a 5-foot hover height, apply sufficient forward cyclic to accelerate to effective translational lift (ETL). Check cyclic, collective and pedal response, rigging, abnormal vibrations, and/or displacement.

d. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4166

Perform stability and control augmentation system check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

Maintain a 10-foot hover altitude, +5 feet – 2 feet.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear. With aircraft stabilized at 10 + 5 – 2 foot hover into the wind, check the following:

a. In one continuous movement, smoothly and repeatedly displace the cyclic approximately 1-inch aft of center, 1-inch forward of center (or forward then aft) and then return the cyclic to center. Stabilize the aircraft. Check for a constant rate during the pitching motion of the fuselage and observe an almost immediate damping of the fuselage moment when the flight controls are neutralized.

b. In one continuous movement, smoothly and repeatedly displace the cyclic approximately 1-inch right of center, 1-inch left of center (or left then right) and then return the cyclic to center. Stabilize the aircraft. Check for a constant rate during the rolling motion of the fuselage and observe an almost immediate damping of the fuselage moment when the flight controls are neutralized.

c. In one continuous movement, displace the left (or right) pedal approximately 1-inch forward of the hover pedal position, and then return the pedal to the original position. Return the aircraft to a stabilized hover into the wind. Check for a constant rate during the yaw motion of the fuselage and observe an almost immediate damping of the fuselage moment when the flight controls are neutralized. Repeat the check using the other pedal.

d. Select SCAS release (REL) switch and acknowledge the SCAS disengage (DISENG) audio. Repeat the pitch, roll, and yaw checks with SCAS disengaged. Observe that the resultant movement of the fuselage will be more pronounced and usually tend to continue after the displaced control is centered. Compare the flight characteristics and handling qualities between the two test states.

e. Reengage SCAS pitch/roll and yaw switches. Verify the SCAS DISENG message deletes. Return to 3-foot hover.

f. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. The lack of visual references at night reduces the aviator's ability to estimate height above ground and drift.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4168

Perform heading hold check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:
Maintain the appropriate hover altitude, (either 3 ±1 foot or 10-foot ±2 foot, as appropriate).

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. Additionally, the MTP will direct the rated RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear. With aircraft stabilized at 3 ±1 foot hover into the wind, check the following:

a. Select horizontal situation display (HSD) and enter missed approach point (MAP) offset mode. Engage heading hold, monitor the aircraft heading, and confirm that the heading (HDG) HOLD/heading hold mode (HHM) advisory message is displayed on the multifunction display (MFD).

b. While guarding, but without applying pressure to the anti-torque pedals, verify that the heading is maintained within ±2 degrees of the initial reference heading using the MAP offset display.

c. Continue guarding the anti-torque pedals and moderately increase the collective to bring the aircraft to a stabilized 10-foot hover. Verify HDG HOLD/HHM remains engaged following the ascent. When the aircraft is stabilized, observe the MAP offset display, and verify the aircraft heading is re-established to within ±2 degrees of the initial 3-foot hover height reference.

d. While guarding the anti-torque pedals, lower the collective to re-establish a 3-foot stabilized hover.

e. Displace the HDG HOLD engage/disengage (ENGA/DISENG) trim switch to either R (right) or L (left) to change the aircraft heading at least 10 degrees from the initial reference heading. Observe the aircraft maintains the new heading by referencing the map offset display. Return the aircraft to the original reference heading by displacing the HDG HOLD ENGA/DISENG trim switch in the appropriate direction. Repeat the check in the opposite direction.

f. Apply slight pressure (either left or right) to the anti-torque pedals and observe that heading hold disengages, the HDG HOLD/HHM message deletes from the MFD, and an advisory audio is heard in both headsets.

g. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. The lack of visual references at night reduces the aviator's ability to estimate height above ground and drift.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4170

Perform power cylinder check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

Maintain a 10-foot hover altitude, +5 feet, -2 feet.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. The MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will brief the RCM and/or NCM on the use of the terms "cycle," "off," and "check complete," and the emergency procedures to be performed in the event of a hydraulics system failure. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. The RCM and/or NCM will identify the hydraulic system (HYD SYS) switch, will maintain a hand on the switch until told to remove it, and will not select the system to either the off or on position until instructed by the MTP. Direct the RCM and/or NCM to confirm during the check that the low HYD press message does not display on the MFD. On aircraft without voice activated communication (VOX) capability, select HOT MIC (microphone) on both internal communication system (ICS) systems. Confirm the aircraft maneuver area is sufficient and clear. With aircraft stabilized at 10 + 5 – 2 foot hover into the wind, check the following:

   a. Check the right servo by smoothly and repeatedly displacing the cyclic at a moderate rate, approximately 3 inches to either side of center, diagonally from the left-rear to right-forward quadrant. During the maneuver, confirm that movement is unrestricted. Repeat the check for the left servo by displacing the cyclic from the right rear to the left-forward quadrant.

   b. Return the aircraft to a stabilized 3-foot hover. Adjust ICS switches, as necessary.

   c. Record the results of checks as appropriate.

SINGLE PILOT CONSIDERATIONS: This check will not be performed without an additional crewmember onboard. Either an additional RCM or a NCM is required to be on board to assist with HYD SYS switch functions. Except for rated aviator duties, the RCM crew actions described above may be accomplished by the NCM at the direction of the MTP.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. The lack of visual references at night reduces the aviator's ability to estimate height above ground and drift.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4172

Perform engine response check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

Do not exceed 50 feet above ground level (AGL).

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. Additionally, the MTP may direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Do not exceed a 50-foot hover height during these flight maneuvers. Confirm the aircraft maneuver area is sufficient and clear. With aircraft stabilized at 3 ±1 foot hover into the wind, check the following procedures for the appropriate aircraft type:

a. OH-58D. Make a positive increase in the collective pitch. Confirm that the engine responds smoothly and rapidly, and that engine gas generator speed (Ng) increases in less than 1 second and then stabilizes.

(1) Land the aircraft, reduce the throttle to the idle position, and select the fuel control panel switch to analog (ANLG) back up. Note the fuel control caution and advisory messages and acknowledge the audio.

(2) Increase the throttle to the full-open position. Rotor speed/power turbine speed (Nr/Np) should stabilize at 102 to 103 percent.

(3) Alternately activate the revolutions per minute (RPM) increase/decrease switch to the plus (+) and minus (-) positions. Nr/Np should remain constant.

(4) Verify the maneuver area is clear and reestablish a stabilized 3-foot hover. Make a positive increase in collective pitch and note Nr/Np. Confirm that Ng increases in less than 1 second and then stabilizes.

(5) Land the aircraft and reduce the throttle to the idle position. Select the fuel control panel switch to normal (NORM), perform escape built-in test (ESC BIT), and increase the throttle to the full-open position. Adjust the RPM increase/decrease switch to achieve 100 percent Nr.

(6) Record the results of checks as appropriate.

b. OH-58D(R). Select the full authority digital electronic control (FADEC) monitor page and verify if any ENG surge events have occurred.

(1) Make a positive increase in the collective pitch. Confirm that the engine responds smoothly and rapidly, and that Ng increases in less than 1 second, then stabilizes. Reestablish 3-foot hover.

