TC 1-218

AIRCREW TRAINING MANUAL
Utility Airplane
C-12

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Aircrew Training Manual
Utility Airplane C-12

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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 C-12 aircrew training. It is based on the battle-focused training principles outlined in FM 7-1 and establishes crewmember qualification, and refresher, mission, and continuation training, and evaluation requirements.

This manual applies to all Active Army, Army National Guard (ARNG)/the Army National Guard of the United States (ARNGUS), and U.S. Army Reserve (USAR) C-12 crewmembers and their commanders.

This manual is not a stand-alone document. All requirements contained in Army regulations (ARs) and TC 1-210 must be met. This manual is the governing authority for training and flight evaluation purposes only. If differences exist between the maneuver descriptions in the operator manuals and this manual, the operator manuals are the authority for operating the aircraft. Implementation of this manual conforms to AR 95-1 and TC 1-210.

This manual (in conjunction with the Army regulations and TC 1-210) will help aviation commanders at all levels develop a comprehensive aircrew training program. By using this ATM, commanders ensure that individual crewmember and aircrew proficiency is commensurate with the unit mission and that aircrews routinely employ standard techniques and procedures.

Standardization officers, evaluators, and unit trainers will use this manual and TC 1-210 as the primary tools to assist the commander to develop and implement the aircrew training program. Crewmembers will use this manual as a "how to" source for performing crewmember duties. It provides performance standards and evaluation guidelines so crewmembers know the level of performance expected. Each task has a description of how it should be done to meet the standard.

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 Center, ATTN: ATZQ-ES (Fixed Wing Branch), Building 4503 Kingsman Street, Fort Rucker, AL 36362-5263. Recommended changes may also be e-mailed to ATZQES@rucker.army.mil.

This publication implements portions of standardization agreement (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.

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Chapter 1
Introduction

This ATM describes training requirements for crewmembers. It will be used with AR 95-1, AR 600-105, NGR 95-210, TC 1-210, and other applicable publications. The tasks in this ATM enhance individual and aircrew proficiency training. The training focuses on accomplishing tasks that support the unit's mission. The scope and level of training for individual crewmembers and collective 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(s) for each crewmember. Crewmembers will train, and must maintain proficiency, in each crew station they are designated to occupy. Instructor pilots (IPs), standardization instructor pilots (SPs), and instrument flight examiners (IEs) must maintain proficiency in both pilot seats. Commanders may designate other aviators in both seats. Aviators designated to fly from both pilot seats will be evaluated in each seat during annual proficiency and readiness test (APART) evaluations. This does not mean that all tasks must be evaluated in each seat. Commanders will develop a program to meet this requirement.

1-2. SYMBOL USAGE AND WORD DISTINCTIONS.

a. **Symbol usage.** The diagonal (/) is used to indicate "and" or "or." For example, IP/SP may mean IP and SP, or it may mean IP or SP. A difference in the task description between series of aircraft will be indicated by reverse lettering (for example, R).

b. **Word distinctions.**

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

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

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

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

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

(a) Will or must indicates a mandatory requirement.

(b) Should indicates a preferred, but nonmandatory, method of accomplishment.

(c) May indicates an acceptable method of accomplishment.

1-3. APPLICABILITY. Operators of C-12C/D/J/R/T/U series airplanes will use this manual. This ATM also applies to future procurements of Super King Air versions of the C-12 and to existing C-12 aircraft that are modified by the program executive officer-aviation (PEO-AV). This manual does not apply to RC-12 aircraft.

1-4. AIRCRAFT TYPE CERTIFICATE. The Department of Transportation, Federal Aviation Administration (FAA), issued the C-12 a normal category aircraft type certificate under Title 14 Code of Federal Regulations (CFR), Part 23 (14 CFR 23). The C-12J is a Beech 1900C airliner, not a Super King Air. It is certified as a large airplane (over 12,500 pounds) in the normal category under 14 CFR 25.

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. **Fixed-wing qualification.** Initial fixed-wing qualification training will be conducted at the U.S. Army Aviation Center (USAAVNC), or at a DA-approved training site, according to a USAAVNC-approved program of instruction (POI).

(1) Active Army and U.S. Army Reserve (USAR) aviators. An Active Army or a USAR aviator is qualified in fixed-wing aircraft when he has graduated from the qualification course conducted by USAAVNC.

(2) Army National Guard (ARNG) aviators. An ARNG aviator must complete the fixed-wing qualification course conducted by the USAAVNC or a course approved by the Chief, National Guard Bureau (CNGB) and USAAVNC. Qualification training will be completed within 90 consecutive days.

b. **C-12 aircraft qualification.** C-12 qualification training will be accomplished in accordance with AR 95-1.

2-2. UNIT TRAINING.

a. **General.** Commanders may conduct refresher training and series qualification at the unit level.

b. **Training restrictions.**

(1) Low-pressure high-altitude physiology training must be current prior to beginning flight training.

(2) A crewmember may start flight training without a current fixed-wing instrument qualification. However, he cannot advance to RL 2 until he has met the category instrument qualification requirements outlined in AR 95-1.

2-3. SERIES QUALIFICATION TRAINING. To become qualified in a different series of C-12 (excluding C-12J), an aviator must receive—

a. **Academic training.** Training must include sufficient academic instruction to ensure a thorough knowledge of the differences between the aircraft in which an aviator is qualified and the aircraft in which training is conducted. Minimum recommended academic subjects are—

(1) Aircraft systems differences.

(2) Navigation/communication/enhanced ground proximity warning system (EGPWS)/ traffic alert and collision avoidance system (TCAS)/electronic flight instrument system (EFIS), if installed.

(3) Performance planning/takeoff landing data (TOLD).

(4) Limitations.

(5) Emergency procedures.

b. **Flight training.** The minimum flight tasks for C-12 series qualification are those tasks required for a standardization evaluation, with emphasis on systems, avionics, and procedures unique to that aircraft series. Comply with table 2-1 when determining minimum flight-hour training requirements. The intent of the flight training is to provide the aviator with the skills needed to effectively, efficiently, and safely operate onboard systems to their full capability. Therefore, minimum flight hours from table 2-1 should be used to train full system capabilities (for example, use multiple area navigation [RNAV]/global positioning system [GPS] approaches instead of long en route legs, demonstrate actual TCAS symbology, and demonstrate EGPWS operation).

Table 2-1. Series qualification training requirements

Series in which aviator will be qualified	*Series in which aviator is qualified*											
	C-12C	*C-12D1*	*C-12D2*	*C-12F1/F2*	*C-12F3*	*C-12T1*	*C-12T2*	*C-12T3*	*C-12R/R+*	*C-12R1*	*C-12U*	*C-12V*
C-12C		A	A	A	A	A	A	A	A	A	A	A
C-12D1	A		A	A	A	A	A	A	A	A	A	A
C-12D2	A	A		A	A	A	A	A	A	A	A	A
C-12T1	C	C	C	C*	C*		A	A	C	C	D	D
C-12T2	C	C	C	C*	C*	A		A	C	C	D	D
C-12T3	C	C	C	C*	C*	B	B		C	C	D	D
C-12R1	C	C	C	C	C	C	C	C	B		C	C
C-12U	C	C	C	C	C	D	D	D	C	C		D
C-12V	C	C	C	C	C	D	D	D	C	C	D	

A. As a minimum, an aviator will receive 1 hour of day or night flight instruction and demonstrate proficiency in the tasks required for a standardization evaluation to an SP/IP. This is proficiency-based training; therefore, qualification may require more than 1 hour.

B. As a minimum, an aviator will receive 2 hours of day or night flight instruction and demonstrate proficiency in the tasks required for a standardization evaluation to an SP/IP. This is proficiency-based training; therefore, qualification may require more than 2 hours. Training should focus on cockpit and system-specific differences.

C. As a minimum, an aviator will receive 7 hours (1 hour at night) of flight instruction and demonstrate proficiency in the tasks required for a standardization evaluation to an SP/IP. This is proficiency-based training; therefore, qualification may require more than 7 hours. For C-12R/T/U/V, an aviator must satisfactorily complete a 25-question open-book written exam to demonstrate knowledge of avionics unique to the C-12R/T/U/V, as appropriate.

D. As a minimum, an aviator will receive 4 hours of flight instruction and demonstrate proficiency in the tasks required for a standardization evaluation to an SP/IP. This is proficiency-based training; therefore, qualification may require more than 4 hours. For C-12R/T/U/V, an aviator must satisfactorily complete a 25-question open-book written exam to demonstrate knowledge of avionics unique to the C-12R/T/U/V, as appropriate.

* If previously qualified in multiple series of C-12F aircraft (for example, C-12F1, C-12F2, C-12F3), an aviator completing C-12T series qualification in one specific T-series is considered T-series qualified in the corresponding F-series aircraft for which they were previously qualified. (For example, an aviator who is qualified in the C-12F3 and completes T-series qualification in a C-12T1 is also considered C-12T3 qualified.)

2-4. MODEL 1900C AND 1900D (C-12J) SERIES QUALIFICATION TRAINING. Operators of the 1900C and the 1900D may use the manufacturer's pilot operating handbook (POH) or Air

Force manual (TO 1C-12J-1SS-9). Once qualified and transitioning into the other series 1900, TO 1C-12J-1SS-9, paragraph 2-3, series qualification; and table 2-1, item A, apply. To become qualified in a 1900D or a 1900C (C-12J), an aviator must be C-12 qualified and perform the following:

a. **Academic training.**

(1) Aircraft systems. The aviator must receive sufficient instruction on aircraft systems to be able to exhibit adequate knowledge of the systems and components, both normal and abnormal, and emergency procedures. Minimum recommended academic subjects are—

- Crew coordination.
- Pressurization system.
- Pitot static system.
- Powerplant.
- Environmental system.
- Flight controls.
- Propeller system.
- Pneumatics system.
- Landing gear.
- Electrical system.
- Oxygen system.
- Loading.
- Fuel system.
- Anti-ice and deice systems.
- Weight and balance.

(2) Performance and limitations. The aviator must demonstrate proficient use of performance charts, tables, or graphs relating to items such as—

- Accelerate-stop distance.
- Accelerate-go distance.
- Takeoff performance—all engines, one engine inoperative.
- Climb performance.
- Cruise performance.
- Fuel consumption, range, and endurance.
- Performance planning/TOLD.
- Descent performance.
- Landing performance.

b. **Flight training.** As a minimum, the aviator must demonstrate proficiency in the tasks required for a standardization evaluation to an IP or SP. This is proficiency-based training. Commanders will designate the right-seat tasks in which the aviator must demonstrate proficiency.

2-5. INDIVIDUAL TRAINING (RL 3). Crewmembers are designated RL 3 during aircraft qualification or refresher training when they are required to regain proficiency in all base tasks. Crewmembers will receive training in the crew station(s), in which they are authorized to perform crew duties. Crewmembers undergoing RL 3 training in the aircraft must fly with an SP, IP, or IE, as appropriate. Crewmembers progress from RL 3 by demonstrating proficiency in all base tasks (day, night, and instruments) to an SP, IP, or IE, as appropriate. Only mission-essential personnel will be onboard the aircraft while RL 3 training/evaluation is conducted.

a. **Newly assigned crewmembers.** A crewmember who has not flown within the previous 180 days must be designated RL 3 for refresher training. The crewmember should attend a Directorate of Evaluation and Standardization (DES)-approved C-12 simulator-training course prior to training. The crewmember must be trained and subsequently demonstrate proficiency in all base tasks to an SP, IP, or IE, as appropriate, for advancement to RL 2. Commanders may require crewmembers entering the aircrew training program who have flown within the past 180 days, but not the previous 60 days, to undergo refresher training. The commander will base his decision on a

records check and/or a proficiency flight evaluation (PFE) for aircraft currency. The commander will establish a training plan for each crewmember who does not demonstrate proficiency in any task(s) during this PFE. A crewmember demonstrating a lack of proficiency in base task(s) must, as a minimum, demonstrate proficiency in those tasks to an SP, IP, or IE, as appropriate, for advancement to RL 2.

(1) During RL 3 training, crewmembers do not have minimum hour, iteration, or annual proficiency and readiness test (APART) requirements in the aircraft in which the training is conducted. The only requirements are those designated by the commander, aircraft currency requirements, and AR 600-105.

(2) Crewmembers must complete a day and night local area orientation flight, per TC 1-210, before progressing to RL 1.

b. **Refresher training requirements (RL 3).** Crewmembers will receive refresher training in the crew station(s) in which they are authorized to perform crew duties. Commanders will designate the right-seat tasks in which the aviator must demonstrate proficiency.

(1) Academic training. The crewmember will receive training and demonstrate a working knowledge of the following applicable topics and complete the operator's manual written examination.

- Introduction.
- Pitot static system.
- Powerplant.
- Flight controls.
- Propeller system.
- Landing gear.
- Electrical system.
- Performance charts.
- Fuel system.
- Weight and balance.
- Pressurization system.
- Performance planning/TOLD.
- Environmental system.
- Flight planning, to include Department of Defense (DOD) flight information publications (FLIP).
- Pneumatics system.
- Instrument departures, en route navigation, and reporting.
- Anti-ice and deice systems.
- Instrument approaches.
- Oxygen system.
- Local standing operating procedures (SOPs) and regulations.
- Crew coordination.

(2) Flight training. Table 2-2 is a guide for developing a refresher flight-training hour requirement. Actual hours will be based on individual proficiency. The crewmember will receive training and demonstrate proficiency in each base task appropriate to the aircraft in table 2-3, on page 2-7.

Table 2-2. Refresher flight training guide

Flight Instruction	***Hours***
Local area orientation	1.0
Day and night base task training	12.0
Flight evaluation	2.0
Instrument base task training (aircraft/simulator)	8.0
Instrument evaluation	2.0
Total hours	**25.0**

(3) Night training. The crewmember will complete a one-hour flight (minimum) at night. The training must include all tasks marked with an "X" in the night column of table 2-3, page 2-7. The aviator must occupy the pilot station. Training in night operations must include locating and operating all aircraft lighting systems.

c. **Regressing crewmembers.** Crewmembers failing to demonstrate proficiency in any base tasks during any evaluation will be designated RL 3. The commander will establish a crewmember-training plan for the crewmember. A crewmembers who is determined to be below standard must be trained, and subsequently demonstrate proficiency to a SP, IP, or IE, as appropriate, before being reinstated to the appropriate RL status. A crewmember regressed to RL 3 must meet existing flying hour and task iteration requirements.

(1) Academic training. After an unsatisfactory evaluation, the commander establishes academic requirements applicable to the base task(s) evaluated as unsatisfactory. The crewmember will receive training and demonstrate a working knowledge of those topics.

(2) Flight training. The commander will determine the task(s) to be trained as part of the crewmember's training plan. As a minimum, the crewmember must train and demonstrate proficiency in the task(s) evaluated as unsatisfactory. The commander may establish additional task(s) for training and evaluation as part of the crewmember's training plan.

2-6. MISSION TRAINING (RL 2). TC 1-210 outlines mission-training requirements and guidelines for developing a mission-training program. Mission training develops the crewmember's ability to perform specific mission/additional tasks selected by the commander to support the unit's METL. Mission training may be accomplished while performing missions. Upon completion of RL 3-series or refresher training, the aviator may perform pilot (PI) duties while undergoing RL 2 training with a unit trainer (UT), IP, SP, or IE. Proficiency in mission-related tasks is the goal. During mission training, an aviator does not have minimum hour, task iteration, or APART requirements in the aircraft in which the training is conducted. The only requirements are those designated by the commander, aircraft currency requirements, and AR 600-105.

a. **Academic mission training.** The commander should tailor mission academic training to fit the needs of the unit's mission and METL.

b. **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.

2-7. CONTINUATION TRAINING (RL 1). An aviator begins continuation training after completing the series or refresher training and mission training. The commander may designate a crewmember in this phase of training after a records review or proficiency flight evaluation. This chapter outlines tasks each aviator must be able to perform to support the unit's mission. Required performance standards are specified in chapter 4.

a. **Semiannual aircraft flying-hour requirements.**

(1) Flight activity category (FAC) 1—55 hours.

(2) FAC 2—30 hours

(3) FAC 3—There is no provision to designate fixed-wing crewmembers as FAC 3.

Note: UTs, IPs, SPs, IEs, and maintenance test pilots (MPs) may credit hours they fly while performing assigned duties toward their semiannual flying-hour requirements.

Note: Aviators may credit up to 6 hours of compatible simulator flight time toward their semiannual flying-hour requirement.

b. **Annual task and iteration requirements.**

(1) FAC 1 and FAC 2. Crewmembers must perform at least one task iteration annually in each mode they are required to fly, as indicated in table 2-3, page 2-7, as well as those mission and additional tasks designated on the commander's task list (CTL). One iteration of each task that can be trained in the aircraft must be performed in the aircraft. Day iteration tasks performed at night may be counted for day iterations. The crewmember is responsible for maintaining proficiency in each task. The commander may require additional iterations of specific tasks. Aviators designated MPs must, in addition to the required minimum annual tasks and iterations, perform at least one iteration of the maintenance test flight (MTF) tasks in table 2-5, page 2-11, semiannually.

(2) FAC 3. There are no provisions to designate fixed-wing crewmembers as FAC 3.

(3) Additional aircraft. The requirement to perform instrument tasks in additional aircraft will be at the commander's discretion.

2-8. CURRENCY REQUIREMENTS.

a. Aircraft in a series with similar cockpits (controls and displays), operating characteristics, and handling characteristics are grouped below.

(1) C-12C, D1, D2.

(2) C-12T (1, 2, 3).

(3) C-12R1.

(4) C-12U, V.

(5) C-12J.

b. Currency in any one aircraft series will satisfy the requirement for all aircraft within the series or group. Separate currency is required for all other aircraft. Aviators are required to receive aircraft series qualification in accordance with this manual. A crewmember whose currency has lapsed must complete a PFE in the aircraft by an IP or SP. The commander will designate the tasks for this evaluation.

2-9. ACADEMIC CONTINUATION TRAINING. Units must develop a viable academic training program to reinforce crewmember aviation skills and knowledge to attain and sustain technical and tactical proficiency. Academic training may be conducted in any suitable environment (for example, a classroom, hangar, flight line, or field site). Academic training may be oral instruction, written instruction, computer-based instruction (CBI), or distance learning and may be conducted either individually or in groups. Topics listed in paragraph 3-4b should be considered in the development of the unit's academic training program. Instructors should take advantage of commercial and Federal Aviation Administration (FAA) publications and Web sites to find relevant topics to share during academic training sessions.

2-10. TRAINING TOPICS. Refer to paragraph 3-4b for training topic guidelines.

2-11. TASK LISTS.

a. **Base tasks.** Table 2-3 lists the base tasks. An X under the mode of flight column denotes the task as a base task for that mode of flight.

b. **Additional tasks.** The commander may design additional tasks based on the unit METL.

c. **Evaluation guidelines.** APART evaluation tasks are defined as base tasks for that mode of flight. An X in the mode of flight column denotes that task as a base task. Tasks in the EVAL column identified with an "S" denote mandatory tasks for the standardization flight evaluation. This flight evaluation may be conducted under day or night in visual meteorological conditions (VMC). Tasks identified with an "I" indicate a mandatory task for the instrument evaluation. The use of the word "or" indicates a task that may be evaluated on either the standardization or instrument flight evaluation. The commander should select additional mission tasks that support the unit's METL for evaluation.

Table 2-3. Aviator base task list

Legend.
D—day mode of flight
Eval—mandatory for selected flight evaluations
I—tasks mandatory for instrument flight evaluation
N—night unaided mode of flight
S—tasks mandatory for standardization flight evaluation

Task Number	***Task Title***	***D***	***I***	***N***	***EVAL***
1000	Conduct crew mission briefing	X	X	X	S & I
1004	Plan a visual flight rules (VFR) flight[1]	X			S
1007	Plan an instrument flight rules (IFR) flight[1]		X		I
1015	Verify/prepare weight and balance	X			
1022	Prepare DA Form 4888-R	X	X		S & I
1023	Perform flight at minimum control speed with critical engine inoperative [(V_{mca}), simulator only][2]				
1029	Perform preflight inspection	X	X	X	S or I
1035	Perform engine start	X	X	X	S
1040	Perform aircraft taxi	X		X	S
1045	Perform engine runup	X		X	S
1104	Perform normal takeoff and climb	X		X	S
1120	Perform steep turns	X			S
1122	Perform climbs and descents	X			S
1125	Perform slow flight	X			S
1138	Perform fuel management procedures	X	X	X	S & I
1144	Perform touch and go (required for IP/SPs only)	X			S
1145	Perform normal landing	X		X	S
1177	Perform go-around	X		X	
1182	Perform radio communications	X	X		
1201	Perform instrument takeoff		X		I
1210	Perform holding procedures		X		I
1212	Perform enhanced ground proximity warning system (EGPWS)/terrain awareness and warning system (TAWS) operations	X	X		S or I
1215	Perform precision approach[3]		X		I
1220	Perform nonprecision approach		X		I

Table 2-3. Aviator base task list

Legend.
D—day mode of flight
Eval—mandatory for selected flight evaluations
I—tasks mandatory for instrument flight evaluation
N—night unaided mode of flight
S—tasks mandatory for standardization flight evaluation

Task Number	*Task Title*	*D*	*I*	*N*	*EVAL*
1240	Perform missed approach		X		I
1245	Perform unusual attitude recovery	X	X		S or I
1250	Perform autopilot/flight director operations		X		
1254	Perform IFR navigation		X		I
1260	Operate weather avoidance system	X	X		S or I
1262	Perform circling approach		X		
1264	Perform global positioning system (GPS) approach[4]		X		I
1265	Perform traffic alert and collision avoidance system (TCAS) operations	X	X		S or I
1300	Perform emergency procedures	X	X		S or I
1302	Perform procedures for two-way radio failure	X	X		S or I
1303	Perform approaches to stalls	X			S
1310	Perform emergency procedures for engine failure during cruise flight	X	X		S or I
1315	Perform single-engine landing	X			S
1320	Perform single-engine go-around	X			S
1325	Perform emergency procedures for engine failure during takeoff	X			S
1335	Perform emergency procedures for engine failure during final approach	X			S
1340	Perform emergency landing gear extension[5]				
1352	Perform rejected takeoff	X			
1800	Perform after-landing tasks	X	X	X	S & I

Notes:

1. When tasks 1004 and 1007 are performed in the primary aircraft, they do not have to be performed in the additional aircraft.

2. Task 1023 is a simulator-only maneuver and has no annual task iteration or evaluation requirement.

3. Task 1215 must be evaluated at least once annually while the aircraft is operating single engine.

4. Units performing area navigation (RNAV/GPS) approaches will train and evaluate task 1264.

5. Task 1340 is required only for qualification/refresher training, and has no other annual iteration requirements.

2-12. FLIGHT SIMULATOR STANDARDS.

a. The flight simulator must be full motion with outside visual capability, level C or better.

b. The flight simulator must be Super King Air similar and must be compatible when performing evaluations. Contact DES, Fort Rucker, Alabama for a list of approved simulators and training locations.

2-13. SIMULATOR TRAINING.

a. Fixed-wing aviators serving in C-12 assignments will complete C-12 simulator recurrent training within 12 to 18 months after completing the fixed-wing multiengine qualification course.

b. Aviators qualified in C-12-series aircraft but not having served in an operational C-12 assignment for 12 months or more will receive C-12 simulator refresher training prior to unit assignment and/or progressing to RL 2.

c. Aviators currently serving in C-12 assignments will receive C-12 simulator recurrent training biennially (once every 2 years).

d. Fixed-wing aviators may apply 6 hours of compatible simulator flight time to their semiannual flying-hour requirement.

e. Aviators completing the fixed-wing instructor pilot course that includes time flown in a compatible or similar simulator will receive credit for simulator requirements listed in paragraph 2-13a through d.

f. Aviators failing to meet the aircrew training program requirements set forth in paragraph 2-12 and 2-13 will be processed in accordance with AR 95-1.

2-14. MAINTENANCE TEST PILOT.

a. **Prerequisites.** Commanders select maintenance test pilots (MPs) from the most qualified aviators. Instructor pilot qualification in category is highly desirable. The crewmember undergoing MP qualification training will receive academic training (table 2-4) and flight training in all maintenance test pilot tasks in table 2-5 before being designated as an MP. The MP will be designated in writing on DA Form 7120-R (*Commander's Task List*).

b. **Qualification requirements.** MP qualification training will be conducted at the unit level. The training will be conducted by a maintenance test pilot qualified IP/SP designated by the commander in writing on DA Form 7120-R. The crewmember undergoing MP qualification training will receive academic and flight training, and must demonstrate proficiency in all maintenance test pilot tasks listed in table 2-5 before being designated MP.

c. **Evaluation requirements.** The MP will be evaluated annually on performance of selected MP tasks during the APART by a maintenance qualified SP/IP designated by the commander. MPs who are not active IP/SPs will conduct duties from the left seat only. Maintenance test pilot qualified IP/SPs may perform duties from either the left- or right-side pilot stations. Tasks in table 2-5 indicated by an X in the evaluation column are the minimum tasks to be evaluated during the annual MP evaluation. Maintenance test pilot qualified IP/SPs will demonstrate proficiency from both the left and right pilot stations during qualification and during the annual MP evaluation. The commander may designate additional MP tasks to be evaluated during the APART.

(1) Academic training. Use the topics listed in table 2-4 as a guide for developing a mission academic training program for MPs.

Table 2-4. Maintenance test pilot academic training guide	
TM 1-1500-328-23	***DA Pam 738-751***
Maintenance Test Flights and Maintenance Operational Checks – Section III	Chapter 1 – Introduction
Maintenance Test Flight Manual	Chapter 2 – Aircraft Logbook Forms and Records
Maintenance Test Flight Check Sheet	Chapter 3 – Maintenance Forms and Records
Crew Coordination	Aircraft Systems

(2) Flight training. The MP will receive training and demonstrate proficiency in all tasks listed in table 2-5. As a minimum, tasks with an X in the evaluation column will be evaluated during the annual MP flight evaluation.

Table 2-5. Maintenance test pilot task list		
Task Number	***Task Title***	***Evaluation***
4910	Perform taxiing check	
4915	Perform engine run-up/aircraft systems check	X
4921	Perform before-takeoff checks	
4923	Perform during-takeoff checks	
4925	Perform after-takeoff checks	
4927	Perform during-climb checks	
4929	Perform pressurization system checks	
4931	Perform during-cruise checks	
4935	Perform speed check at maximum cruise power	X
4937	Perform maximum power-lever position check	X
4939	Perform engine-acceptance check	X
4941	Perform engine ice vanes check	
4943	Perform trim and rigging check	
4945	Perform autopilot checks	
4948	Perform stall warning system checks	X
4949	Perform flap operation check	X
4951	Perform minimum elevator trim check	X
4953	Perform auto-ignition checks	X
4955	Perform manual propeller-feathering and unfeathering checks	X
4957	Perform propeller-auto-feathering system check	X
4961	Perform maximum rate of descent check	X
4963	Perform landing gear warning horn operation check	
4967	Perform emergency landing gear extension check	
4969	Perform elevator trim check	
4980	Perform communication and navigation equipment check	

2-15. ANNUAL NUCLEAR, BIOLOGICAL, AND CHEMICAL TRAINING REQUIREMENTS. The commander will evaluate the unit mission and determine if nuclear, biological, and chemical (NBC) training is required. If NBC training is required, all FAC 1 and selected FAC 2 positions will receive the NBC training.

a. **NBC training requirements.** Aviators who require NBC training or evaluations must wear full mission-oriented protective posture (MOPP) gear during NBC training. The minimum tasks required for NBC training are listed in table 2-6. Commanders may select additional tasks based on the unit's mission.

Table 2-6. Nuclear, biological, and chemical training requirements

Task Number	*Task Title*
1029	Perform preflight inspection
1035	Perform engine start
1040	Perform aircraft taxi
1104	Perform normal takeoff and climb
1145	Perform normal landing
1800	Perform after-landing tasks

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

(1) Aircrews use extra care when performing flight duties or training in cockpits when wet bulb temperatures are above 75 degrees Fahrenheit.

(2) A qualified and current aviator, without a protective mask and NBC boots, is at one set of the controls at all times.

(3) Emergency procedures training is not accomplished in flight while aircrews are wearing MOPP gear.

(4) Close coordination is maintained with the local flight surgeon regarding NBC training.

2-16. AIRCRAFT SURVIVABILITY EQUIPMENT TRAINER TRAINING REQUIREMENTS. Aircraft Survivability Equipment Trainer (ASET) training will be performed according to TC 1-210 and current guidance. Units will incorporate mode 4/identification, friend or foe (IFF) training into unit aviation academic programs and train, as a minimum, once annually.

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Chapter 3
Evaluations

This chapter describes evaluation principles and grading considerations for individual crewmembers. 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 according to AR 95-1, TC 1-210, and this ATM.

3-1. 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 provide constructive comments. These evaluators are the SPs, IPs, and IEs who assist the commander in administering the aircrew training program.

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. During the evaluation, the evaluator must refrain from making a personal area of expertise a dominant topic.

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

d. **Participant cooperation.** All participants must cooperate to accomplish the evaluation objectives. The evaluation 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 to make improvements.

f. **Purpose of evaluation.** An evaluation determines the examinee's ability to perform essential hands-on/academic tasks to prescribed standards. Flight evaluations determine the examinee’s ability to exercise crew coordination in completing the tasks.

g. **Crew coordination.** The guidelines for evaluating crew coordination are based on a subjective analysis of how effectively a crew performs to accomplish a series of tasks. The evaluator must determine how effectively the examinee employs the 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. However, in order for the evaluator to determine the examinee’s level of proficiency, the evaluator may intentionally perform as an ineffective 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 he is being supported by a fully functioning crewmember.

3-2. GRADING CONSIDERATIONS.

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

b. **Flight evaluation.** Task standards are based on an ideal situation. Grading is based on meeting the minimum standards. The evaluator must consider deviations (for example, high wind, turbulence, or poor visibility) from the ideal during the evaluation. If conditions are not ideal, the evaluator must make appropriate adjustments to the standards.

3-3. CREWMEMBER EVALUATION. Evaluations are conducted to determine the crewmember's ability to perform the tasks selected on the CTL and to check the crewmember's understanding of the required academic subjects listed in the ATM. When the examinee is an evaluator/trainer or a UT, 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 evaluator's qualifications at a new duty station will be conducted in the aircraft.

a. **Performance Criteria.**

(1) Pilot (PI). The PI must demonstrate an understanding of the tasks on the CTL, including conditions, standards, descriptions, and appropriate considerations. The examinee must perform selected tasks to ATM standards while applying aircrew coordination principles. The PI must demonstrate a basic understanding of the appropriate academic subjects from the ATM, familiarization with the individual aviator training folder (IATF), and understanding of the CTL.

(2) Pilot in command (PC). The PC must meet the requirements in paragraph 3-3a(1) and demonstrate sound judgment and maturity in the management of the mission, crew, and assets.

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

(4) Maintenance test pilot (MP). The MP must meet the PC requirements in paragraph 3-3a(2) and be able to objectively access and document the aircraft performance according to appropriate maintenance standards.

(5) Instructor pilot (IP). The IP must meet the PC requirements in paragraph 3-3a(2) and be able to objectively train, evaluate, and document performance of the PI, PC, MP, and UT, using role reversal for UT training, as appropriate. The IP must be able to develop and implement an individual training plan and have a thorough understanding of the requirements and administration of the aircrew training program.