(2) Reselect the FADEC monitor page to verify that ENG surge numbers have not incremented.

(3) Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. Several attempts may be required to establish effective crew coordination measures to confirm proper aircraft and aircraft systems reactions and responses. Use of a call and response method may be required. The lack of visual references at night reduces the aviator's ability to estimate height above ground and drift.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4176

Perform throttle warning message check

CONDITIONS: In an OH-58D (R) helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. Additionally, the MTP may direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear. With aircraft stabilized at 3 ±1 foot hover into the wind, check the following:

   a. Slowly reduce throttle to 92 ±1 degrees TP and verify CHECK THROTTLE warning message displays.

   b. Slowly increase throttle to 93 ± 1 degrees. CHECK THROTTLE warning and audio extinguishes.

   c. Return throttle to full open.

   d. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4178

Perform manual throttle operations check (full authority digital electronic control)

CONDITIONS: In an OH-58D(R) helicopter, over a level surface, heading into the wind, with the MMS off and IDM off.

STANDARDS: Appropriate common standards plus the following:

1. Maintain aircraft heading into the wind, ±10 degrees.
2. Smoothly coordinate throttle and collective controls.
3. Maintain a 3-foot hover ±1 foot.
4. Maintain revolutions per minute (RPM) rotor speed (Nr) 100 ±2 percent at a hover.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. Additionally the MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. Additionally, the MTP may direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

   Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

   a. Land the aircraft and reduce the throttle to the engine idle position.

   b. Select the manual position on the full authority digital electronic control (FADEC) automatic (auto)/manual switch. Confirm that the manual legend illuminates, the FADEC manual warning message displays on the multifunction display (MFD), and the FADEC audio is heard in both headsets.

   c. Smoothly adjust the throttle to 100 percent Nr. Continue to carefully adjust the throttle while increasing collective to establish a stabilized 3-foot hover into the wind. Note that fuel burn rate (FBR) adjusts as appropriate for manual mode.

   d. While at a hover, maintain Nr at 100 ±2 percent. Note engine response and power turbine speed (Np) fluctuations.

   e. Land the aircraft while continuously monitoring and maintaining RPM.

   f. With the aircraft skids firmly on the ground, reduce throttle to idle while decreasing the collective to the full down position.

   g. Select the FADEC auto/manual push-button switch to the auto position. Confirm the auto legend on the switch is illuminated and FADEC manual message deletes from MFD. Check engine history pages for maintenance codes.

h. Increase the throttle to full open, and ensure that the FADEC system operates properly and maintains Nr at 100 percent.

i. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. Selection of a suitable take-off and landing area is crucial for this maneuver.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4186

Perform hover/hover bob-up check

CONDITIONS: In an OH-58D(R) helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance, if available. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

   Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear. With aircraft stabilized at 3 ±1 foot hover into the wind over recognizable landmark, check the following:

   a. Select HOVER/HOVER BOB-UP page.

   b. (R) Select Hover position (HVR POS) and enter 15 feet. Drop position box.

   c. Move helicopter and verify proper display reaction of Velocity Vector, Acceleration Cue, and Position Box on multifunction display (MFD). (R) Verify HVR DRIFT advisory displays at set limit and remains active until helicopter position is 5 feet less than the drift limit set.

   d. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4194

Perform flight instruments check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

   Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

   a. Select vertical situation display (VSD) page on one multifunction display (MFD) and horizontal situational display (HSD) on the other MFD.

   b. Maneuver the aircraft to make changes in altitude, attitude and heading.

   c. Verify proper indications are displayed and there are no excessive fluctuations. Confirm that the standby instruments correlate with the MFD display.

   d. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. Use of a call and response method may be required. The MTP must be prepared to increase their airspace surveillance requirements as the RCM and/or NCM may be focused on systems instruments during the maneuver.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4210

Perform takeoff and climb checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

   Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

   a. Perform before takeoff checks and execute a normal takeoff.

   b. During the takeoff and climb, verify that flight control positions and instruments are normal for conditions and that there are no unusual vibrations.

   c. Check for correlation and function of VSI and Airspeed Indicators on MFDs and Standby Indicators.

   d. (R) Verify Fuel Burn Rate (FBR) and Fuel Time Remaining (FTR) display changes with collective position changes display.

   e. Initiate a fuel consumption check when in straight and level flight.

   f. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. Use of a call and response method may be required. The MTP must be prepared to increase their airspace surveillance requirements as the RCM and/or NCM may be focused on systems instruments during the maneuver. The MTP should know the surface wind direction and velocity as this will assist the MTP in establishing the crab angle required to maintain the desired ground track.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations. As the aircraft clears the snow/sand/dust cloud and all barriers, accelerate to climb airspeed and trim the aircraft.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4232

Perform control rigging check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

1. Maintain airspeed of 100 ±5 knots indicated airspeed (KIAS), into the wind.
2. Maintain mast torque at 70 ±2 percent.
3. Maintain the aircraft in trim.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. The MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

a. Select an altitude that will allow for safe recovery.

b. Establish trimmed flight into the wind at 70 percent mast torque and 100 KIAS.

c. Select force trim to ON, select stability and control augmentation system release (SCAS REL) switch, and acknowledge the SCAS DISENG (disengage) audio. Relax cyclic pressure and note that the cyclic remains in place.

d. When the cyclic check is complete, select the force trim to OFF.

e. While maintaining the aircraft in trim, confirm the pilot's station anti-torque pedal position is neutral to 1.5 inches right pedal forward. Relax the pressure on the anti-torque pedals and check for pedal creep.

f. Reengage the SCAS pitch/roll and yaw switches, and confirm that the SCAS DISENG message is deleted from the multifunction display (MFD).

g. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. The RCM and/or NCM must be prepared to provide supplemental lighting for the MTP to observe the anti-torque pedal measurements on the right side. The RCM or NCM must be prepared to increase their airspace surveillance requirements as the MTP may be focused on flight control displacements and system instruments during the maneuver.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4236

Perform autorotation revolution per minute check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

1. Select a suitable autorotation area that will permit a safe descent and emergency touchdown landing.
2. Maintain airspeed of 55 ±5 knots indicated airspeed (KIAS), in trim, into the wind, during autorotation.
3. Establish a climb prior to 500 feet above ground level (AGL) while maintaining airspeed greater than 50 KIAS.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. The MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

a. Confirm that the heater (HTR), engine (ENG) anti-ice, and mast-mounted sight (MMS) switches are OFF. Improved data modem (IDM) circuit breaker is pulled OH-58D(R).

b. Maneuver the aircraft to establish an upwind track to the selected area. Establish 55 KIAS, level flight, in trim, at an altitude that will allow safe recovery. Confirm the aircraft maneuver area is clear.

c. Contact flight following as appropriate and announce initiation of the maneuver.

d. Smoothly lower the collective to the full-down position and confirm that rotor speed (Nr) remains within limits.

e. Retard the throttle to the engine-idle position, confirm clutch disengagement, and that engine gas generator speed (Ng) stabilizes at 63 to 65 percent.