(6) Standardization pilot/instrument examiner (SP/IE). The SP must meet the requirements in paragraph 3-3a(5). The IE must meet the requirements of paragraph 3-3a(2). The SP/IE must be able to train and evaluate IPs/SPs/IEs/MPs, as appropriate, using role-reversal. The SP must also be able to develop and implement a unit-training plan and administer the commander's aircrew training program. If the IE is not also an IP or SP, the IE must be evaluated to perform unusual attitude recovery, simulated engine shutdown, or simulated engine failure, according to AR 95-1. IEs who are not fixed-wing IP/SPs may only perform simulated engine failures and unusual attitude recoveries in cruise flight (may not be performed while on an instrument approach procedure [IAP] or in the traffic pattern).

Note: Crewmembers who have access to the flight controls must be evaluated in all crew positions authorized on their CTLs. Not all tasks are required to be evaluated in every crew position. Evaluators will select some tasks to be evaluated in each crew position appropriate to the duties to that crew station (left or right seat) and individual duty qualification (PI, PC, IP, SP, IE, UT, MP).

b. **Evaluation Criteria.**

(1) Proficiency flight evaluations. This evaluation is conducted according to AR 95-1, TC 1-210, and paragraph 3-4. The commander will select the topics and flight tasks to be evaluated for the type of evaluation being conducted.

(2) APART standardization flight evaluation. The SP/IP will evaluate a minimum of two topics from each subject area in paragraphs 3-4b. If the evaluated crewmember is an IP/SP, the SP will evaluate the IP/SP's ability to instruct tasks.

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

(4) APART MP evaluation. A maintenance test pilot qualified IP/SP will evaluate a minimum of two topics from the subject areas in paragraphs 3-4b(9). The evaluator may choose topics in other subject areas if they apply to maintenance test flights or are appropriate for the type of evaluation.

c. **Flight simulators.** A compatible flight simulator may be used to conduct instrument evaluations if the following criteria are met:

(1) Must be full motion, category C or higher.

(2) Must be Super King Air-compatible. Contact DES, Fort Rucker, Alabama for a list of approved simulators and training locations.

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

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

(1) Reviews the examinee's records to verify that the examinee meets all prerequisites for the rating.

(2) Confirms the purpose of the flight evaluation, explains the evaluation procedure, and discusses the evaluation standards and criteria to be used.

b. **Phase 2—Academic oral evaluation topics.** The evaluator should avoid asking questions that require reciting lists. The evaluator should ask questions that are easily understood, have a definite answer, and are relevant to determining the understanding of a topic.

(1) Regulations and publications (AR 95-1, DA Pam 738-751, DOD FLIP, TC 1-210, operator's manual, applicable major Army command (MACOM) supplements, local and unit SOPs). Topics are—

- Aircrew training program, IATF/CTL requirements.
- Crew coordination.
- Performance planning/TOLD.
- Aviation life support equipment (ALSE).
- Weight and balance requirements.
- Fuel requirements.
- Crew endurance.
- Forms, records, and publications required in the aircraft.
- Risk management.

(2) Aircraft systems, avionics, and mission equipment description and operation (operator's manual). Topics are—

- Landing gear.
- Electrical system.
- Engines and related systems.
- Environmental system.
- Propellers.
- Navigation equipment.
- Ice protection.
- Fuel system.
- Pneumatic system.
- Servicing and parking.
- Pressurization.
- ASE.

(3) Instrument planning and procedures (AR 95-1, AIM, DOD FLIP, operator's manual, FM 1-230, and FM 1-240). Topics are—

- Departure procedures.
- Closing flight plans.
- Required weather for takeoff, en route, destination, and alternate.
- Position reports.
- Notices to airmen (NOTAMs).
- Visual flight rules (VFR) requirements.
- Terminal aerodrome forecasts (TAF).
- Aviation routine weather reports (METAR).
- Flight plan preparation.
- DOD FLIP symbology.
- Airspace—types, dimensions, and requirements in which to operate.
- Fuel requirements.
- En route weather services.
- Weather hazards.
- Transponder requirements.
- Arrival procedures.

(4) Operating limitations and restrictions (operator's manual). Topics are—

- Propeller limitations.
- Engine limitations.
- Weather/environmental limitations/restrictions.
- Engine over-temperature and over-speed limitations.
- Autopilot limitations.
- Generator limits.
- Fuel system limitations.
- Loading limitations.
- Landing gear cycling (if applicable).
- Starter limitations.
- Brake deice limitations.
- Airspeed limits, minimum and maximum.
- Pitot heat limitations.
- Maneuvering limits.
- Altitude limitations.
- Icing limitations.
- Crosswind limitations.
- Oxygen requirements.
- Cracked cabin window/windshield.
- Maximum design sink rate.
- Intentional engine out speed.
- Required equipment listing (REL).

(5) Aircraft emergency procedures and malfunction analysis (operator's manual chapter 9). Topics are—

- Emergency terms and definitions.
- Emergency exits and equipment.
- Engine malfunctions.
- Chip detectors.
- Fires.
- Fuel system malfunctions.
- Hydraulic system malfunctions.
- Electrical system emergencies.
- Landing emergencies.
- Flight control malfunctions.
- Duct over-temperature caution light illuminated.
- Loss of pressurization.
- Engine bleed air malfunction.
- Low oil pressure.

(6) Aeromedical factors (AR 40-8, FM 3-04.301, and TC 1-204). Topics are—

- Flight restrictions due to exogenous factors.
- Hypoxia.
- Stress.
- Middle ear discomfort.
- Spatial disorientation.
- Decompression sickness.

(7) Aerodynamics (FM 1-203 and operator's manual). Topics are—

- Stall and stall characteristics.
- Spins and spin recovery.
- Minimum single engine control airspeed (Vmca) – causes and prevention.
- Asymmetrical thrust.
- Torque and P factor.
- Hydroplaning.
- Elements of the lift equation.
- Turning performance.
- Slow flight.
- Crosswind landings.

(8) Night mission operations (TC 1-204). Topics are—

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

(9) MP system operations—systems malfunction analysis and trouble-shooting (DA Pam 738-751 and TM 1-1500-328-23). Topics are for MPs only.

- Engine start.
- Propellers.
- Instruments.
- Hydraulic (if applicable).
- Electrical.
- Engine performance check.
- Caution panel.
- Flight controls.
- Fuel system.
- Special procedures.
- Power plant.
- Maintenance test flight requirements.
- Forms and records.

(10) SP, IP, IE, and UT evaluator/trainer topics (Instructor Pilot Handbook). Topics are—

- Learning process.
- Human behavior.
- Effective communication.
- Teaching process.
- Teaching methods.
- Instructor as a critic.
- Types of evaluations.
- Instructional aids.
- Planning instructional activity.
- Techniques of flight instruction.
- Flight instructor characteristics and responsibilities.
- Role reversal.

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

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

- Mission.
- Weather.
- Flight route.
- Performance data.
- Transfer of flight controls.
- Simulated engine-failure procedures.
- Crew duties, to include emergency duties.

Note: Task 1000, operator's manual, and local directives contain additional crew briefing requirements.

(2) Preflight inspection and engine-start, and run-up procedures. The evaluator will evaluate the examinee's use of checklist (CL)/MTF manual. The evaluator will also have the examinee properly identify at least two aircraft components and discuss their functions.

(3) Flight tasks. As a minimum, the evaluator will evaluate tasks identified in chapter 2 as mandatory for the designated crew station(s) and missions or additional tasks selected by the commander. A crewmember designated as an MP will have those tasks designated according to paragraph 2-14c evaluated during the APART evaluation. An IP, SP, IE, or UT must demonstrate an ability to instruct and evaluate 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.

(4) Engine shutdown and after-landing tasks. The evaluator will evaluate the examinee's use of CL/MTF manual.

d. **Phase 4—Debriefing.** On completion of the evaluation, the evaluator will—

(1) Advise the examinee whether he passed or failed the evaluation.

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

(3) Offer recommendations for improvement.

(4) Complete the applicable forms.

(5) Ensure that the examinee reviews and initials the applicable forms.

Note: A training plan will be developed for the crewmember to allow him to regain proficiency in tasks that were evaluated as unsatisfactory.

3-5. ADDITIONAL EVALUATIONS.

a. **NBC evaluation.** If the commander determines that NBC training is required, he will establish, in writing, an NBC evaluation program.

b. **Post-mishap flight evaluation.** This evaluation will be conducted after any class A or B accident and any class C accident at the discretion of the commander. The evaluation will be conducted according to paragraph 3-3a(1) through (5) and paragraph 3-3b(1). See AR 40-501 for medical release requirements prior to flight. After the evaluation, the IP will debrief the examinee and complete the appropriate IATF entries.

c. **Medical flight evaluation.** This evaluation is conducted according to AR 95-1. The commander, 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. The flight surgeon may need to be part of the crew to assist in the completion of the evaluation.

(1) After the examinee has completed the medical flight evaluation, the evaluator will prepare a memorandum including—

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

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

(c) A general statement of the examinee's ability to perform with the disability and under what conditions the crewmember can perform.

(2) The unit commander will forward the memorandum to Commander, U.S. Army Aviation Center, ATTN: MCXY-AER, Fort Rucker, AL 36362-5333 for board action. Commanders will coordinate with the local flight surgeons to obtain board results to ensure actions are completed in a timely manner.

d. **No-notice evaluation.** This evaluation is conducted according to TC 1-210 and the unit's SOP. The commander will select the evaluation method: written, oral, and/or a flight in an aircraft or simulator. The evaluation may be conducted for an individual or a crew. After the evaluation, the evaluator will debrief the examinee or crew and complete the appropriate IATF entries.

e. **Operator's manual examination.** This examination will consist of 50 multiple choice or true/false questions. Questions from each chapter of the operator's manual should be included in the examination. The aviator must answer 35 of the 50 questions correctly to receive a passing grade.

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Chapter 4
Crewmember Tasks

This chapter contains essential tasks for maintaining crewmember skills. Each task includes the task title, number, conditions, and standards by which performance is measured. It also includes a description of crew actions and training and evaluation requirements. The task description is a training aid to assist crewmembers in successfully performing the tasks to standard. (See chapter 6 for essential crew callouts and crew duties.)

4-1. TASK CONTENTS.

a. **Task number.** Each ATM task is identified by a 10-digit systems approach to training (SAT) number. The first three digits of each task in this ATM are 011 (U.S. Army Aviation School); the second three digits are 218 (C-12 utility airplane). 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 designated by the commander as mission essential are not included in this ATM. The commander will develop conditions, standards, and descriptions for those additional tasks and assigns them a 3000-series number.

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

c. **Conditions.** The conditions specify the common wartime or training conditions under which the task will be performed.

(1) A reference to the IP in the task conditions includes the SP.

(2) When a UT, IP, or IE is cited in the condition, that individual will be at one set of the flight controls unless the task is performed in a flight simulator. An IP, SP, or IE may conduct training/evaluations from a noncrewmember station, if authorized by the commander.

(3) Unless otherwise specified in the conditions, all in-flight aircraft training and evaluations will be conducted under visual meteorological conditions (VMC). Simulated instrument meteorological conditions (IMC) denote flight solely by reference to flight instruments while the aviator is wearing a hood or other similar device that restricts outside visual references. Tasks that are unique to a particular group of C-12s are indicated in the condition (for example, R).

(4) If RL 1 training is conducted in a flight simulator, an IP or IE is not required to be a crewmember to perform emergency procedures tasks. During an evaluation, the appropriate evaluator must be a crewmember in the simulator.

(5) Tasks requiring specialized equipment are not mandatory in aircraft that do not have the equipment installed (for example, TCAS).

(6) If a high cockpit workload exists, essential cockpit procedures may be performed from memory. Crews will prioritize tasks and verify with the checklist (CL) as time/crew workload permit. The pilot not on the controls (P) and pilot on the controls (P*) will use the "challenge and response" method of reading the CL. This is the most positive way to proceed through a CL as it allows for both pilots to remain aware of all CL-related activities. Flexibility with this method is required. During

periods of high cockpit workload (departure or takeoff, traffic pattern, descent, and approaches) the P* may not be able to respond in a quick and positive manner. As a result, the benefits of the challenge and response do not justify the additional workload it places on the P*. Under these circumstances the CL should still be read aloud; however, the P now also provides the response. The P should only accomplish noncritical functions without acknowledgment. The operation of systems such as landing gear, flaps, autopilot, flight management systems (FMS), and flight director mode selections require P* participation, mandating a response such as "Confirmed" (for example, before-landing check—"**Gear, DOWN/confirm**," P* responds—"**Confirmed**").

d. **Standards.** The standards describe the minimum degree of proficiency or standard of performance to which the task must be accomplished. Individual instructor techniques will neither be treated as standards nor used as grading elements. Standards are based on ideal conditions. The following standards apply to all tasks.

(1) All tasks.

(a) Perform crew coordination actions and callouts per chapter 6 and the task description.

(b) Apply the appropriate night and environmental task considerations when performing the task under those conditions.

(2) Taxi operations.

(a) Comply with taxi clearances.

(b) Follow taxi lines with minimum deviation.

(c) Maintain a safe taxi speed.

(d) Use controls correctly, as required for wind conditions.

(3) In flight tasks.

(a) Maintain heading ± 10 degrees.

(b) Maintain altitude ± 100 feet.

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

(d) Maintain rate of climb or descent ± 100 feet per minute (FPM).

(e) Maintain the aircraft in trim ± 1/4 ball width.

(f) Maintain ± 1 NM when tracking (distance measuring equipment) DME arcs.

(4) Standards other than those listed above will be addressed in each particular task.

e. **Description.** The description explains one or more recommended techniques 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, or IMC. When specific crew actions are required, the task will be broken down into crew actions and procedures as follows:

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

(a) All crewmembers. Perform crew coordination actions and announce malfunctions or emergency conditions. Monitor engine and systems operations and avionics (navigation and communication), as necessary. During VMC, focus attention primarily outside the aircraft, maintain airspace surveillance, and clear the aircraft. Provide timely warning of traffic and obstacles by announcing the type of hazard, direction, and distance. Chapter 6 contains examples of crew callouts and guidance on cockpit coordination.

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

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

(d) P*. The P* is responsible for aircraft control and the proper execution of immediate action items contained within the emergency procedures. P* when verbally being described or referenced is called the "pilot on the controls." He will announce any deviation, and the reason, from instructions issued by ATC or the P.

(e) P. The P is responsible for navigation, in-flight computations, communication, and assisting the P* as requested. Verbally, the P is referred to as the "pilot not on the controls" or "copilot," depending on context.

(f) Trainer/evaluator. When acting as P during training and evaluations, the trainer/evaluator will act as a functioning crewmember and perform as required. This is true unless he is training or evaluating pilot response to an incapacitated or unresponsive crewmember.

(2) Procedures. This section consists of one or more recommended techniques for accomplishing the task. 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 to allow the P* to use judgment for minor deviations as long as the standards are met. (For example, advancing the propellers to a high revolutions per minute [RPM] on base to control high airspeed instead of short final is acceptable.) For airplanes, the normal crew station for the P* is the left seat. Crew callouts are in **bold** type when integrated in the task. Switch and control positions are in UPPERCASE text (for example, **flaps – UP**). Chapter 6 contains a consolidated list of callouts.

f. **Considerations.** This section defines considerations for task accomplishment under various night and environmental conditions. Crewmembers must consider additional aspects to a task when performing it in different environmental conditions. The inclusion of environmental considerations in a task does not relieve the commander of the requirement for developing an environmental training program, according to TC 1-210.

g. **Training and evaluation requirements.** Training and evaluation requirements define whether the task will be trained/evaluated in the aircraft, simulator, or academic environment. Training and evaluations will be conducted only in the authorized environments. Listing aircraft under evaluation requirements does not preclude the IP 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. Chapter 2, table 2-3, lists the modes of flight in which the task must be evaluated. The commander may also select additional mission and/or additional tasks for evaluation.

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

(1) All flight tasks (tasks with engines operating).

(a) AR 95-1.

(b) FM 1-203.

(c) FM 1-230.

(d) Operator's manual/CL.

(2) All instrument tasks.
   (a) AR 95-1.
   (b) FM 1-240.
   (c) DOD FLIP.
   (d) Aeronautical information manual (AIM).
   (e) FAA Instrument Flying Handbook.
   (f) FAA Instrument Procedures Handbook.