f. Confirm the aircraft is in trim and that Nr is stabilized within the normal operating range.

g. Verify the cyclic position is normal for conditions and sufficient right pedal remains. Note any increase or decrease in main rotor vibrations, and that mast torque (MQ)/engine torque (EQ) indications are at or near 0 percent.

h. Smoothly advance the throttle to full open, adjusting the collective as necessary to maintain Nr/Np within limits. During power application, confirm clutch reengagement.

i. Increase the collective and establish a climb prior to descending below 500 feet AGL.

j. Contact flight following as appropriate.

k. Compare recorded Nr to Nr required for aircraft weight and density altitude (DA); adjust, as required.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. Attitude control is critical during night autorotation due to lack of references. The RCM and/or NCM must be prepared to increase their airspace surveillance requirements as the MTP may be focused on flight control displacements and systems instruments during the maneuver.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4244

Perform hydraulics off check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

1. Maintain airspeed of 80 ±10 knots indicated airspeed (KIAS).
2. Maintain the aircraft in trim.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. The MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will brief the RCM and/or NCM on the use of the terms "hydraulics off," "hydraulics on," "check complete," and the emergency procedures to be performed in the event of a hydraulics system failure. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. The RCM/NCM will identify the hydraulic system (HYD SYS) switch, will maintain a hand on the switch until told to remove it, and will not select the system to either the off or on position until instructed by the MTP. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

a. Select an altitude that will allow for safe recovery in the event of a hydraulics failure. Establish level flight, in trim, into the wind at 80 KIAS noting cruise power.

b. Direct the RCM/NCM to identify and move the HYD SYS switch to the OFF position using the briefed command.

c. Confirm the low HYD PRESS (pressure) and stability and control augmentation system disengage (SCAS DISENG) caution messages displayed and acknowledge the audio. If pitch and roll attitude can be maintained without unusual effort, direct the RCM/NCM to remove his hand from the HYD SYS switch.

d. Do not exceed any aircraft limitations during the following maneuvers. Confirm the aircraft maneuver area is clear and then check controllability by making shallow left and right turns. Establish level flight. Maintain the aircraft in trim during the following collective checks. Raise the collective to 83 percent mast torque to ensure the ability to increase collective is present prior to reduction, lower the collective and verify that mast torque can be decreased to at least 17 percent. Raise the collective and verify that mast torque can be increased to at least cruise power mast torque. Excessive force should not be necessary to achieve either of the mast torque settings.

e. Upon completion of the collective checks, reestablish level flight.

f. Relax pressure on the flight controls. Direct the RCM/NCM to again identify and move the HYD SYS switch to the HYD SYS position using the briefed command. Re-engage the SCAS pitch/roll and yaw switches.

g. Record the results of checks as appropriate.

SINGLE PILOT CONSIDERATIONS: This check will not be performed without an additional crewmember onboard. Either an additional RCM or a NCM is required to be on board to assist with HYD SYS switch functions. Except for rated aviator duties, the RCM crew actions described above may be accomplished by the NCM at the direction of the MTP.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. The RCM and/or NCM must be prepared to increase their airspace surveillance requirements as the MTP may be focused on flight control displacements and systems instruments during the maneuver.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4250

Perform collective anticipator check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

1. Select an area that will permit a safe descent and emergency touchdown landing.
2. Maintain airspeed of 80 ±10 knots indicated airspeed (KIAS) into the wind.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. The MTP will brief all Warnings, Cautions and Notes that may impact upon the checks to be performed. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

a. Maneuver the aircraft to establish an upwind track to the selected area. Establish level flight, in trim, at 80 KIAS.

b. Announce initiation of the maneuver and lower collective to attain 78 ± 1% NG and allow to stabilize.

c. Make a smooth increase of collective at a rate that will achieve 85 percent mast torque in not more than 5 seconds.

d. Confirm that the rotor speed (Nr) droop does not exceed 4 percent (OH-58D), 2 percent (R). If the Nr droop exceeds 4 percent (OH-58D), 2 percent (R), the MTP will terminate the test flight and return to the maintenance facility for corrective action.

e. Record the results of checks as appropriate.

Note: The 5-second pull is the maximum, (and desired), length of time to attain 85 percent mast torque. As an example, if the Nr droop is only 2 percent in a 3-second pull, the system is functioning properly.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. Use of a call and response method may be required. The RCM or NCM must be prepared to increase their airspace surveillance requirements as the MTP may be focused on system instruments during the maneuver. The MTP must be prepared to increase their airspace surveillance requirements as the RCM and/or NCM may be focused on systems instruments during the maneuver.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4252

Perform vibration analysis

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards plus the following:

1. During 4/revolutions (rev) vertical vibration check, maintain torque required to induce the vibration.
2. During increasing airspeeds, do not exceed computed velocity never exceed (airspeed limit [Vne]).

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

a. Analysis during increasing airspeeds. While maintaining straight and level flight, progressively increase the airspeed from 70 KIAS to VNE in 10-knot increments. Note any increase or decrease in vibration levels.

b. Perform a letdown check at airspeed where vibration is present to determine whether the vibration is mechanical (pitch change links), or aerodynamic (trim tabs). Terminate the maneuver if vibrations become severe.

c. 4/rev vertical vibration check. A 1/rev vibration will normally mask a 4/rev vibration.

(1) Establish level flight, in trim, at the airspeed/mast torque where the 4/rev is most pronounced, (use 70 to 80 knots indicated airspeed [KIAS] for training and evaluation).

(2) Confirm the aircraft maneuver area is clear. While maintaining the aircraft in trim, and at the appropriate airspeed/mast torque, first execute a 45-degree right bank, followed by a left turn to establish a stabilized 45-degree left bank. Note any change in the 4/rev vibration level. An increase or decrease in vibration will indicate the presence of a correctable condition. Correctable vibrations are determined as acceptable or unacceptable depending on the severity. If the 4/rev vibration remains constant during the maneuvers, it is inherent, and therefore considered uncorrectable. If an intermittent 1/rev is encountered, it is an indication of a product balance problem.

d. Record the results of checks as appropriate.

Note: These procedures should be used to determine whether aviation vibration analyzer (AVA) equipment should be installed for further vibration analysis or rotor smoothing, or if other maintenance action is required.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. The RCM and/or NCM must be prepared to increase their airspace surveillance requirements as the MTP may be focused on flight control displacements and systems instruments during the maneuver.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4272

Perform communication checks

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

   a. Verify that all radios are functioning properly on at least two frequencies. Confirm pilot press to talk switches as well as floor switches. Check all installed secure radio equipment for proper operation. Confirm proper operation of the transponder with the local air traffic control (ATC) facility.

   b. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4276

Perform special/detailed procedures

CONDITIONS: In an OH-58D helicopter and equipment installed.

STANDARDS: Appropriate common standards plus the following:

Perform special/detailed procedures according to TM 1-1520-248-MTF as part of general maintenance test flights.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation any of the procedures. Check any equipment installed on the aircraft for which special detailed procedures are contained in section IV of the maintenance test flight (MTF). Use additional reference publications, as required.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted academically or in the aircraft.
2. Evaluation will be conducted in the aircraft or academically. If these checks are performed during an MTP or ME evaluation, the evaluated crewmember should demonstrate knowledge of the system, published operational checks, and knowledge of published charts, graphs, and worksheets.