(3) All tasks with environmental considerations.
   (a) FM 1-202.
   (b) TC 1-204.

4-2. TASKS.

a. **Standard versus description.** Aviators and trainers/evaluators are reminded that task descriptions may contain required elements for successful completion of a given task. Conversely, descriptions are not to be used as a grading standard. A task description explains a method to achieve the standard but allows flexibility for different techniques and minor variations that enable the aviator to meet the standards. Attention to the use of the words, "will," "should," or "may" throughout the text of a task description is crucial. The word "will" in a task description means the procedure described is mandatory and will be evaluated as a task standard. The word "recommended" indicates that a procedure is encouraged but is not mandatory.

b. **Equipment requirements.** Tasks requiring specific equipment do not apply to those units whose aircraft have no such equipment installed. (For example, task 1265, Perform traffic alert and collision avoidance system [TCAS] operations, does not apply to aircraft without TCAS.)

TASK 1000

Participate in a crew mission briefing

CONDITIONS: Before flight and given DA Form 5484-R (*Mission Schedule/Brief*) and a unit-approved crew briefing checklist (CL).

STANDARDS:

1. The pilot in command (PC) will participate in the task and acknowledge an understanding of DA Form 5484-R, in accordance with AR 95-1.
2. The PC will conduct, or supervise, an aircrew mission briefing.
3. Crewmembers will acknowledge an understanding of the aircrew mission briefing.

DESCRIPTION:

1. Crew actions.

   a. An authorized briefing officer will evaluate and 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.

   b. The PC has overall responsibility for the crew briefing. He may direct the other crewmember to perform all, or part, of the crew briefing.

2. Procedures.

   a. Brief the mission using a unit-approved crew mission briefing CL. Figure 4-1 shows a suggested format for a briefing CL.

   b. Identify mission and flight requirements that demand effective communication and proper sequencing and timing of crewmember actions.

NIGHT CONSIDERATIONS: Not applicable.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
DA Form 5484-R
Unit SOP

CREW BRIEFING CHECKLIST

1. Mission overview.
2. Weather. Departure, en route, destination, and alternate, if required.
3. Notices to airmen (NOTAMs).
4. Flight route.
5. Refueling requirements.
6. Crew callouts, duties, and responsibilities.*
7. Analysis of the aircraft.
   a. Logbook and preflight deficiencies.
   b. Performance planning.
      (1) Takeoff landing data (TOLD).
      (2) Required mission deviations, based on aircraft performance, weather, or threat.
      (3) Single-engine capability.
8. Risk assessment considerations.
9. Crewmember questions, comments, and acknowledgment of the mission briefing.

Note: Use the word "standard" when the crew has been trained on crew callouts, duties, and responsibilities, according to chapter 6 and the unit SOP.

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

TASK 1004

Plan a visual flight rules flight

CONDITIONS: Prior to flight and given access to weather information; notices to airmen (NOTAMs); flight planning aids; necessary charts, forms, publications, local flying rules, and weight and balance information.

STANDARDS: Appropriate common standards plus these additions/modifications:

1. Complete the takeoff landing data (TOLD) card using the operator's manual.
2. Verify that the weight and balance is within limits for the planned load, using the appropriate DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*).
3. Obtain weather for departure, en route, destination and alternate (if used) and ensure weather will be at or above VFR (visual flight rules) weather minimums required by AR 95-1.
4. Plan the mission to meet all requirements for VFR flight.
5. Determine appropriate departure, en route, and arrival procedures.
6. Select routes that avoid hazardous weather, ensuring mission completion. If appropriate, select altitudes that conform to VFR cruising altitudes.
7. Complete and file a flight plan according to AR 95-1, Department of Defense (DOD) flight information publication (FLIP), and local or host country procedures.
8. Compute the following for the mission:
   a. Distance within ±5 miles, true airspeed within 10 knots indicated airspeed (KIAS), and estimated time en route (ETE) within ±3 minutes for each leg of the flight.
   b. Ensure the VFR fuel reserve requirement will be met according to AR 95-1.
9. Perform mission risk assessment and mission briefing/briefback, according to unit standing operating procedures (SOP) and AR 95-1.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will ensure the required preflight planning items are complete. The PC may direct the pilot (PI) to complete portions of the VFR flight planning.
   b. The PI will complete all assigned elements and report the results to the PC.
2. Procedures.
   a. Obtain information about the weather, using appropriate military, Federal Aviation Administration (FAA), or host-country weather facilities. After ensuring the flight can be completed under VFR, check NOTAMs and other appropriate sources for restrictions that may apply to the flight.
   b. Obtain navigational charts that cover the entire flight area and allow for changes in routing that may be required because of weather, terrain, or special-use airspace. Select the course(s) and altitude(s) that best facilitate mission accomplishment.
   c. Compute total distance and flight time and calculate the required fuel using the appropriate charts in the operator's manual. Complete the appropriate flight plan and file it with the appropriate agency.

NIGHT CONSIDERATIONS: Checkpoints used during the day may not be suitable for night.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
DD Form 365-4
Local flying rules
14 CFR/Host nation regulations
Unit SOP

TASK 1007

Plan an instrument flight rules flight

CONDITIONS: Prior to instrument flight rules (IFR) flight and given access to weather information; notices to airmen (NOTAMs); flight planning aids; and necessary charts, forms, publications, and weight and balance information.

Note: The use of computer flight planning programs is authorized. The crew should verify the information with applicable charts before using.

STANDARDS:

1. Complete the takeoff landing data (TOLD) card using the operator's manual.
2. Verify the weight and balance is within limits for the planned load using the appropriate DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*).
3. Obtain weather for departure, en route, destination and alternate (if used) and ensure weather will be at or above IFR weather planning minimums required by AR 95-1.
4. Plan the mission to meet all requirements for instrument meteorological conditions (IMC) flight. Determine the proper departure, en route, and destination procedures, and decide if an alternate is required.
5. Select route(s) and altitudes that avoid hazardous weather conditions and conform to IFR cruising altitudes and do not exceed aircraft or equipment limitations.
6. Compute for the mission—
   a. Distance within ±5 miles, true airspeed within 10 knots indicated airspeed (KIAS), and estimated time en route (ETE) within ±3 minutes for each leg of the flight.
   b. Ensure IFR fuel and reserve requirement will be met, according to AR 95-1.
7. Perform mission risk assessment and crewmember briefing.
8. Complete and file a flight plan according to AR 95-1, Department of Defense flight information publication (DOD FLIP), local or host country procedures.

DESCRIPTION:

1. Crew actions.
   a. The PC will ensure all premission planning items, according to AR 95-1, are completed and the aircraft is properly equipped to accomplish the assigned mission. The PC may direct the pilot (PI) to complete some portions of the IFR flight planning.
   b. The PI will complete the assigned elements and report the results to the PC.
2. Procedures.
   a. Using appropriate military, Federal Aviation Administration (FAA), or host-country weather facilities, obtain information about the weather. Compare destination forecast and approach minimums, and determine if an alternate airfield is required.
   b. Check the NOTAMs and other appropriate sources for restrictions that may apply to the flight.

c. Obtain navigation charts that cover the entire flight area, and allow for changes in routing or destination that may be required. Select the route(s) or course(s) and altitude(s) that best facilitate mission accomplishment. When possible, select preferred and alternate routing. Select altitude(s) that minimize icing and turbulence and are above minimum IFR altitudes, conform to the semicircular rule (when applicable), and do not exceed aircraft or equipment limitations.

d. Compute the total distance and flight time and calculate the required fuel. Use the appropriate charts, operator's manual, or a computer flight-planning program, if applicable. Before using a computer flight-planning program, verify aircraft performance data with the operator's manual. Complete the appropriate flight plan and file it with the appropriate agency.

NIGHT CONSIDERATIONS. Not applicable.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
DD Form 365-4
14 CFR/Host nation regulations
Local standing operating procedures (SOP) and regulations

TASK 1015

Verify/prepare aircraft weight and balance

CONDITIONS: Given crew weights, payload weights, takeoff fuel, aircraft configuration, aircraft weight and balance information, operator's manual, and a completed or blank DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*) or electronic computer data sheet according to AR 95-1.

STANDARDS:

1. Verify that center of gravity (CG) and gross weight remain within aircraft limits for the duration of the flight. Complete form, if applicable.
2. Identify all mission or flight limitations imposed by weight or CG.

DESCRIPTION:

1. Crew actions.
   a. Select the completed DD Form 365-4 or electronic computer data sheet for the aircraft configuration load and mission. Verify that aircraft gross weight and CG remain within the allowable limits for the entire flight. Note all gross weight, loading task, and maneuver restrictions/limitations.
   b. If there is no completed DD Form 365-4 or electronic computer data sheet that meets mission requirements, complete a new DD Form 365-4.
   c. All crewmembers will be briefed on any limitations.
2. Procedures.
   a. Identify the correct DD Form 365-4 for the configuration and fuel load.
   b. Verify the aircraft CG in relation to CG limits for takeoff and landing.
   c. Ensure loading is within zero fuel weight.
   d. Verify ramp and takeoff and landing weights are within the aircraft limits.

NIGHT CONSIDERATIONS: Not applicable.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references.
DD Form 365-4
TM 55-1500-342-23

TASK 1022

Prepare a DA Form 4888-R (C-12 Takeoff and Landing Data)

CONDITIONS: Given a completed DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*), the aircraft operator's manual, environmental conditions at takeoff, runway information, and a blank DA Form 4888-R (*C-12 Takeoff and Landing Data [TOLD]*).

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

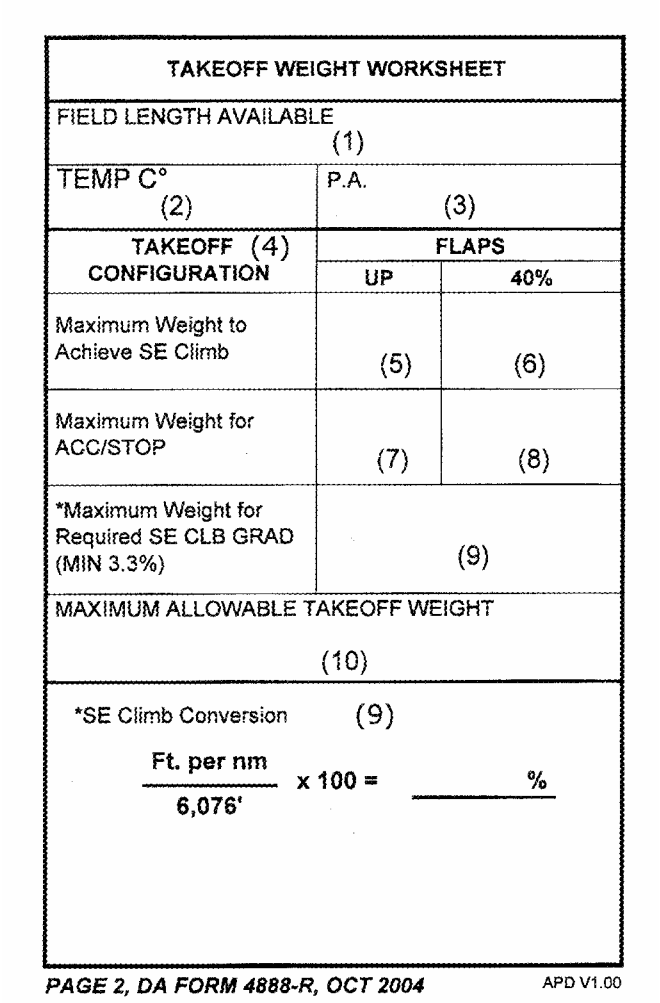
1. Compute performance data correctly, according to procedures given in the aircraft operator's manual and the description below.
2. Recompute TOLD card data if conditions increase by 1,000 feet pressure altitude (PA), 10 degrees Celsius or 500 pounds gross weight.

Note: Performance planning computer software may be used to complete TOLD card data. The software must be approved for use by the program executive officer-aviation (PEO-AV). DA Form 4888-R (shown in figures 4-2 and 4-3) must be used during aircrew training program evaluations.

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will compute or direct the other crewmember to compute the aircraft performance data, according to the instructions provided in 3 below.
   b. The PC will verify that the aircraft meets the performance requirements for the mission and brief the other crewmember.
   c. The PC will ensure that aircraft limitations and capabilities are not exceeded.
2. Procedures.
   a. DA Form 4888-R is an aid for organizing takeoff and landing planning data. The TOLD card provides an easy reference for the crew for takeoff, takeoff emergencies, and landing. The TOLD card is a guide to expected aircraft performance. It will be computed prior to takeoff and should be updated prior to landing. It is a primary risk management tool for the crew and commander to determine the maximum acceptable payloads, minimum runway lengths, and associated risks.
   b. The most accurate performance data can be obtained by using existing conditions. If mission or time constraints preclude using these conditions, use the highest PA and temperature forecast for takeoff. Charts for completing the items in figures 4-2 and 4-3 are in the aircraft operator's manual and supplemented by the instructions below. The crew should be aware of variables between precomputed and actual performance. Runway surface conditions will affect takeoff and landing distances.

Note: The C-12 operator’s manuals have minor variations in the chart titles between the different series and may not match the example exactly (for example, a chart may reference “Flaps—UP” instead of “Flaps 0 percent”).



TAKEOFF WEIGHT WORKSHEET		
FIELD LENGTH AVAILABLE (1)		
TEMP C° (2)	P.A. (3)	
TAKEOFF (4) CONFIGURATION	FLAPS	
	UP	40%
Maximum Weight to Achieve SE Climb	(5)	(6)
Maximum Weight for ACC/STOP	(7)	(8)
*Maximum Weight for Required SE CLB GRAD (MIN 3.3%)	(9)	
MAXIMUM ALLOWABLE TAKEOFF WEIGHT (10)		

*SE Climb Conversion (9)

$$\frac{\text{Ft. per nm}}{\text{6,076'}} \times 100 = \underline{\qquad\qquad}\ \%$$

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Figure 4-2. DA Form 4888-R (C12 Takeoff and Landing Data [TOLD]) (back)

3. Supplemental instructions.

   a. Back. The back of the TOLD card (DA Form 4888-R) is a takeoff weight worksheet. It determines the maximum allowable takeoff weight that will assure accomplishment of the required departure performance. It is a decision making tool for the crew; therefore, it is completed first.

Item 1 – Field length available. Enter the length of the runway to be used for the departure, or the runway length plus any runway overrun.

Note: The distance of a runway overrun (according to the general planning [GP] definition) may be added to the runway length for accelerate/stop (ACC/STOP) calculations, but, because the departure obstacle clearance climb gradient (clb grad) is normally calculated from the end of the runway, the overrun distance may not be used for accelerate/go (ACC/GO) calculations. Therefore, an 8,000-foot runway with a 1,000-foot runway overrun has an available field length for ACC/STOP calculations of 9,000 feet; however, the available field length for ACC/GO calculations is 8,000 feet.

Item 2 – Temperature (Celsius). Enter the temperature for the time of departure.

Item 3 – PA. Enter the pressure altitude for the time of departure.

Item 4 – Takeoff configuration. Determined by the crew after considering the allowable takeoff weights from the following calculations as well as other factors.

Item 5 and 6 – Maximum weight to achieve single-engine (SE) climb. Enter the maximum allowable takeoff weight from the TAKEOFF WEIGHT charts for flaps 0 percent (UP) and 40 percent from the appropriate operator's manual.

Item 7 and 8 – Maximum weight for ACC/STOP. Enter the maximum takeoff weight that will ensure accelerate and stop distance is available on the runway or the runway plus any runway overrun available. Enter the appropriate ACC/STOP chart at the right side of the chart on the ACC/STOP FIELD LENGTH-FEET at the appropriate field length available. Establish a baseline at that field length; it is now the limit for allowable takeoff weight.