REFERENCES: Appropriate common references.

TASK 4280

Perform before-landing check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

   a. Announce initiation of the before-landing checks. Perform the before-landing checks in sequence.

   b. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations. Altitude, apparent ground speed, and rate of closure are difficult to estimate at night. The rate of descent should be slightly less than during the day to avoid abrupt attitude changes at low altitudes. After establishing the descent, reduce airspeed to approximately 40 to 45 knots until apparent ground speed and rate of closure appear to be increasing. Before descending below obstacles, determine the need for artificial lighting.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations. The rate of descent will be determined by the rate in which the snow/sand/dust is blown from the intended landing point. During the descent, remain above the snow/sand/dust cloud until it dissipates and the touchdown point can be seen. Be prepared to execute a go-around. Establish and discuss the environmental effects at the termination point.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4282

Perform after-landing check

CONDITIONS: In an OH-58D helicopter.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Coordinate with and brief the RCM and/or NCM on the maneuvers to be performed, commands expected to hear, and the resultant actions he will take. Confirm the aircraft maneuver area is sufficient and clear prior to initiation of each of the following procedures:

   a. Announce initiation of the after-landing checks. Perform the after-landing checks in sequence.

   b. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 4284

Perform engine shutdown checks

CONDITIONS: In an OH-58D helicopter with the after-landing check performed.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions.

   a. The MTP will identify and perform the required checks in this task applicable to the maintenance being performed in sequence. The MTP will direct assistance from the RCM and/or NCM to include clearing the aircraft and maintaining obstacle avoidance and airspace surveillance. Additionally, the MTP will direct the RCM and/or NCM to assist with monitoring and acknowledging multifunction display (MFD) indications and messages. The MTP will ensure the results of the checks are recorded to include any specific readings.

   b. The RCM or NCM should assist the MTP as directed.

2. Procedures.

Identify the checks to be performed. Brief the RCM, NCM, and/or ground support personnel as necessary, if available. The MTP will ensure the area surrounding the aircraft is clear. Perform the required checks in sequence. Record the results of checks as appropriate.

NIGHT OR NIGHT VISION GOGGLES (NVG) CONSIDERATIONS: Apply appropriate common considerations.

SNOW/SAND/DUST CONSIDERATIONS: Apply appropriate common considerations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted academically or in the aircraft.
2. 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 both crewmembers to perform most aircraft/system functions from either crew stations 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 personally the situation rather than to seek assistance from the other crewmember. It is essential for the pilot in command (PC) to brief specific duties prior to 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.** Good cockpit teamwork requires positive communication among crewmembers. Communication is positive when the sender directs, announces, requests, or offers information; the receiver acknowledges the information; the sender confirms the information, based on the receiver's acknowledgment or action.

b. **Direct assistance.** A crewmember will direct assistance when unable to maintain aircraft control, position, or clearance. A crewmember will also direct assistance when unable to properly operate or troubleshoot aircraft systems without help from the other crewmembers.

c. **Announce actions.** This will 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 actions that affect the actions of the other crewmembers.

d. **Offer assistance.** A crewmember will provide assistance or information when requested and when another crewmember appears to need help.

e. **Acknowledge actions.** Communications in the aircraft must include supportive feedback to ensure that crewmembers correctly understand announcements or directives.

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 airspeed, altitude, or obstacle avoidance.

h. **Coordinate action sequence and timing.** Proper sequencing and timing ensure that the actions of one crewmember mesh with the actions of the other crewmembers.

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. **Establish and maintain flight team leadership and crew climate.** 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 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 grade 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. **Accomplish premission planning and rehearsal.** 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, civil considerations (METT-TC) 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. **Apply appropriate decision making techniques.** 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. In order 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. **Prioritize actions and equitably distribute workload.** 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 the overloading of 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. **Effectively manage unexpected events.** 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. **Ensure that 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 callouts. 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. **Maintain mission situational awareness.** 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. **Communicate and acknowledge decisions and actions.** 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 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. **Seek supporting information and actions 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. **Mutually cross-monitor crewmember actions.** 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 pilot not on the controls (P) first asks the P* if 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. **Practice advocacy and assertion.** 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) Crewmembers state the rationale for their recommended plans and courses of action when time permits, but they always maintain a professional atmosphere. 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 grade 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. **Conduct crew-level after-action reviews.** 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. **Maintain mission planning and rehearsal.** Explore, in concert, all aspects of the assigned mission and analyze each segment for potential difficulties and possible reactions in terms 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 intra-crew 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 that may impact 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 (DOD) flight information publication (FLIP) contains standard terminology for radio communications. Operator's manuals contain standard terminology for items of equipment. Table 6-1 is a list of other standard words and phrases that crewmembers may use.

Table 6-1. Examples of standard words and phrases

Standard word or phrase	***Meaning of standard word or phrase***
Abort	terminate a preplanned aircraft maneuver.
Affirmative	yes.
Bandit	an identified enemy aircraft.
Break	immediate action command to perform an emergency maneuver to deviate from the present ground track; will be followed by the word "right," "left," "up," or "down."
Call out	command by the pilot on the controls for a specified procedure to be read from the checklist by the other crewmember.
Cease fire	command to stop firing but continue to track.

Table 6-1. Examples of standard words and phrases	
Standard word or phrase	***Meaning of standard word or phrase***
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 the direction (for example, “left,” “right,” “slide left,” or “slide right”). Also indicates that ground personnel are authorized to approach the aircraft.
Come up/down	command to change altitude up or down; normally used to control masking and unmasking operations.
Contact	establish communication with... (followed by the name of the element).
Controls	refers to aircraft flight controls.
Drifting	an alert of the unintentional or undirected movement of the aircraft; will be followed by the word “right,” “left,” “backward,” or “forward.”
Egress	command to make an emergency exit from the aircraft; will be repeated three times in a row.
Execute	initiate an action.
Expect	anticipate further instructions or guidance.
Firing	announcement that a specific weapon is to be fired.
Fly heading	command to fly an assigned compass heading. (This term generally used in low-level or contour flight operations.)
Go ahead	proceed with your message.
Go AJ	directive to activate antijam communications.
Go plain/red	directive to discontinue secure operations.
Go secure/green	directive to activate secure communications.
Hold	command to maintain present position.
Hover	horizontal movement of aircraft perpendicular to its heading; will be followed by the word “left” or “right.”
Inside	primary focus of attention is inside the cockpit for longer than 5 seconds.
Jettison	command for the emergency or unexpected release of an external load or stores; when followed by the word "door,” will indicate the requirement to perform emergency door removal.
Maintain	command to continue or keep the same.
Mask/unmask	to conceal aircraft by using available terrain features and to position the aircraft above terrain features.
Mickey	a Havequick time-synchronized signal.
Monitor	command to maintain constant watch or observation.
Move aft	command to hover aft, followed by distance in feet.
Move forward	command to hover forward, followed by distance in feet.
Negative	incorrect or permission not granted.
Negative contact	unable to establish communication with. . . (followed by name of element).
No joy	target, traffic, or obstruction not positively seen or identified.
Now	indicates that an immediate action is required.

Table 6-1. Examples of standard words and phrases	
Standard word or phrase	***Meaning of standard word or phrase***
Outside	primary focus of attention is outside the aircraft.
Put me up	command to place the P* radio transmit selector switch to a designated position; will be followed by radio position numbers on the intercommunication panels (1, 2, 3). Tells the other crewmember to place a frequency in a specific radio.
Release	command for the planned or expected release of an external load.
Report	command to notify.
Roger	message received and understood.
Say again	repeat your transmission.
Slide	intentional horizontal movement of an aircraft perpendicular to it's heading; will be followed by the word "right" or "left."
Slow down	command to reduce ground speed.
Speed up	command to increase ground speed.
Stand by	wait; duties of a higher priority are being performed and request cannot be complied with at this time.
Stop	command to go no further; halt present action.
Strobe	indicates that the aircraft AN/APR-39 has detected a radar threat; will be followed by a clock direction.
Tally	target, traffic, or obstruction positively seen or identified; will be followed by a repeat of the word “target,” "traffic," or "observation" and the clock position.
Target	an alert that a ground threat has been spotted.
Traffic	refers to friendly aircraft that present a potential hazard to the current route of flight; will be followed by an approximate clock position and the distance from your aircraft with a reference to altitude (high or low).
Transfer of controls	positive three-way transfer of the flight controls between the rated crewmembers (for example, "I have the controls,” “You have the controls," and "I have the controls").
Turn	command to deviate from present ground track; will be followed by words "right" or "left," specific heading in degrees, a bearing ("Turn right 30 degrees"), or instructions to follow a well-defined contour ("Follow the draw at 2 o'clock").
Unable	indicates the inability to comply with a specific instruction or request.
Up on	indicates primary radio selected; will be followed by radio position numbers on the intercommunication panels ("Up on 1, up on 3").
Weapons hot/cold/off	weapon switches are in the ARMED, SAFE, or OFF position.
Wilco	I have received your message, I understand, and I will comply.

Appendix A
Aircraft Series Qualification

A-1. OH-58D(R) SERIES QUALIFICATION. A crewmember qualified in the OH-58D, but not qualified in the OH-58D(R) will receive the following training before performing crew duties in the OH-58D(R).

a. **Classroom system trainer.** Academic instruction as outlined in figure A-1.

b. **Hot cockpit training.** 3.0 hours minimum and demonstrated knowledge of the subjects required by figure A-1.

1. General	
CDS4 components	Warning message priority
CDS4 system architecture	Joint variable message format (JVMF) advisories
Initial page	Hover (HVR) fail advisory
ZERO switch	Ground setup page
Zeroization complete	Engine history page
Emergency (EMERG) switch up	Global positioning system (GPS) satellite data
Very high frequency (VHF) and ultra high frequency (UHF) set to EMERG	Universal Transverse Mercator (UTM) present position zone
Embedded global positioning system/inertial navigation system (EGI) time figure of merit (FOM)	Latitude/longitude zones
	Direct waypoint hot cursor
2. Weapons	
Normal weapons vertical situation display (VSD)	
Pilot's weapon select switch	Sparse VSD engagement circle
Rocket VSD	Rocket steering cue
Copilot-gunner (CPG) weapon select switch	Mast-mounted sight (MMS) azimuth
Weapons page	Pitch cue
Range to target	Laser firing
Gun offset reticle	Laser reverts to previous selection
Sparse VSD gun select removed	MMS steering cue "boxed"
Sparse VSD enhanced reticle	MMS steering cue "unboxed"
Sparse VSD reticle	Machine gun optical display assembly (ODA)
Sparse gun VSD	Lock-on after launch (LOAL) in constraints
Lock-on before launch (LOBL) ± 20 degrees	LOAL out of constraints
LOAL ± 7.5°degrees	LOBL in constraints
Weapons Page	LOBL out of constraints
Weapons bit/setup page	Rockets not armed sight displayed

3. Communication	Initial page 1
R3 SINCGARS data mode (SDM)	CPG cyclic
R3 enhanced data mode (EDM)	JVMF initialization and usage
FM-1 control page flight hours (FH)	Prepoint list
FM-1 control page 2 FH	Software version page
Identification, friend or foe (IFF) page 1	
IFF page 2	

Figure A-1. OH-58D(R) qualification classroom systems trainer (CST), hot cockpit subjects

c. **Flight instruction.** A minimum of 6.0 hours in the OH-58D(R). Crewmembers will demonstrate proficiency in the tasks listed in figure A-2.

TASK NUMBER	*TASK TITLE*
1022	Perform preflight inspection
1024	Perform before starting engine through before leaving helicopter checks
1032	Perform radio communications procedures
1070	Respond to emergencies
1072	Respond to engine failure at a hover
1074	Respond to engine failure at cruise flight
1082	Perform autorotation
1102	Perform manual throttle operations(full authority digital electronic control [FADEC])
1142	Perform digital communication
1300	Perform MMS operations

Figure A-2. OH-58D(R) qualification, flight tasks

A-2. OH-58D SERIES QUALIFICATION. A crewmember qualified in the OH-58D(R), but not qualified in the OH-58D will receive the following training before performing crew duties in the OH-58D

a. **Classroom system trainer.** Academic instruction as outlined in figure A-3.

1. Improved MMS system processor (IMSP) (if installed)
Change summary
Mast mounted sight – pilot
Basic theory and controls
Operating modes
LASER operations, airborne calibration, and limitations

2. CDS 2 master controller processor unit (MCPU)

3. Electronic supervisory control (ESC)

4. Preflight and component locations

Figure A-3. OH-58D qualification, classroom systems trainer subjects

b. **Hot cockpit training.** Demonstrated knowledge and proficiency of the subjects required by figure A-4.

1. Cockpit changes

2. Data Loader Transfer
Navigation (NAV) align, auto, manual, fast heading
Datum/spheroid entry
Engine Monitor pages
Fault Detection (FDL) MENU
Built-in test (BIT) pages
Caution/warning history
Engine history
Ground setup (air-ground engagement system [AGES], EGI boresight)

3. Improved MMS system processor (IMSP)(if installed)
Preflight
Setup/airborne calibration
Point tracker types (centroid/feature)
TV (Normal/Inverse)
Split screen
Prepoint
Multiple point track
Fields of view

4. Communications equipment
CSC (VOX) (if installed)
FM ARC-201C (time of day [TOD], LOAD)
Transponder bits

5. Weapons subjects
Rocket steering cue
50 Cal. reticle

Figure A-4. OH-58D qualification, hot cockpit subjects

c. **Flight instruction.** Crewmembers will demonstrate proficiency in the tasks listed in figure A-5.