Now, on the left side of the chart, from the OUTSIDE AIR TEMPERATURE-CELSIUS scale trace up the chart vertically on the correct temperature line to the point of intersection with the correct PRESSURE ALTITUDE-FEET scale. Trace horizontally across the chart to the first REFERENCE LINE. If the intersection point at the first REFERENCE LINE is above the established field length baseline, trace down (maintaining the same relative distance between the guidelines) until intersecting the field length baseline. Then, trace down vertically to determine the maximum takeoff weight to achieve ACC/STOP. Consider using appropriate STOPPING DISTANCE FACTORS for wet or icy runways.

Item 9 – Maximum weight for required single engine (SE) climb gradient (CLB GRAD). The minimum SE CLB GRAD for all instrument flight rules (IFR) departures is 3.3 percent (200 feet per nautical mile [nm]). When a climb requirement greater than the minimum is specified, convert the climb requirement of the departure procedure (DP) from feet per nautical mile to a percentage.

To accomplish the conversion, divide feet per nautical mile by 6,076 (the number of feet in a nautical mile) and multiply by 100 (for example, 200 feet nautical mile/6,076 x 100 = 3.29 = 3.3 percent). To determine the maximum takeoff weight to achieve the SE climb requirement, use the "CLIMB—ONE ENGINE INOPERATIVE" chart in the appropriate operator's manual. Enter the chart on the right side at "CLIMB GRADIENT PERCENT," using the calculated climb gradient required for the departure. Establish a baseline at that climb gradient as the limit for takeoff weight. Now, enter the chart on the left side at the OUTSIDE AIR TEMPERATURE-CELSIUS scale, trace up the chart vertically to the intersection point with the correct PRESSURE ALTITUDE-FEET scale, and trace horizontally across the chart to the "REFERENCE LINE." Maintaining the same relative distance between the guidelines, trace up the chart to the intersection point with the climb gradient baseline. Then, from that point, trace down the chart vertically to read the maximum takeoff weight to achieve the required SE climb gradient. The weight is applicable to either takeoff configuration, flaps 0 percent or 40 percent.

Item 10 – Maximum allowable takeoff weight. Enter the most limiting weight from item 5 through 9 to determine the maximum allowable takeoff weight for the configurations. Considering mission load capability along with all other factors, decide on the takeoff configuration and associated takeoff weight for the departure. Enter the configuration and maximum allowable takeoff weight (or computed takeoff weight if lower) on the front of the TOLD card, and complete the performance planning for the departure on the front side of the card.

b. Front. The front of the card is used to record the departure performance data for the configuration and takeoff weight determined from the back of the card. It includes the data for the takeoff and departure, as well as landing data for use in the event of an immediate return to the departure airport.

Item 1 – Station. Enter the identifier for the departure airport.

Item 2 – Field length available. Enter the length of the takeoff runway, or the length of the takeoff runway plus any runway overrun.

Item 3 – Temperature (Celsius). Enter the temperature for the time of departure.

Item 4 – PA. Enter the pressure altitude for the time of departure.

Item 5 – Takeoff weight. Enter the takeoff weight, not to exceed the maximum determined by the takeoff weight worksheet on the back of the card.

Item 6 – Minimum takeoff power. Enter the minimum takeoff power from the appropriate MINIMUM TAKEOFF POWER AT 2,000 RPM chart.

Item 7 – Configuration. Mark the appropriate flap position (X).

Item 8 – Takeoff field length required. Enter the takeoff field length that corresponds to the limiting data from item 10 on the back of the card. If ACC/STOP was the most restrictive weight determinate, enter the required ACC/STOP distance. It is the required field length for the takeoff (for example, if the runway is 7,000 feet, the ACC/STOP distance is 6,000 feet, and ACC/STOP was the determinate for maximum allowable takeoff weight, then the takeoff field length required is 6,000 feet). The crew should not attempt a takeoff from any shorter field length.

Item 9 –Accelerate-go (ACC/GO). Enter the ACC/GO distance from the appropriate accelerate-go chart. This value is advisory and the crew should consider limiting takeoff weight if the available field length (plus any clearway) is less than the ACC/GO distance.

Item 10 – Takeoff decision speed (V_1)/rotation speed (Vr). In the C-12, V_1, and Vr are equivalent. Enter the speed from the ROTATION column, for the takeoff weight, in the tabular data box at the top of the TAKEOFF DISTANCE—FLAPS 0 or FLAPS 40 chart.

Item 11 – Takeoff safety speed (V_2)/best single-engine rate-of-speed climb (Vyse).

For performance planning purposes, utilize V_2 and Vyse as equivalent values. Enter the speed from the V_2 column or from the 50-foot column (C-12D2, T1, T2, T3, U, and R) for the takeoff weight, in the tabular data box at the top of the TAKEOFF DISTANCE—FLAPS 0 PERCENT/UP chart (for example, the speeds for a 12,500-pound C-12C and D are V_1/Vr = 103 and V_2/Vyse = 120; and for C-12D2, T1, T2, T3, R, and U are V_1/Vr = 111 and V_2/Vyse = 121.

Note: Consistent with Army departure procedures, do not use the TAKEOFF DISTANCE—FLAPS 40 PERCENT/APPROACH chart to determine V_2/Vyse.

Item 11a – Best angle-of-climb speed (Vx). If conducting an obstacle clearance climb, use the speed listed in the Vx column of the tabular data at the top of the TAKEOFF DISTANCE—FLAPS 40 PERCENT/APPROACH chart.

Item 12 – Climb gradient altitude. Enter the climb gradient altitude, as determined from the DP. If the DP requires a 300-foot per nautical mile climb to 4,000 feet, the climb gradient altitude is 4,000 feet.

Note: Items 13 through 16 are relative to an immediate landing back at the departure airfield in the event of some takeoff emergency or other reason requiring a return. For subsequent landings, enter the correct runway length, aircraft weight, and approach speed data for the conditions.

Item 13 – Runway length available. Enter the available runway length for the runway of intended landing.

Item 14 – Landing weight. Enter the accurate aircraft weight for the landing.

Item 15 – Indicated reference airspeed (Vref). Enter the Vref speed for the landing weight. Actual Vref is calculated by multiplying 1.3 times the stalling speed in the landing configuration (Vso) for the landing weight, if the landing is to be made with full flaps, or use 1.3 times the Vs1 (flaps 40 percent stall speed), if the landing is to be made with 40 percent or more, but less than 100 percent flaps. The Vref speed for landing with full flaps can also be obtained by subtracting 5 knots indicated airspeed (KIAS) from the approach speed for the landing weight as listed in the tabular data on the landing distance charts. Examples follow:

(a) Vref for an 11,000-pound aircraft landing with full flaps is
Vso = 72 KIAS x 1.3 = 93.6 = 94 KIAS
Or,
speed from the tabular data for 11,000 lbs = 99 KIAS
99 – 5 = 94 KIAS

(b) Vref for an 11,000-pound aircraft landing with 60 percent flaps is
Vs1 = 82.7 = 83 KIAS x 1.3 = 107.9 = 108 KIAS

Note: If landing will be accomplished with less than full flaps, the appropriate LANDING DISTANCE—FLAPS UP chart must be utilized for determining the landing distance.

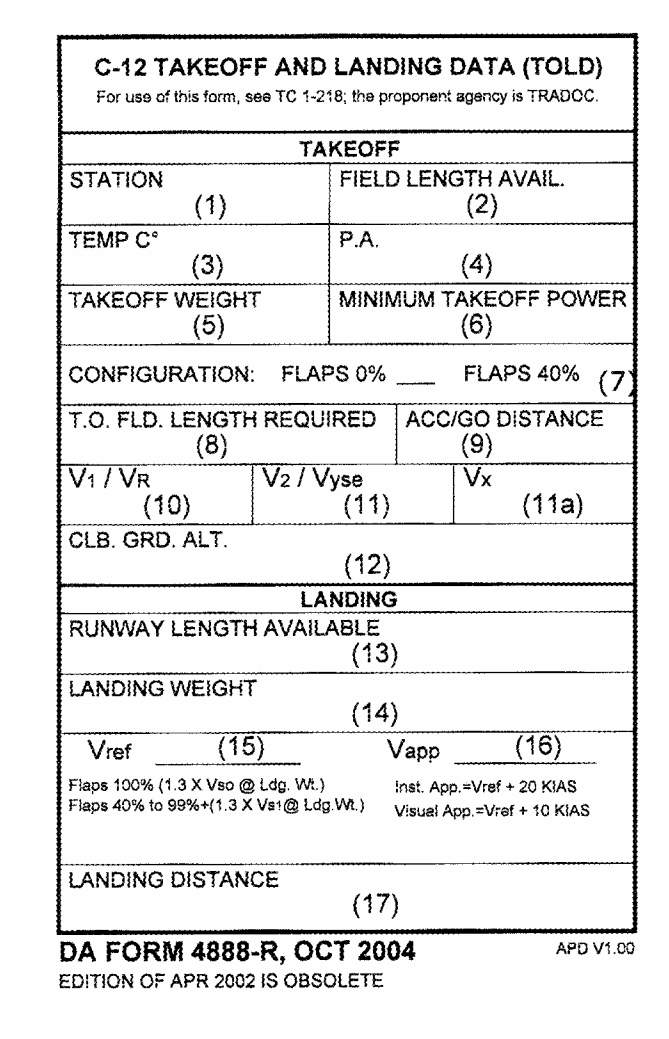
Item 16 – Approach speed (Vapp). Enter the Vapp for the approach to be flown. Normal instrument approaches are flown at Vref + 20 KIAS, and visual approaches conducted at the completion of instrument approaches are flown at Vref + 10 KIAS.

Note: Increase the Vapp for gusting wind conditions by adding one half the wind gust speed. Also, increase Vapp for anticipated wind-shear encounters.

Item 17 – Landing distance. Enter the landing distance for the landing weight from the landing distance without propeller reversing flaps 100 percent chart. Consider using appropriate stopping distance factors for wet or icy runways.

Note: Those aircraft utilizing TM 1-1510-225-10, chapter 7, and TM 1-1510-218-10, chapter 7a refer to this note. If the aircraft will be landed with FLAPS less than full DOWN, the LANDING DISTANCE—FLAPS UP (TM 1-1510-225-10, chapter 7, figure 7-108 or 7-110, and TM 1-1510-218-10, chapter 7a, figures 7a-108 or 7a-110) must be used to obtain landing distances.

Note: Those aircraft utilizing TM 1-1510-218-10, chapter 7, refer to this note. If the aircraft will be landed with flaps less than full DOWN, the “LANDING DISTANCE—FLAPS 40 PERCENT” (TM 1-1510-218-10, chapter 7, figures 7-32 or 7-35) must be used to obtain landing distances.



C-12 TAKEOFF AND LANDING DATA (TOLD)

For use of this form, see TC 1-218; the proponent agency is TRADOC.

TAKEOFF	
STATION (1)	FIELD LENGTH AVAIL. (2)
TEMP C° (3)	P.A. (4)
TAKEOFF WEIGHT (5)	MINIMUM TAKEOFF POWER (6)
CONFIGURATION: FLAPS 0% ___ FLAPS 40% (7)	
T.O. FLD. LENGTH REQUIRED (8)	ACC/GO DISTANCE (9)
V_1 / V_R (10)	V_2 / Vyse (11) / Vx (11a)
CLB. GRD. ALT. (12)	
LANDING	
RUNWAY LENGTH AVAILABLE (13)	
LANDING WEIGHT (14)	
Vref ___(15)___ Vapp ___(16)___	
Flaps 100% (1.3 X Vso @ Ldg. Wt.) Flaps 40% to 99%+(1.3 X Vs1@ Ldg.Wt.)	Inst. App.=Vref + 20 KIAS Visual App.=Vref + 10 KIAS
LANDING DISTANCE (17)	

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EDITION OF APR 2002 IS OBSOLETE

Figure 4-3. DA Form 4888-R (C12 Takeoff and Landing Data [TOLD]) (front)

4. Power limited takeoffs. In accordance with the notes on the minimum takeoff power charts, excess power that can be developed without exceeding engine limitations may be utilized for takeoffs. However, in the interest of preserving the engines, aircrews should limit the takeoff power to the value derived from the chart (minimum takeoff power). To perform a minimum power takeoff, set only the minimum takeoff power from the chart and do not utilize the available excess power. Do not use the minimum takeoff power method when the excess power would assure an extra safety margin during departures.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
DA Form 4888-R
DD Form 365-4

TASK 1023

Perform flight at minimum control speed with critical engine inoperative (Vmca, simulator only)

CONDITIONS: In a simulator.

STANDARDS: Appropriate common standards plus these additions/modifications:

1. Maintain positive airplane control at all times.
2. Maintain takeoff power (or maximum allowable) on the operating engine.
3. Maintain heading ± 10 degrees until minimum single engine control airspeed (Vmca).
4. Maintain 3- to 5-degree bank angle into operating engine (ball one-half off center).
5. Set powerplant controls; correctly identify and verify the inoperative engine after the failure, completing memory items and the checklist (CL) as time permits.

DESCRIPTION:

1. Crew actions. The main focus of the pilot on the controls (P*) will be outside the aircraft. The pilot not on the controls (P) will monitor flight and engine instruments, keep the area of observation cleared, and perform actions requested by the P*.

2. Procedure. This maneuver demonstrates aircraft controllability and handling characteristics while flying at or near Vmca airspeed. Additionally, this maneuver demonstrates the lack of aircraft controllability and recovery methods when directional control is lost when flying below Vmca airspeed. The number 1 engine may be failed either before or after entering the traffic pattern. The P* assisted by the P will perform the following actions:

   a. Complete the descent-arrival check or call for P action before entering the traffic pattern or starting an instrument approach. Fly a normal traffic pattern or normal instrument approach and perform the single-engine before-landing check at the same point as with both engines operating. Verify all CL items as the P calls them out. (The P will announce "**Check Complete**" when the last item is verified. Plan for a normal approach, allowing for sufficient time on final so minor alignment, speed, and altitude corrections can be accomplished without excessive low-altitude maneuvering. Turn final so as to complete the turn at or above 500 feet above ground level (AGL). Maintain a minimum of takeoff safety speed (V_2)/best single-engine, rate-of-climb speed (Vyse) until landing is assured. Landing assured can be defined as the point on final where the decision to extend flaps beyond approach is based on the ability to remain visual meteorological conditions (VMC) until touchdown and the need to start reducing airspeed gradually so as to arrive at indicated reference airspeed (V_{ref}) plus half the wind gust speed at approximately 50 feet above the landing area.

b. At a given altitude, perform the single-engine go-around by applying takeoff power (or maximum allowable power) on the right engine. While banking the aircraft 3 to 5 degrees into the operative engine, reduce airspeed at a rate not to exceed 1 knot per second by gradually increasing pitch attitude (demonstrating improper pitch control). Maintain heading as airspeed dissipates by using proper rudder, aileron, and elevator coordination. At Vmca, full rudder deflection and a 5-degree bank angle into the operative engine will be required to maintain heading. Note airspeed, then increase pitch attitude slightly to demonstrate the loss of directional control that occurs with a decrease in airspeed. Regain heading control immediately by reducing power on the operative engine and decreasing pitch attitude.

Note: During this maneuver, rapid rolling tendencies may develop if airspeed reduction is abrupt or the maneuver is performed at an altitude at which the aircraft stalls before or at Vmca. In this event, immediate reduction of power and pitch attitude (angle of attack) is required to effect a prompt recovery.

c. The P* should complete the maneuver by continuing with the single-engine go around and call for the CL.

Note: Two conditions cause actual Vmca to be greater than that shown in the aircraft operator's manual. One is caused by maintaining the wings level (ball centered), while the other is caused by allowing the inoperative engine propeller to windmill (not feathered).

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in a simulator.
2. This maneuver is not a required evaluation or iteration maneuver.

Note: This maneuver is to be trained for familiarization purposes in a simulator only.

REFERENCES:

Common references
14 CFR 91
FAA-S-8081-12A

TASK 1029

Perform preflight inspection

CONDITIONS: In a C-12 airplane and given access to the aircraft operator's manual and checklist (CL).

STANDARDS:

1. Without error, perform the preflight inspection according to the CL.
2. Correctly enter appropriate information on DA Form 2408-12 (*Army Aviator's Flight Record*) and DA Form 2408-13-1 (*Aircraft Maintenance and Inspection Record*).
3. Determine if inoperable items affect the mission by using the required equipment list (REL).

DESCRIPTION:

1. Crew actions.
   a. The pilot in command (PC) will ensure a preflight inspection is conducted using the aircraft CL. He may direct the PI to complete elements of the aircraft preflight inspection and will verify that all checks have been completed. The PC will report any aircraft discrepancies that may affect the mission and ensure the appropriate information is entered on DA Form 2408-12 and DA Form 2408-13-1.
   b. The PC or pilot (PI) will complete the assigned elements.
2. Procedure.
   a. The PC will ensure a proper preflight is conducted and that all checks are verified using the CL. Enter appropriate information on DA Form 2408-12 and DA Form 2408-13-1.
   b. Crewmember(s) will complete the preflight, as directed. The PC will ensure that the aircraft meets the required preflight inspection criteria.

NIGHT CONSIDERATIONS: If time permits, accomplish the preflight inspection during daylight hours. During the hours of darkness, use a flashlight with an unfiltered lens to supplement available lighting. Hydraulic leaks, oil leaks, and other defects are difficult to see using a flashlight with a colored lens. TC 1-204 contains details about preflight inspection at night.

COLD WEATHER CONSIDERATIONS: Brakes and tire-to-ground contact should be checked for freeze lockup. In addition to the normal preflight exterior inspection, special attention should be given to all vents, openings, control surfaces, hinge points and wing, tail, and fuselage surfaces for accumulation of ice or snow. Ice, snow, and frost accumulation must be removed before takeoff. The wing contour may be sufficiently altered by the ice and snow to cause its lift qualities to be seriously impaired (resulting in the loss of lift) and cause adverse stall characteristics. Propeller blades and hubs will be inspected for ice and snow. Unless engine inlet covers have been installed during snow and freezing rain, the propellers should be turned by hand in the direction of normal rotation to verify they are free to rotate prior to starting the engines. Remove snow, frost, and ice accumulations, in accordance with the operator's manual.

DESERT AND HOT WEATHER CONSIDERATIONS: Check that the landing gear struts are free of sand and grit and the aircraft interior is free of an accumulation of sand and dust.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
FAA-P-8740-24
DA Form 2408-12
DA Form 2408-13-1

TASK 1035

Perform engine start

CONDITIONS: In a C-12 airplane or simulator with access to the checklist (CL).

STANDARDS: Without error, perform procedures and checks according to the CL.

DESCRIPTION:

1. Crew actions.
   a. All crewmembers will complete the required checks or procedures pertaining to their crew duties, according to the CL and the preflight briefing.
   b. Both aviators will clear the area around the airplane before each engine start.
2. Procedure.
   a. The P* will start the engine(s) according to the CL and verify system operation.
   b. The P should read the CL, complete all designated P checks, monitor engine instruments and systems during the starting process, and assist the P*, as required.

NIGHT CONSIDERATIONS: Before starting the engine(s), ensure that all internal and external lights are operational and properly set. Lighting levels must be high enough so the crew can easily see the instruments and the aviator can start the engines without exceeding operating limitations. Beacon lights will be turned on prior to starting the engines and remain on during engine operation, except during conditions that may cause vertigo or other hazards to safety.

COLD WEATHER CONSIDERATIONS:

1. Before starting engine(s). Check all controls for full travel and freedom of movement.
2. Starting engine(s).
   a. Check that the compressor of each engine rotates freely by momentary starter application, if required.
   b. When starting engines on ramps covered with ice, the propellers should remain feathered to prevent the tires from sliding. To prevent exceeding torque limits when advancing the condition levers to HIGH idle during the start procedure, place the power lever(s) in BETA and the propeller lever(s) in HIGH revolutions per minute (RPM) before advancing the condition lever to HIGH idle.

DESERT AND HOT WEATHER CONSIDERATIONS: Use normal starting procedures. Be aware that higher-than-normal engine temperatures may be expected, and be prepared to abort the start before temperature limitations are exceeded. Blowing sand and debris may require the use of the ice vanes.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
FAA-P-8740-24

TASK 1040

Perform aircraft taxi

CONDITIONS: In a C-12 airplane or simulator with access to the checklist (CL).

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

1. Correctly perform procedures and checks according to the checklist.
2. Properly use power, ground fine, or beta, and brakes to maintain a safe taxi speed.

DESCRIPTION:

1. Crew actions.

   a. Each crewmember will complete the required checks or procedures pertaining to his crew duties, according to the checklist and the preflight briefing.

   b. The pilot not on the controls (P), when directed by the pilot on the controls (P*), will check the flight instruments to verify proper indications. This will allow the P* to keep his attention outside while the aircraft is moving.

2. Procedure. The P*, assisted by the P, will perform the following actions:

   a. After completing before taxi checks with the CL, clear the immediate area. Release the parking brakes. To initiate taxi, increase power until aircraft starts to move, then immediately reduce power to IDLE, ground fine, or beta, as required, and ensure that both sets of brakes operate properly. Maintain a safe taxi speed compatible with airfield and environmental conditions. Apply controls, as required by wind conditions. Regulate taxi speed with a combination of power, ground fine or beta, or brakes, as applicable. Do not drag the brakes. Complete required taxi checks and verify with the CL. While taxiing, follow taxi lines (when applicable) and remain within approved taxi areas. Use ground guides when operating in areas that are closely restricted.

   b. The P should read the checklist and help the P* clear the area. The P should complete all designated P checks and assist the P*, as required.

   Note: When taxing within close proximity of other aircraft/obstacles, the PC may place the condition levers to LOW IDLE.

NIGHT CONSIDERATIONS: Due to restricted visibility at night, taxi speeds should be reduced to allow for a greater margin of safety. Outside guidance should be requested when taxiing in areas in which obstacles are difficult to see. Avoid shining the taxi/landing light into other aircraft cockpits or the ground guide's eyes.

COLD WEATHER CONSIDERATIONS:

1. Before attempting to taxi, activate the brake deice system, ensuring the bleed air valves are open and the condition levers are in HIGH IDLE. Use an outside observer, if one is available, to confirm that the wheels are turning and not sliding.

2. When possible, avoid taxiing in deep snow, lightweight dry snow, or slush. Under these conditions, more power is required, steering is more difficult, and snow and slush will be forced into the brake assemblies. Exercise caution to ensure the spray pattern of slush is not ingested into the engine or cooler intakes. Flaps should be retracted during taxi to avoid throwing snow or slush into the flap mechanism. The brake deice system will thaw frozen brake assemblies, but

moisture remaining may refreeze after the system is deactivated. Brakes should be allowed to cool before setting the parking brake. Chocks or sandbags may be used to prevent the aircraft from rolling. Because spotty ice cover is difficult to see, taxi speeds should be slow and more clearance should be allowed in maneuvering the aircraft.

DESERT AND HOT WEATHER CONSIDERATIONS

Note: If ice vanes are used during ground operations, oil temperatures must be monitored.

1. Warm-up and ground operations. Use normal procedures for warm-up and ground operations. Higher gas generator revolutions per minute (N_1) speeds may be necessary to maintain oil temperatures within operating limits.

2. Taxiing. When practical, avoid taxiing over sandy terrain to minimize propeller erosion and engine deterioration. Use minimum braking to prevent brake overheating, especially when operating with higher N_1 speeds.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
FAA-P-8740-24

TASK 1045

Perform engine run-up

CONDITIONS: In a C-12 airplane or simulator with access to the checklist (CL).

STANDARDS: Without error, perform procedures and checks according to the CL. Ensure that engines and systems are operating within prescribed tolerances.

DESCRIPTION:

1. Crew actions. Each crewmember will complete the required checks or procedures pertaining to his crew duties according to the checklist and the preflight briefing.
2. Procedure. Considering the wind velocity and direction, the pilot on the controls (P*) may position the aircraft 45 degrees to the runway unless airfield policy or excessive winds dictate otherwise. Ensure the nose wheel is centered. The LS (left seat) pilot will complete the aircraft runup checks, if applicable, and ensure the systems and equipment are operating properly. Use the checklist to verify that all checks are completed. Record appropriate information on applicable aircraft logbook forms. The RS (right seat) pilot should read the checklist, complete all designated pilot not on the controls (P) aircraft systems and mission equipment checks, and assist the P*, as required. The LS crewmember may task the RS crewmember to complete the designated system checks. The P should ensure that the aircraft does not move during the checks while the P*'s attention is diverted to items inside the cockpit.

NIGHT CONSIDERATIONS: Lighting levels must be high enough so the crew can easily see the instruments and perform engine checks without exceeding engine limitations. The P should assist in clearing the area, while maneuvering into position and when stopped.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1104

Perform normal takeoff and climb

CONDITIONS: In a C-12 airplane or simulator, day or night.

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

1. Complete before-takeoff, lineup, and after-takeoff checks.
2. Maintain a predetermined track (normally the runway centerline) between the main landing gear during the takeoff roll.
3. Obtain the computed minimum takeoff power by 65 knots.
4. Rotate at takeoff decision speed (V_1)/rotation speed (Vr)–0 / +5 knots indicated airspeed (KIAS).
5. Perform initial climb at takeoff safety speed (V_2)/best single-engine, rate-of-climb speed (Vyse) + 5 (± 5) KIAS until 500 feet above ground level (AGL). Do not exceed a maximum of 15-degree pitch attitude or 20-degree pitch attitude for obstacle clearance climbs.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls (P*) focus will primarily be outside the aircraft during the maneuver. While initiating power application, the P* will monitor engine instruments and initiate an abort procedure if aircraft performance is not satisfactory. The P* will maintain an effective cross-check of the flight instruments, rotate the aircraft at V_1/Vr, and establish a V_2 + 5 KIAS climb.

   b. The pilot not on the controls (P) will assist the P* by verifying the P*'s flight instrument settings, adjusting power, monitoring the engine and systems instruments, making the crew callouts, retracting the gear, and reading the checklist. The P will perform those actions directed by the P*.

Note: During the departure briefing, the PC will review the TOLD card, and the crew will discuss a rejected takeoff plan.

2. Procedure. The P*, assisted by the P, will perform the following actions:

Note: Takeoff flap setting is determined by the pilot in command (PC) after evaluating the criteria from the takeoff weight worksheet on the back of the takeoff landing data (TOLD) card.

   a. Normal takeoff.

      (1) Lineup. Complete the before takeoff check and the lineup check. Crewmembers should begin the lineup check when cleared onto the active runway, and complete it while taxiing into position on the runway. The check must be completed before beginning the takeoff roll. Align the aircraft with the runway.

      (2) Power. The P* advances the power levers toward the target power, maintains control of the power levers, and directs the P to "**Set Power**." The P assists the P* by adjusting the power levers to attain takeoff power (either the minimum takeoff power or the maximum allowable power), as briefed, and announces, "**Power Set**." Normally, when field length is not restrictive, the power is set during the initial stage of the takeoff roll and will be completed by 65 KIAS.

Note: Application of takeoff power before brake release is only mandatory when required field length and available field length are the same. The manufacturer will only assure the performance obtained from the performance charts if takeoff power is applied before brake release. However, allowable power routinely exceeds the minimum takeoff power from the chart by 5 to 7 percent; the charts do not provide a methodology to determine the increased performance. All takeoff performance charts are based on using only minimum takeoff power.

Note: The P* does not relinquish control of the power levers to the P. The P is limited to assisting the P* by setting and maintaining the takeoff power as briefed. If there is a need to abort the takeoff during the takeoff roll, the P* will retard the power levers.

(3) Takeoff. Maintain directional control with nose wheel steering and rudder so the predetermined track is between the main gear. Maintain level wings with the ailerons. The P monitors the engine and system instruments and, as the aircraft approaches 65 KIAS, if all indications are normal, announces, "**Normal**." As the aircraft approaches V_1/Vr, the P announces, "V_1, **Rotate**." The P* removes his hand from the power levers, places it on the yoke, and rotates the aircraft sufficiently so the aircraft leaves the ground at V_1/Vr plus 3 KIAS (lift-off speed [Vlof]).

(a) When two positive rate-of-climb indications are noted, the P will announce "**Positive rate**." The P* will call "**Gear UP**." The P will move the landing gear control handle to the UP position, turn off the landing taxi lights, monitor the retraction of the gear and announce, "**Gear is UP**," or in the case of a malfunction, "**Gear did not retract**." On reaching a minimum airspeed of 105 KIAS, the P* will call for "**Flaps UP**," and the P will retract the flaps, if necessary, or note that they are up and respond, "**Flaps are UP**."

(b) The P* will establish the aircraft in a V_2 + 5 knot climb not to exceed a 15-degree pitch attitude. Accept a higher airspeed rather than exceed the maximum pitch attitude.

(4) Climb. After reaching 500 feet AGL the P* will establish the aircraft in a cruise climb. On reaching cruise climb airspeed, the P* announces, "**Set climb power**." The P will reduce the power levers sufficiently to preclude an over-torque, set the props to climb revolutions per minute (normally 1900 RPM), readjust the torque to achieve climb power, and respond, "**Climb power set, your power**." The P then relinquishes control of the power levers to the P* and the P* calls for the after takeoff checklist.

b. Crosswind takeoff. Position the aileron control into the wind before the start of the takeoff roll. Normally, the amount of required aileron input will decrease as the aircraft gains airspeed and the controls become more effective; use only sufficient input to keep the aircraft from drifting. As the aircraft is rotated, use rudder as necessary to prevent turning (crabbing) into the wind. Takeoff in "slipping" flight and remain in the slip until the gear is retracted. The aircraft must remain aligned with the runway until the gear is retracted in case it settles back to the runway. As the gear is retracted, transition into a "crab" into the wind to continue a straight ground track. In the case of an IFR departure when the departure procedure or clearance requires maintaining the runway heading, do not crab into the wind but fly the magnetic heading of the runway.

c. Obstacle clearance climb. If an obstacle at the end of the runway must be cleared, the takeoff will be made by applying minimum takeoff power prior to brake release and using flaps at the APPROACH or 40 percent position. Establish the initial climb at the Vx speed obtained from the tabular data box of the TAKEOFF DISTANCE FLAPS 40 PERCENT/

APPROACH chart. Do not exceed a 20-degree pitch attitude and accept the additional airspeed. Once the obstacle is cleared, retract the flaps at a minimum airspeed of 105 KIAS, and proceed with the normal takeoff procedures.

NIGHT CONSIDERATIONS: Adjust cockpit lights, as necessary, and ensure a serviceable flashlight is readily accessible. Landing and taxi lights may be left off during takeoffs from runways where dust, smoke, or haze may be encountered. Reduced visual references will make it difficult to maintain the desired ground track. Knowing the surface wind conditions will assist in determining the approximate crab angle into the wind during the climb. Be prepared to transition to instrument flight if visual references are too few or you experience any symptoms of spatial disorientation.

COLD WEATHER CONSIDERATIONS: If there is a possibility of ice, snow, or frost accumulation on the flying surfaces, do not attempt a takeoff. Activate all anti-ice and deice systems allowing sufficient time for the equipment to become effective. Accumulations of snow, slush, or water will increase takeoff distances. After a takeoff from a runway covered with snow, slush, or water, delay gear retraction and cycle the landing gear to dislodge ice accumulation. When aircraft icing is likely, climb at higher than normal airspeed. Stall speeds may be higher than normal and the stall warning horn may be unreliable.

DESERT AND HOT WEATHER CONSIDERATIONS: Use normal takeoff procedures. Avoid taking off in the wake of another aircraft if the runway is sandy or dusty.

MOUNTAIN CONSIDERATIONS: Use normal takeoff procedures. Takeoff and climb performance will be reduced due to density altitude.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
Unit SOP

TASK 1120

Perform steep turns

CONDITIONS: In a C-12 airplane or simulator.