TASK NUMBER	*TASK TITLE*
1022	Perform preflight inspection
1024	Perform before starting engine through before leaving helicopter checks
1032	Perform radio communications procedures
1070	Respond to emergencies
1072	Respond to engine failure at a hover
1074	Respond to engine failure at cruise flight
1082	Perform autorotation
1100	Perform analog throttle operations
1142	Perform digital communication
1300	Perform MMS operations

Figure A-5. OH-58D qualification, flight tasks

Appendix B

FADEC Manual Throttle Operations Four-Step Method of Instruction (MOI)

B-1. FADEC Manual Throttle Four-Step MOI. This four step MOI is intended as a supplement to Task 1102 in TC 1-248. All four steps are designed around the building block technique of pilot training in accordance with the instructor pilots' handbook which gives the instructor pilot (IP) a more defined process for teaching this maneuver. **IPs should not allow pilots to progress from one step to the next unless they are proficient in the step that they are being trained.** This process also gives an IP the ability to revert to an earlier training step should a pilot experience an obstacle to learning.

B-2. STEP-1: BASIC. Begin on level ground at engine idle. The IP or pilot will switch the full authority digital electronic control (FADEC) to the manual (MAN) position. With the collective full down, the IP will direct the pilot on the controls (P*) to increase and decrease the throttle between idle and 100 percent rotor speed (Nr) to get the direction and "feel" of the throttle and how throttle movements affect Nr. Repeat several times until the P* can easily establish and maintain Nr as directed by the IP. The IP will direct the P* to achieve/maintain 100 percent Nr, then increase the collective while maintaining 100 percent Nr until the aircraft is light on the skids and then decrease the collective to full down while maintaining 100 percent Nr. Repeat several times until the P* can easily maintain Nr while correlating collective movements. Finally, the IP will direct the P* to perform a takeoff from the ground, maintain a hover, and practice left and right 360 degree turns. The IP will direct the P* to land the aircraft and return the collective to the full down position **(The IP must ensure that the P* does not "dump" the collective when contact is made with the ground which will result in an overspeed)**. Repeat until the P* can easily maintain Nr within limits while taking off to a hover, landing from a hover, while making 360 degree turns at a hover and while landing from a hover.

B-3. STEP-2: FADEC FAILS AT A HOVER. While in the automatic (AUTO) mode, the IP will direct the P* to observe the throttle while the P* makes a throttle reduction to the appropriate position using the index mark for reference. Once the P* can make a smooth, quick reduction to the correct position while looking at the throttle, the IP will direct the P* to practice the initial reduction without looking and then glance down to "fine tune." (This is how a pilot should react should a real failure occur.) Repeat until the reduction is smooth and controlled and can be made in approximately 2 seconds. (Two seconds is faster than the hydromechanical unit [HMU] pistons can extend at normal power settings required for flight.) The IP will place the FADEC switch from AUTO to MAN. The P* will react by making the necessary throttle and collective inputs to gain Nr control and maintain it within standards. After the P* has established positive control of Nr, hovering turns and landing from a hover may be practiced to teach correlation of throttle and collective inputs to changing power requirements.

The second variation is to announce to the P* that the FADEC has failed in the fixed flow mode. The P* will reduce the throttle to the appropriate position and then direct the IP to place the FADEC switch from the AUTO to the MAN position and make the necessary throttle and collective inputs to gain control of and establish the Nr.

B-4. STEP-3: FADEC FAILS IN FLIGHT. Training in cruise flight is the next logical step. Begin at 80 knots, straight and level at an altitude that will allow sufficient time to recover should the need arise. (The same approximate altitude that would be used to conduct a simulated engine failure at altitude would be appropriate.) The IP will switch FADEC to the MAN position. The pilot will react accordingly by making the necessary throttle and collective inputs to gain Nr control and maintain it within standards. Once the P* has gained manual throttle control and is straight and level, the IP will direct the pilot to decelerate to 40 knots and then accelerate back to 80 knots. This requires the pilot to correlate throttle and collective movements through power changes. Initially it may take several minutes and several miles to accomplish this procedure. While established at the minimum and maximum power settings of this maneuver, the pilot should observe the throttle index marks to stress the effect of power demands to appropriate throttle settings. Repeat until the P* can complete the entire step in approximately the time and distance equal to the standard downwind leg of a traffic pattern.

> ***Note:*** A pilot unable to perform step 3 to standard will NOT be able to perform a visual meteorological conditions (VMC) approach. Do not progress to step 4 unless the pilot is proficient in step 3.

B-5. STEP-4: TAKING FADEC FAILURE TO THE GROUND (RUNNING LANDING/VMC APPROACH). This step is simply the culmination of training conducted so far. Step 4 should be conducted while flying a standard traffic pattern to a large clear area. A flight strip or runway type environment is ideal if readily available. The final approach path and landing area must be familiar to the IP and clear of obstructions/obstacles before FADEC manual throttle operations are attempted. For this reason and for practice, the IP should direct the P* through a simulation of step 4 while in the AUTO mode prior to conducting it in the manual mode. At approximately the mid-downwind point, at 80 knots, straight and level, the IP will place the FADEC in the manual mode. The P* will react accordingly by making the necessary throttle and collective inputs to gain Nr control and maintain Nr within standards. The P* should maneuver the aircraft so that it is on final at approximately 40 to 45 knots, straight and level, in trim, and at the appropriate altitude before beginning the approach. The P* should know 3 foot and out-of-ground effect (OGE) hover power required in order to make comparisons with torque throughout the approach to help assist in anticipating power changes. The pilot should also be aware that the vertical speed indicator (VSI) is a good tool to indicate impending changes in altitude and/or approach angle. Once the approach angle has been intercepted and the approach has begun, the transition through ETL is the largest single power change the pilot will have to make prior to touchdown.

a. **Running landing.** Prior to arrival on final approach, the crew will establish operation in the FADEC MAN mode. On final approach, establish straight and level flight at 40 to 45 knots and determine an approach angle which allows safe obstacle clearance to arrive at the intended point of landing. Once the approach angle is intercepted, coordinate throttle and collective to maintain the approach angle and maintain operating limits. Maintain apparent ground speed and rate of closure to arrive at two feet above the intended touchdown area at approximately ETL. If all conditions are within parameters, reduce throttle to the engine idle position, (the throttle must be at the idle detent prior to touchdown or overspeed may occur), maintain heading with pedals, and apply collective to accomplish a smooth and controlled touchdown. The touchdown speed may vary from at, above, or below effective translational lift (ETL) as dictated by the landing area conditions and controllability,

but increased control inputs may be required for operations below ETL. After ground contact, ensure the aircraft remains stable as collective is lowered to reduce ground run.

CAUTION

A common tendency is to apply aft cyclic as the throttle is being reduced. The IP/P* must be aware of this tendency and guard against it.

b. **VMC approach.** This power change should be planned to occur at an altitude so that there is opportunity to react and recover should the P* make inappropriate control inputs. Initially, the P* should be directed to decelerate through ETL at approximately 250 feet above ground level (AGL) and, as proficiency progresses, never lower than 100 feet AGL depending upon the experience of the P* regardless of the approach angle used. Once the P* negotiates ETL and the corresponding power change, the P* need only hover down the approach path to the desired termination. The IP will terminate the approach if:

(1) The aircraft is not below ETL by the altitude directed by the IP.