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

1. Maintain angle of bank within -5 to +10 degrees.
2. Roll out on the desired heading ±10 degrees.
3. Roll into a coordinated turn of 180 degrees or 360 degrees with a minimum bank of 45 degrees and maximum of 60 degrees.
4. Apply smooth coordinated pitch, bank, and power to maintain altitude and airspeed.
5. Avoid any indication of an approaching stall, abnormal flight attitude, or exceeding structural or operating limitations during any part of the maneuver.

DESCRIPTION:

1. Crew actions. The main focus of the pilot on the controls (P*) will be outside the aircraft. The pilot not on the controls (P) will monitor flight and engine instruments, keeping the area of observation cleared, and perform actions requested by the P*. The P* will call out the direction of turn before starting the turn toward the P so the P can thoroughly clear the area of observation. The P will acknowledge clearing of the area before the turn is started.

2. Procedure. A steep turn is classified as a 45- to 60-degree bank angle. The maneuver should be performed using maximum outside visual reference and minimum reference to instruments.

   a. Entry. Establish level flight at a designated altitude, 160 knots indicated airspeed (KIAS) in the clean configuration. Increase power, as required, maintaining airspeed in the turn. Determine a visual reference for level flight. When the altimeter is stationary, begin the turn by banking the aircraft with the aileron at a rate that will result in a smooth and uniform rate of change in the bank angle.

   b. Turn. Add power, as necessary, to maintain airspeed. As 30 degrees is being passed, adjust back pressure on the yoke to maintain the pitch attitude on the horizon that will result in maintaining altitude. Continue the bank until the desired bank angle is reached. Use elevator trim, as necessary, to neutralize the control pressures. When the desired angle of bank is reached, apply sufficient opposite aileron to maintain a constant bank angle (compensate for overbanking tendency). If the bank angle is constant throughout the turn, the tendency of the airplane is to be stable. The only corrections should be minor pressure movements with the yoke to correct for minor variances in altitude (pitch) and power (airspeed).

   c. Rollout. Begin rollout approximately one half the bank angle prior to reaching the rollout heading. The P* should use a smooth and uniform reduction of bank at the same rate used during the roll-in. Coordinate pitch attitude, power, and retrim as required during the rollout to maintain altitude and airspeed.

NIGHT CONSIDERATIONS: Before starting turns, the area should be cleared using the technique of off-center viewing. Steep banks at low altitudes should be avoided. When using the lights of cities or towns for a horizon reference, the crew should be aware that disorientation or vertigo may occur. If this happens, the P* should discontinue the turn and return to level flight immediately. If no horizon is visible the P* may have to use instruments as his primary reference.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1122

Perform climbs and descents

CONDITIONS: In a C-12 airplane or simulator.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions. The main focus of the pilot on the controls (P*) will be outside the aircraft. The pilot not on the controls (P) will monitor flight and engine instruments, keeping the area of observation cleared, and perform actions requested by the P*.
2. Procedure. The P*, assisted by the P, will perform the following actions:

   a. Climbs. Establish the climb by applying power, if required, and adjusting the pitch attitude to obtain the airspeed prescribed in the aircraft operator's manual for the desired climb. Monitor instruments to ensure that operating limits are not exceeded. Trim the aircraft, as required, throughout the maneuver. The P will call out altitudes and airspeeds when requested by the P*.

   b. Descents.

      (1) En route descents. Establish the descent by adjusting pitch attitude and reducing power to maintain the desired airspeed (normally cruise airspeed) and the desired rate of descent. During the descent, control airspeed by adjusting power. The rate of descent will depend on the amount of pitch applied. Trim the aircraft, as required, throughout the maneuver. The P will call out altitudes and airspeeds when requested by the P*. The P will call out "**1,000 to go**," when appropriate.

Note: A technique for determining top of descent (TOD) (or a given point in space) to depart an altitude to reach an assigned altitude by another given point may be determined as follows: (altitude to lose) multiplied by 3, plus the altitude restriction point. Note the following example:

An air traffic control (ATC) clearance while flying eastbound toward the Wiregrass very high frequency omnidirectional range (VOR) may be "Army 12345, descend to reach 12,000 by 30 miles west of Wiregrass VOR."

(27,000 feet – 12,000 feet) x 3 plus 30 distance measuring equipment (DME) = 75 DME descent point.

(2) Cruise descents. Reduce power to a setting below that required for level flight at cruise. Maintain altitude while maintaining or decelerating to the desired cruise speed. While approaching the desired cruise airspeed, adjust pitch attitude and power to maintain desired cruise airspeed and the desired rate of descent. During the descent, control airspeed by adjusting power. The rate of descent will depend on the amount of pitch applied. Trim the aircraft, as required, throughout the maneuver. The P will call out altitudes and airspeeds when requested by the P*. The P will call out "**1,000 to go**" when appropriate.

(3) Emergency descents. Establish the descent by using the prescribed emergency procedures in the operator's manual. Exercise caution to not exceed the published speed if descending in turbulent air or in the vicinity of mountainous terrain. Establish a 25- to 45-degree bank in the initial descent to maintain positive G-forces and properly clear altitudes below the aircraft. Call out the direction of the turn before starting turns toward the P so the P can thoroughly clear his area of observation. The P should acknowledge that the area is clear before the turn is started. Maintain this heading change for at least 90 degrees. During the descent, control airspeed by adjusting pitch attitude. Trim the aircraft, as required, throughout the maneuver. Unless an actual emergency exists, the maneuver will be performed during daylight hours under visual meteorological conditions (VMC). In addition to clearing the area, the P will monitor the aircraft instruments and inform the P* if the assigned altitude is about to be exceeded or airspeed is approaching maximum. The P will call out altitudes and airspeeds when requested by the P*. The P will call out "**1,000 to go**" when appropriate.

(4) Glides. Establish the glide by reducing the power to idle. Simultaneously adjust pitch attitude to maintain best glide airspeed; if unknown, use the flaps UP V_2 + 10. During the descent, control airspeed by adjusting pitch attitude. To recover to level flight, set power as required to maintain the desired airspeed and adjust pitch attitude as required to stop the descent. Direct the P to retract the landing gear with a "**Gear UP**" callout and "**Flaps UP**" if recovering from the landing configuration. The maneuver should be practiced with the aircraft in both a cruise and a landing configuration. The P will perform the assigned duties and monitor the aircraft instruments and call out altitudes and airspeeds when requested by the P*.

(5) Two-engine inoperative glides (day, VMC, with an instructor pilot [IP]). This maneuver is performed to gain proficiency in maneuvering the aircraft when both engines have failed. The IP may simulate failing the engines individually or simultaneously. After the P* performs the proper procedures for engine failure, the IP will configure the propellers and power to obtain zero thrust. During the descent, control airspeed with pitch attitude to obtain maximum glide distance or the glide speed recommended in the aircraft operator's manual. If unknown, use flaps UP takeoff safety speed (V_2)/best single-engine, rate-of-climb speed (Vyse). Practice turns using various angles of bank and with the aircraft in both the clean and the landing configurations. This simulation will be terminated no lower than 500 feet above ground level (AGL) with a two-engine go-around or two-engine landing.

NIGHT CONSIDERATIONS: Under certain conditions, vertigo can adversely affect the visual sense, and could cause a loss of orientation. Cross-check attitude instruments closely, especially when the horizon is not visible or is obscured by haze or smoke.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1125

Perform slow flight

CONDITIONS: In a C-12 airplane, visual meteorological conditions (VMC) or simulator.

STANDARDS: Appropriate common standards plus the following:

1. Stabilize and maintain the airspeed at Vref ± 5 knots, not lower than minimum single engine control airspeed (Vmca).
2. Avoid any indication of an approaching stall.
3. Select an altitude that will allow the task to be completed no lower than 4,000 feet AGL.

DESCRIPTION:

1. Crew actions. The main focus of the pilot on the controls (P*) will be outside the aircraft. The pilot not on the controls (P) will monitor flight and engine instruments, keep the area of observation cleared, and perform actions requested by the P*.

2. Procedure. This maneuver demonstrates aircraft controllability and handling characteristics while flying at low airspeeds. It provides practice of control techniques and shows the capabilities and limitations of the aircraft in the low-speed regimes. Recommended propeller setting for this task is as specified in the aircraft operator's manual for climb. The maneuver should be performed using maximum outside visual references and minimum references to flight instruments. The P*, assisted by the P, will perform the following actions:

Note: The minimum airspeed is red line (minimum single engine control airspeed [Vmca]).

a. While maintaining heading and altitude, set propeller speed to climb RPM, turn yaw damper off, and complete the before-landing checklist. When speed allows, extend flaps to FULL. Allow the aircraft to decelerate to Vref. It may be necessary to reduce power at lighter weights to obtain Vref. Adjust pitch attitude, as necessary, to maintain altitude. Maneuver the airplane in straight-and-level flight, in climbs and descents, and in turns not to exceed a standard rate turn (10 percent of airspeed + 7 degrees = standard rate turn). The P* should maintain coordinated flight while maneuvering through the proper use of the rudder and aileron.

b. The P* should complete the maneuver by returning to 160 knots indicated airspeed (KIAS) in the clean configuration to a predetermined altitude (see task 1177).

NIGHT CONSIDERATIONS: High aircraft pitch attitudes may obscure part of the horizon and require a faster cross-check of whatever lights or visual horizon is observable.

Note: Intentional or simulated engine failures below safe twin-engine operative speed selected (Vsse) are prohibited.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
14 CFR 91
FAA-S-8081-12A

TASK 1138

Perform fuel management procedures

CONDITIONS: In a C-12 under visual meteorological conditions (VMC), instrument meteorological conditions (IMC) or simulated IMC, or in a simulator.

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

1. Verify that the required amount of fuel is on board at the time of takeoff.
2. Correctly perform an in-flight fuel consumption check after level-off or entry into cruise flight.
3. Initiate 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. Pilot not on the controls (P). As part of the cruise checklist the P will check and record fuel data, as appropriate. Using on board equipment (for example, KLN-90B) the P will compute or determine fuel remaining, fuel required to reach destination, and alternate with the appropriate fuel reserve. The P will announce the initiation of the fuel check and the results when completed.

   b. Pilot on the controls (P*). The P* will acknowledge the results of all fuel checks.

   Note: If the aircraft is equipped with a component that will allow fuel calculations, it should be used.

2. Procedures.

   a. Before-takeoff fuel check. The pilot in command (PC) will ascertain total fuel on board, and compare with mission fuel requirements determined during premission planning. If fuel is inadequate, have the aircraft refueled or revise/abort the mission.

   b. Initial airborne fuel reading. After aircraft has leveled off or entered mission profile, and appropriate power settings are obtained from chapter 7 of the operator's manual, the P will note the total fuel quantity and fuel flow.

   c. Fuel consumption check. As part of the cruise check, the P will determine the flight time remaining based on fuel remaining versus fuel required to reach destination, alternate, and have a fuel reserve available. If the fuel quantity is inadequate, the P will advise the P* and recommend an alternate course of action or determine the alternate course of action if the P is the PC.

   d. Fuel quantity and consumption. The P will periodically monitor the fuel quantity and consumption rate. If fuel quantity/flow indicates a deviation from computed values, the P will repeat fuel consumption check to determine if fuel is adequate to complete the flight.

   e. Perform cross-feed operation. During single engine operations, the P* will set appropriate cross-feed controls or call for P action to equalize fuel quantities, according to the aircraft operator's manual.

NIGHT CONSIDERATIONS: The P should complete all duties associated with fuel management procedures.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
Equipment operating handbook

TASK 1144

Perform touch-and-go landing

CONDITIONS: In a C-12 airplane with an instructor pilot (IP), given access to the checklist (CL), on a suitable runway (length must exceed accelerate-stop distance by 2,000 feet), with both engines operating, and cleared by air traffic control (ATC) or in a simulator.

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

1. Attain landing approach speed (plus half wind gust speed) ±5 knots indicated airspeed (KIAS).
2. Maintain at or above the approach angle on the flight management system (FMS)/instrument landing system (ILS) glide path, visual approach slope indicator (VASI) or precision approach path indicator (PAPI) when available.
3. Execute touchdown within the first 1/3 of the runway available for landing with the desired runway track between the main gear during landing and rollout.
4. Maintain centerline between the main landing gear after touchdown and during rollout.

DESCRIPTION:

1. Crew actions. On downwind leg, the IP will inform the pilot on the controls (P*) that the landing will be a touch-and-go unless the IP later calls out "**Full stop**." All crewmembers will complete the required checks or procedures pertaining to their crew duties according to the checklist and the preflight briefing. The IP will, in addition to performing IP duties, also perform normal pilot not on the controls (P) duties. The IP will read the CL, monitor flight and engine instruments, keep the area of observation cleared, and perform actions requested by the P*.
2. Procedure. After the aircraft has landed and is rolling out, the P*, assisted by the IP, will perform the following actions:

Note: The touch-and-go landing will not be performed on completion of a practice single-engine landing.

a. The IP will state, "**Stabilize power**." The P* will advance the power levers up to approximately the 12 o'clock position on the power lever quadrant (to stabilize the propellers' revolutions per minute [RPM] and torque on both engines).

b. The IP will ensure the propeller levers are set to the HIGH RPM position, flaps to APPROACH (40) or UP (0) and trim, as required, for takeoff.

c. The IP will state, "**Advance power**." The P* will advance power levers to a power setting briefed by the IP and state, "**Set power**."

d. The IP will set the desired takeoff power setting, and state, "**Power set**."

e. The IP will call "V_1 **Rotate**" at takeoff decision speed (V_1).

f. From this point, continue the takeoff using the procedures specified for a normal takeoff.

Note: It is the IP's responsibility to obtain air traffic control (ATC) clearance for the touch-and-go landing and to advise ATC if the procedure later changes to a full-stop landing.

NIGHT CONSIDERATIONS: Normal approach and landing techniques are used at night. However, the addition of a slight amount of power is normally used to reduce the rate of descent and to maintain minimum flying speed until touchdown. This is especially important during dark field

landings when the ground surface is not visible. When visibility is lowered by haze or smoke, the range of the landing light may be insufficient to see obstructions in time to avoid them. The electronic/visual glide slope indicator should be used as the most accurate and reliable approach-angle indicator. If visual glide slope indicator is not available, the obstruction lights along with the threshold lights should be used to establish a sight picture during the approach. The apparent distance between runway lights can also be used as an aid in establishing the flare-out point.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1145

Perform normal landing

CONDITIONS: In a C-12 airplane or simulator.

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

1. Attain landing approach speed (plus half wind gust speed) ±5 knots indicated airspeed (KIAS).
2. Maintain at or above the approach angle on the flight management system (FMS)/instrument landing system (ILS) glide path, visual approach slope indicator (VASI) or precision approach path indicator (PAPI) when available.
3. Cross the runway threshold at Vref (indicated reference speed) plus half wind gust speed ±5 KIAS.
4. Execute touchdown within the first 1/3 of the runway available for landing with the desired runway track between the main gear during landing and rollout.
5. Maintain positive directional control and crosswind correction during the after-landing roll.
6. Use beta, reverse, ground fine, and brakes (as appropriate) to bring the aircraft to a safe stop.