(2) The pilot accelerates back above ETL.

(3) The approach progresses so that the intended landing area can no longer be safely made.

Note 1: Throughout FADEC training, the IP will emphasize basic flying skills by teaching the P* to anticipate power and control requirements and, whenever possible, by separating those requirements in order to simplify the task being flown. Example: If the P* needs to descend and decelerate, the P* should attempt to accomplish one and then the other (descend and then decelerate, or decelerate then descend). The P* should be taught to anticipate power changes and demands and to adjust the throttle and Nr to "lead" those changes accordingly.

Note 2: It is imperative that the P* understands that the initial response to the FADEC tone is to always reduce the throttle to a position that intelligently coincides with the selected power demand. The index mark on the throttle is merely a reference point that indicates approximately 75 degrees power level angle (PLA) and approximately 315 pounds per hour of fuel flow. There is no negative result if the pilot reduces the throttle to the appropriate position even if FADEC has not failed because FADEC in the AUTO mode will not react to that amount of throttle reduction.

Note 3: The second variation of inducing a FADEC failure at a hover or at altitude is for the IP to announce to the P* that the FADEC has failed in the fixed flow mode. The P* will reduce the throttle to the appropriate position, then direct the IP to place the FADEC in the MAN mode, and then make the necessary throttle and collective inputs to gain control of Nr. The P* will describe to the IP the symptoms of a FADEC failure to the fixed flow mode.

Note 4: The crew briefing conducted will include the following concept: If the IP takes the controls and announces "I have the controls" for any reason when the FADEC is in the MAN mode, the P will immediately prepare to press the FADEC button should the IP request that FADEC be placed back into the AUTO mode.

Note 5: During training/evaluations, if the aviator has not demonstrated proficiency in FADEC manual operations (step 4) to an IP/SP in the previous six months, the training/evaluation will be conducted in accordance with this four-step process.

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Glossary

ABF	attack by fire
ABRM	aerial ballistic reference mark
ACCPTD	accepted
ACP	armament control panel
ADJ	adjust
ADSS	ANVIS display symbology subsystem
AGES	air-ground engagement system
AGL	above ground level
AHO	above highest obstacle
AIM	aeronautical information manual
ALT	altitude
AMC	air mission commander
AMCOM	aviation and missile command
AMPS	air mission planning station
ANCD	automated net control device
ANLG	analog
ANVIS	aviator's night vision imaging system
APART	annual proficiency and readiness test
AR	Army regulation
ARTY	artillery
ASE	aircraft survivability equipment
ASR	airport surveillance radar
ATAS	air-to-air Stinger
ATC	air traffic control
ATIS	automatic terminal information service
ATM	aircrew training manual
ATP	aircrew training program
attn	attention
AVA	aviation vibration analyzer
AVTR	airborne video tape recorder
AUTO	automatic
AWR	airworthiness release
BDA	battle damage assessment
BFGL	battlefield graphics list
BFT	Blue Force Tracker

BHOT	black hot
BIT	built-in-test
BMP	Boyevaya Mashina Pekhoty (Russian combat vehicle, infantry [amphibious armored])
CAL	calibrate; calibration
CALC	calculation
CAS	close air support
CBAT	computer based aircraft survivability equipment training
CBRN	Chemical, Biological, Radiological, and Nuclear
CCA	close combat attack
CDS	control and display subsystem
CFR	code of federal regulations
CG	center of gravity
CHUM	chart updating manual
CL	checklist
CNTL	control
COMM	communications
CONT	continue
CPG	copilot-gunner
CPHD	Copperhead
CPO	copilot/observer
CPT	cockpit procedural trainer
CPU	central processing unit
CST	classroom systems trainer
CTL	commander's task list
CXP	common transponder
D	day
DA	Department of the Army (form); density altitude
DD	Department of Defense (form)
DGNS	Doppler global positioning system navigation system
DIR	direct
DISENG	disengage
DOD	Department of Defense
DPICM	dual purpose improved conventional munitions
DR	dead reckoning
DTC	data transfer cartridge
DTM	data transfer module

EA	engagement area
ECM	electronic counter measures
ECCM	electronic counter-countermeasures
EDM	enhanced data mode
EGI	embedded global positioning system/inertial navigation system
ELA	en route low altitude
EMERG	emergency
ENG	engine
ENGA	engage
EQ	engine torque
ESC	electronic supervisory control
ETA	estimated time of arrival
ETE	estimated time en route
ETL	effective translational lift
ETP	exportable training packet
F	Fahrenheit
FAA	Federal Aviation Administration
FAC	flight activity category
FADEC	full authority digital electronic control
FAF	final approach fix
FARP	forward arming and refueling point
FAT	free air temperature
FBR	fuel burn rate
FDC	fire direction center
FDL	fault detection location
FFAR	folding fin aerial rockets
FFE	fire-for-effect
FH	flight hours
FIH	flight information handbook
FLIP	flight information publication
FM	field manual or frequency modulated
FOM	figure of merit
FOV	field of view
FW	fixed wing
FWD	forward
FXD	fixed

FZ	fuse
GCA	ground-controlled approach
GPS	global positioning system
GWT	gross weight
HA	holding area
HC	hexachloroethane (smoke)
HDG	heading
HE	high explosive
HF	high frequency
HHM	heading hold mode
HMS	Hellfire missile system
HMU	hydromechanical unit
HSD	horizontal situation display
HTR	heater
HVR	hover
HYD	hydraulic
IAF	initial approach fix
IAS	indicated airspeed
IATF	individual aircrew training folder
ICM	improved conventional munitions
ICS	internal communication system
IDM	improved data modem
IE	instrument flight examiner
IEA	interface electronics assembly
IF	intermediate approach fix
IFF	identification, friend or foe (radar)
IFRF	individual flight records folder
IFR	instrument flight rules
IGE	in ground effect
IMC	instrument meteorological conditions
IPB	intelligence preparation of the battlefield
IP	instructor pilot
ISAQ	interim statement of airworthiness qualification
JOG	joint operations graphic
JVMF	joint variable message format
KIAS	knots indicated airspeed
KNPT	known point

kph	knots per hour
LAT	latitude
LDA	Launcher Designator Angle
LOAL	lock-on after launch
LOBL	lock-on before launch
LONG	longitude
LOS	line of sight
LRF/D	laser range finder/designator
LTL	laser target line
L	left
LZ	landing zone
MAN	manual
MAP	missed approach point
MAX	maximum
MAYDAY	international radio-telephony distress signal
MCPU	master controller processor unit
MDA	minimum descent altitude
ME	maintenance test pilot evaluator
MED	medical
METL	mission essential task list
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, civil considerations
MFD	multifunction display
MFK	multifunction keyboard
MIC	microphone
MIJI	meaconing, interference, jamming, and intrusion
MMS	mast-mounted sight
MOI	method of instruction
MOPP	mission-oriented protective posture
MOS	military occupational specialty
MQ	mast torque
MSA	minimum safe altitude
msgs	messages
MSN	mission
MTF	maintenance test flight
MTP	maintenance test pilot
MTO	message to observer

muskeg	deep organic mud
NAI	named area of interest
NAV	navigation
NAVAID	navigational aid
NBC	nuclear, biological, and chemical
NCM	non crewmember
NG	night goggles
Ng	engine gas generator speed
N/G	no-go
NGR	National Guard regulation
NOE	nap-of-the-earth
NORM	normal
NOTAM	notice to airmen
NM	nautical miles
Np	power turbine speed
Nr	rotor speed
NVD	night vision device
NVG	night vision goggles
NVS	night vision systems
OCONUS	outside the continental United States
ODA	optical display assembly
OGE	out-of-ground effect
OH	observation helicopter
OT	observer-target
ORIDE	override
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
PC-DTS	Personal Computer Data Transfer System
PC-VDTS	Personal Computer Video Transfer System
PFE	proficiency flight evaluation

PI	pilot
PLA	power level angle
PLGR	precision light weight GPS receiver
PLT	pilot
POI	program of instruction
PPC	performance planning card
PPS	precise positioning service (global positioning system)
PREPT	pre-point
PRI	primary
PZ	pickup zone
(R)	OH-58D(R)
R	reproducible, right
R/C	rate of climb
RCM	rated crewmember
REL	release
rev	revolutions
REQ	request
RFD	request frequency display
RHE	remote Hellfire electronics
RIPL	ripple
RL	readiness level
RMS	rotorcraft mapping system
RND	round
RPT	report
RPM	revolutions per minute
S	satisfactory; standardization
SALUTE	size, activity, location, unit, time, and equipment
SBF	support by fire
SCAS	stability and control augmentation system
SDM	SINCGARS data mode
SH	shell
SIF	selective identification feature
SIT	situation
SM	statue miles
SOI	signal operation instructions
SOP	standing operating procedure
SP	standardization instructor pilot

STANAG	standardization agreement
STBY	standby
str	strength
SUM	summary
sys	system
TACAIR	tactical air
TACFIRE	tactical fire computer
TAMMS(A)	the Army maintenance management system, aviation
TC	training circular
TDH	time, distance, and heading
TGT	target
TIS	thermal imaging system
TISU	thermal imaging sensor upgrade
TM	technical manual
TOD	time of day
T/O	takeoff
TQ	torque
TRADOC	United States Army Training and Doctrine Command
TVS	television sensor
UHF	ultra high frequency
U.S.	United States
USAAWC	United States Army Aviation Warfighting Center
USAR	United States Army Reserve
UT	unit trainer
UTM	universal transverse Mercator
VAPI	visual approach path indicator
VFR	visual flight rules
VHF	very high frequency
VIXL	video image cross-link
VMC	visual meteorological conditions
Vne	velocity never exceed (airspeed limit)
VOX	voice activated communications
VP	vulnerable point
VSD	vertical situation display
VSI	vertical speed indicator
VT	variable time-fuse
VTR	video tape recorder

WFOV	wide field of view
WHOT	white hot
WPN	weapon
WPT	waypoint
WR	when ready

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TM 11-5841-304-12. *Operator's and Aviation Unit Maintenance Manual For LASER Detecting Set AN/AVR-2A(V)1 (NSN 5865-01-346-4772) (EIC: N/A) AN/AVR-2A(V)2 (5865-01-393-9754) (EIC: N/A) AN/AVR-2A(V)3 (5865-01-393-7713) (EIC: N/A) AN/AVR-2A(V)4 (5865-01-432-*

2783) (EIC: N/A) AN/AVR-2A(V)5 (5865-01-461-0157) (EIC: N/A) AN/AVR-2A(V)6 (5865-01-461-0159) (EIC: N/A) AN/AVR-2A(V)7 (5865-01-461-0160) (EIC: N/A) AN/AVR-2A(V)8 (5865-01-461-0158) (EIC: N/A) {NAVAIR 16-30AVR2-4}.15 November 2002.

TM 11-5865-324-12. *Operator's and Aviation Unit Maintenance Manual for Countermeasures Set AN/ALQ-144(V1) and (V3). 1 September 1996*

*TM 11-5855-263-10. *Operator's Manual for Aviator's Night Vision Imaging System (ANVIS), AN/AVS-6(V)l (NSN 5855-01-138-4749) (EIC: IPR); AN/AVS-6(V)2 (5855-01-138-4748) (EIC: IPQ); AN/AVS-6(V)1A (5855-01-439-1745) (EIC: IPW).* 1 February 2004.

TM 11-5895-1733-13&P. *Operator, Aviation Unit (AVUM) and Aviation Intermediate (AVIM) Maintenance Manual Including Repair Parts and Special Tools List (RPSTL) Transponder, Set, AN/APX-118(V). 1 June 2004*

*TM 11-5895-1199-12. *Operator's and Organizational Maintenance for Mark-XII IFF System.* 1 July 1984.

*TM 55-1500-342-23. *Army Aviation Maintenance Engineering Manual for Weight and Balance.* 29 August 1986.

READING RECOMMENDED

This reading contains relevant supplemental information.

FM 6-40. *Tactics, Techniques, and Procedures for Field Artillery Manual Cannon Gunnery.* 1 October 1999. (will be revised as FM 3-09.40).

FM 6-20-40. *Tactics, Techniques, and Procedures for Fire Support for Brigade Operations (Heavy).* 5 January 1990 (will be revised as FM 3-09.4).

FM 7-0 (FM 25-100). *Training the Force.* 22 October 2002.

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OH 58-D PERFORMANCE PLANNING CARD

For use of this form, see TC 1-248; the proponent agency is TRADOC.

DEPARTURE

	CONDITIONS	NOTES
PA T/O		
FAT T/O		
PA MAX		
FAT MAX		

LOADS

T/O WEIGHT		
MAX WEIGHT		
FUEL REQUIRED		
MAX FUEL		

MAXIMUM TORQUE		PREDICTED HOVER TORQUE		
			AT TAKEOFF	MAX COND
5 MINUTES				
30 MINUTES		IGE		
CONTINUOUS		OGE		
MAXIMUM ALLOWABLE GROSS WEIGHT IGE				
MAXIMUM ALLOWABLE GROSS WEIGHT OGE				

ENROUTE

CONDITIONS		DRAG CORRECTIONS	
ALTITUDE		Δ DRAG SQ. FT.	
TEMP		TQ Δ FOR CRUISE AIRSPEED	

	IAS	TORQUE	FUEL FLOW	NOTES
CRUISE				
MAX RANGE				
MAX R/C OR END				
VNE				
CONDITIONS				

ARRIVAL

PA	
FAT	
MAX TQ AVAIL 5 MINUTES	
MAX TQ AVAIL 30 MINUTES	
MAX TQ AVAIL CONTINUOUS	
MAXIMUM ALLOWABLE G.W. IGE	
MAXIMUM ALLOWABLE G.W. OGE	

FUEL MANAGEMENT

	TIME	FUEL
START		
STOP		
AMOUNT		
CONSUMPTION RATE		
BURNOUT TIME		
VFR RESERVE TIME		

TC 1-248
12 April 2007

By order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

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Secretary of the Army
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