DESCRIPTION:

1. Crew actions. Crewmembers will complete the required checks or procedures pertaining to their crew duties, according to the checklist and the preflight briefing. The pilot not on the controls (P) will also read the checklist, monitor flight and engine instruments, keep the area of observation cleared, and perform actions requested by the pilot on the controls (P*).
2. Procedure. The P*, assisted by the P, will perform the following actions: the normal traffic pattern approach is a stabilized descent and deceleration, excluding deviations required by ATC or environmental considerations. The P* will initiate a power reduction resulting in a stabilized descent and a normal approach angle that can be maintained with minor pitch adjustments. The airspeed can be managed through use of flaps, pitch, and power to achieve the desired Vref + speed at the appropriate place in the pattern. If the P* makes a pitch change to correct for the angle, he must understand and correct for the resulting airspeed change. The P* should adjust power as necessary to maintain the desired airspeed. The maximum recommended angle of bank in the traffic pattern is 30 degrees.
    a. Arrival. Complete the descent-arrival check or call for P action before entering the traffic pattern. Maneuver the aircraft into position to enter the downwind leg at midfield at a 45-degree angle (or according to local procedures), at traffic pattern altitude, at 160 KIAS in the clean configuration. Straight-in or base-leg entry may be used, if approved by ATC.
    b. Downwind. When the aircraft is approximately abeam the approach end of the runway (point may vary depending on wind and design of the airfield), initiate the deceleration to Vref + 30 by lowering flaps to APPROACH and extending the landing gear (call for P action — "**Flaps APPROACH, gear DOWN, before landing check.**")
    c. Hold altitude with pitch. Complete the before-landing CL. Verify all checklist items as the P calls them out. The P will announce, "**Check complete**" when the last item has been verified.
    d. Base. As the aircraft nears the turning point, reduce power and allow the aircraft to begin its descent, adjusting to a pitch attitude that will result in a speed of Vref + 20 and trim as

required as the aircraft is turned to base. After roll out on base determine the aircraft position (in relation to the projected approach angle). Adjust pitch to maintain the required descent angle. Adjust propeller RPM to HIGH and/or flaps to the desired setting (call for P action — "**Props HIGH RPM, flaps xx percent**") to maintain the airspeed profile.

Note: Those aircraft utilizing TM 1-1510-225-10, chapter 7, and TM 1-1510-218-10, chapter 7a, refer to this note. If the aircraft will be landed with flaps less than full DOWN, the LANDING DISTANCE–FLAPS UP (TM 1-1510-225-10, chapter 7, figure 7-108 or 7-110, and TM 1-1510-218-10, chapter 7a, figures 7a-108 or 7a-110) must be used to obtain landing distances.

Note: Those aircraft utilizing TM 1-1510-218-10, chapter 7, refer to this note. If the aircraft will be landed with flaps less than full DOWN the "LANDING DISTANCE – FLAPS 40 PERCENT" (TM 1-1510-218-10, chapter 7, figures 7-32 or 7-35) must be used to obtain landing distances.

Note: Flaps should be used as a deceleration tool at the P*'s discretion to obtain the desired airspeed for the approach segment being flown.

Note: The decision when to place the propeller levers to HIGH RPM is at the P*'s discretion.

Note: A common mistake is to use the aiming point marking located approximately 1,000 feet from the landing threshold as a predetermined touchdown point. A stabilized 3-degree descent will allow a descent to the aiming point marking but during a normal roundout the aircraft will touch down beyond the marking and is acceptable. Do not "duck under" the approach angle to try and touch down on the marker.

Note: The P* will complete before-landing check on the downwind leg prior to turning base for a normal traffic pattern. For an extended downwind, straight in, or extended base leg, complete the before-landing check no later than two miles from the threshold. The P* may perform these procedures earlier. If the P* performs the before-landing procedure early, maintain airspeed at Vref +30 KIAS, as minimum, until turning base leg.

Note: When landing on an instrumented runway and the descent angle is at the aiming point markers, the Vref position will be 50 feet above the runway threshold. If landing on an unmarked runway or landing strip, the Vref point will occur prior to the runway threshold. In no case should the P* fixate on touching down on a predetermined point and allow high rates of descent to build. Consideration should be given to ground effect, density altitude, weight, wind, and runway length.

Note: Traffic considerations, ATC requests, or aircraft-specific requirements, may require deviation from normal traffic pattern and airspeed profiles listed for this maneuver. Therefore the use of drag management devices (gear, propellers, and flaps) will be used at the discretion of the P*.

e. Final. Turn final so as to complete the turn at or above 500 feet above ground level (AGL). When established on final approach, select flaps (task the P to move the flap switch to the desired setting), to reduce airspeed gradually so as to arrive at Vref + 10 on final. The landing check may be performed at anytime once the propellers are placed to HIGH RPM. From approximately mid-final to the threshold the P* should stabilize the approach by setting landing flaps (call for P action), set landing trim, and adjust power, as required, to maintain Vref + 10 until such time as is necessary to reduce power to arrive at Vref (plus half the wind gust speed) at approximately 50 feet above the landing area. As the aircraft nears the runway,

coordinate pitch and power, as necessary, to control rate of descent and airspeed for a smooth touchdown. After touchdown, gently lower the nose wheel to the runway and use propeller reversing, beta, brakes, and ground fine as necessary to slow the aircraft. Maintain directional control during the landing roll with rudders/nose wheel steering.

Note: If using a straight-in or base-leg entry, reduce power at a point that will result in a flight path comparable with that of a normal traffic pattern. To maintain the desired ground track, turn base leg, when appropriate.

CROSSWIND CONSIDERATIONS: During crosswind conditions, use the crab-into-the-wind method to correct for drift on all legs of the traffic pattern until final. The crab-into-the-wind is changed to a slip-into-the-wind for roundout and touchdown. The point to begin the slip is at the P*'s discretion. A prolonged slip will result in an increase in the rate of descent and power will be required to resume a normal descent. During the after-landing roll, use normal rudder or nose wheel steering for directional control and position ailerons, as required, to correct for crosswind effect.

NIGHT CONSIDERATIONS: Normal approach and landing techniques are used at night. However, the addition of a slight amount of power is recommended to reduce the rate of descent and maintain minimum flying speed until touchdown. This is especially essential during dark field landings when the ground surface is not visible. When haze or smoke lowers visibility, the range of the landing light may be insufficient to see obstructions in time to avoid them. The visual glide slope indicator, when available, is the most accurate and reliable means of approach angle indications and should be used to maintain a safe glide path. If visual glide slope indicator is not available, the obstruction lights in conjunction with the threshold lights should be used to establish a sight picture during the approach. The apparent distance between runway lights can be used as an aid in establishing the roundout point.

COLD WEATHER CONSIDERATIONS: Landings on icy runways should be made only when necessary. Braking and steering are less effective under slick runway conditions, and hydroplaning may occur at high speeds on wet runways. Use of the rudder to maintain directional control until the tires make solid contact with the runway surface may be necessary. Refer to the aircraft operator's manual for limitations and special procedures. To avoid impairing visibility, reverse power should be used with caution when landing on a runway covered with snow or standing water.

DESERT AND HOT WEATHER CONSIDERATIONS:

1. Use normal landing procedures. Use reverse power and beta/ground fine range with caution to avoid brownout and to preclude blowing excessive amounts of sand and dust into the engines.
2. To prevent brake-disk warping, release the brakes immediately after chocks have been installed.

MOUNTAIN CONSIDERATIONS: If descending in mountainous terrain be aware of the potential for turbulence associated with mountain waves and reduce speed to turbulence penetration airspeed, if required.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
FAA-P-8740-24

TASK 1177

Perform go-around

CONDITIONS: In a C-12 airplane or simulator.

STANDARDS: Use appropriate common standards and perform the go-around according to the aircraft operator's manual.

DESCRIPTION:

1. Crew actions. The main focus of the pilot on the controls (P*) will be outside the aircraft. The pilot not on the controls (P) will monitor flight and engine instruments, keep area of observation cleared, and perform actions requested by the P*. The P will assist the P* with power, gear, and flaps and perform the appropriate crew callouts, per chapter 6.

Note: This maneuver may be combined with upper air work recovery procedures, a rejected landing, a circling approach, or missed approach procedure.

2. Procedure. The P*, assisted by the P, will perform the following actions when performing a go-around or missed approach:

a. The P* will—

(1) Initiate the maneuver by advancing the power levers toward maximum allowable power and direct the P to "**Go-around, set power**."

(2) Simultaneously increase pitch attitude to approximately 7 degrees to stop the descent. The go-around mode on the flight director may be used as an aid.

(3) If flaps are set beyond approach, direct "**Flaps APPROACH**" after the "**Go-around, set power**" callout.

(4) Direct the P "**Gear UP**" on the P's "**Positive rate**" callout.

(5) At 105 knots indicated airspeed (KIAS) (minimum) direct the P to select "**Flaps UP**."

(6) Establish a normal climb at cruise climb airspeed; call for P to "**Set climb power**." (See normal takeoff for climb power adjustment procedures.)

(7) Call for the go-around checklist when time, altitude, and workload permit.

b. The P will—

(1) Set maximum allowable power, when directed, and respond, "**Power set**."

(2) State "**Positive rate**" after observing two positive climb indications.

(3) State "**Flaps APPROACH**" when directed by the P* and the flap switch has been moved to that position. Verify flap position.

(4) Move the gear handle switch to the UP position and turn the light switches to the OFF position, when directed, and respond, "**Gear UP**."

(5) State "**Flaps UP**" when directed by the P* and the flaps switch has been moved to that position. Verify flap position.

(6) Reduce the power levers to prevent over torque and set props to 1900, when directed by the P* and state, "**Climb power set, your power**."

(7) Read go-around checklist when P* directs.

(8) Advise ATC of the go-around/missed approach and intentions, if applicable.

Note: Accelerating to 105 KIAS (minimum) before retracting flaps completely will provide an additional margin of speed over Vmca and stall speed. In the event of an engine failure at this critical phase, this extra speed will assist in maintaining control.

Note: At high gross weights/high-density altitudes, if a go-around is initiated close to the ground and it is questionable whether the aircraft may touchdown when the flaps are retracted, leave the gear down until gaining sufficient altitude/airspeed.

NIGHT CONSIDERATIONS: For traffic avoidance and aircraft identification, the recognition light(s) should be left on until at least traffic pattern altitude. Monitor heading and altitude instruments closely and be prepared to convert to instrument flight if the visual horizon is lost or if affected by vertigo.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1182

Perform radio communications procedures

CONDITIONS: In a C-12 airplane or simulator with two-way radio communications established.

STANDARDS:

1. Without error, adjust avionics to the proper frequencies.
2. Establish radio contact with the appropriate air traffic control (ATC) facility.
3. When communicating with ATC facilities, use correct radio communications procedures and phraseology, per the Department of Defense (DOD) flight information publication (FLIP) and Federal Aviation Administration (FAA) publications.
4. Acknowledge each radio communication with ATC by using the correct call sign.
5. Acknowledge and comply with ATC instructions.

DESCRIPTION:

1. Crew actions. Radio communication is primarily the responsibility of the pilot not on the controls (P). However, if crewmembers monitor multiple frequencies simultaneously, they will keep each other informed about any actions/communications they conduct on their respective frequencies.
2. Procedure.
   a. The crew will use radio communication procedures and phraseology, as appropriate for the area of operations.
   b. The P will adjust avionics, as required, and maintain a continuous listening watch on the assigned frequencies. When required, the P will establish communications with the appropriate ATC facility, monitor the frequency before transmitting, and use the correct radio call sign when acknowledging each communication. The P will transmit pilot reports, position reports, and flight plan changes, as required.
   c. When advised to change frequencies, the pilot on the controls (P*)/P will acknowledge the transmission before making the change and select the new frequency as soon as possible, unless instructed to do so at a specific time, fix, or altitude.

Note: When the P* performs this task, the P* will coordinate actions/communications with the P.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
Unit SOP
FAA Order 7110.65

TASK 1201

Perform instrument takeoff

CONDITIONS: In a C-12 airplane, under instrument meteorological conditions (IMC), simulated IMC, or in a simulator.

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

1. Select navigational aids for departure procedure.
2. Set navigational instruments and selector switches, without error.
3. Select and verify initial level off altitude on the altitude alerter, if installed.

DESCRIPTION:

1. Crew actions.

   a. The main focus of the pilot on the controls (P*) will be inside the aircraft, except during the start of the takeoff. The P* will direct the pilot not on the controls (P) to engage the flight director/autopilot modes, as requested, and acknowledge all P callouts.

   b. The P will assist the P* by performing designated P duties and callouts according to chapter 6. The P will make the required radio transmissions, callouts used for a normal takeoff and perform designated actions requested by the P*.

Note: During the departure briefing, the pilot in command (PC) will review the takeoff landing data (TOLD) card, and the crew will discuss a rejected takeoff plan.

Note: The procedure describes an instrument takeoff (ITO) using the flight director. This maneuver can also be performed without the assistance of a flight director, if desired.

2. Procedure. An ITO uses the same procedures and callouts as a normal takeoff, except it is modified to use flight instruments, flight director, and/or autopilot to assist the P*. (Refer to Task 1104.) The following are modifications and/or additions used for an ITO.

   a. Lineup. Recheck heading and attitude indicators/flight director for possible precession errors. Set the heading bug under the lubber line, set the flight director for the initial desired pitch attitude, and task the P to set the altitude preselector (if installed) and the desired function on the flight director controller. The P should confirm the flight instrument settings.

   b. Power. Same as a normal takeoff.

   c. Takeoff. After the brakes are released, initial directional control should be accomplished predominantly with the aid of outside visual references. As the takeoff progresses, the cross-check should transition from outside references to the heading indicator, airspeed indicator, and attitude indicator. The rate of transition from outside references to inside references is directly proportional to the rate at which the outside references deteriorate. Approaching V_1, the cross-check should be totally committed to the instruments so erroneous sensory inputs can be ignored. At the "**V_1, rotate**" callout, proceed with a normal takeoff callouts and procedures.

   d. Climb. Same as a normal takeoff.

   e. Task the P. At single-engine maneuvering altitude (not less than 500 feet AGL), task the P to engage the desired flight director modes and engage the autopilot, if desired.

f. Assist the P*. Throughout the maneuver, the P should assist the P* by verifying instrument settings, monitoring engine instruments, maintaining takeoff power, engaging the flight director and autopilot modes requested by the P*, making the appropriate callouts and advising the P* of abnormal conditions.

Note: Precession errors in some attitude indicators may cause the horizon bar to lower slightly during acceleration, causing the pitch attitude to appear higher than actual pitch attitude. To avoid lowering the nose prematurely, cross-check the vertical velocity indicator and altimeter to ensure proper climb performance.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1210

Perform holding procedures

CONDITIONS: In a C-12 airplane, instrument meteorological conditions (IMC), or simulated IMC, or in a simulator.

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

1. Execute holding, according to FM 1-240, aeronautical information manual (AIM), and Department of Defense (DOD) flight information publication (FLIP).
2. Correctly tune and identify the appropriate navigational aids (NAVAIDs).
3. Correctly enter holding pattern.
4. Adjust speed to cross the holding fix at or below maximum holding speed.
5. Comply with air traffic control (ATC) reporting requirements.
6. Correctly time and track holding pattern legs.

DESCRIPTION:

1. Crew actions.

   a. The main focus of the pilot on the controls (P*) will be on the aircraft instruments. The P* will announce all frequency changes, instrument settings, and ATC information that the pilot not on the controls (P) does not monitor.

   b. The P will assist by keeping the area cleared when operating in visual meteorological conditions (VMC) and tuning the required frequencies when requested by the P*. The P will note holding pattern instructions and verify pattern location and entry leg. The P will verify all frequency changes requested by the P*, follow the position of the aircraft on the chart, make the required radio transmissions, and be the timekeeper when requested by the P*.

2. Procedure. The P*, assisted by the P, will perform the following procedures:

   a. Timed holding. Slow to holding airspeed within 3 minutes of the fix. Before arrival at the holding fix, analyze holding instructions to determine holding pattern location and proper entry. Upon arrival at the holding fix, turn (if required) to the predetermined outbound heading. Have the P note the time and make the appropriate report to ATC. Check navigation instruments to confirm the aircraft location in relation to the inbound course. Maintain the outbound heading according to the DOD FLIP or as directed by ATC. After the appropriate time outbound, turn to the inbound heading. Apply normal tracking procedures to maintain inbound course. Have the P verify the time required to fly the inbound leg. Adjust subsequent outbound leg elapsed time to obtain the desired inbound leg time or in accordance with appropriate host nation procedures. When holding at a NAVAID or a global positioning system (GPS) waypoint, begin outbound time when 90 degrees abeam the station. When holding at an intersection, begin the outbound time upon establishing the outbound heading (wings level).

   b. Distance measuring equipment (DME) holding. Before arrival at the holding fix (normally a radial and DME fix from a VORTAC/TACAN [very high frequency omnidirectional range/tactical air navigation] station), determine holding pattern and entry. When within 3 minutes of the holding fix, reduce airspeed as appropriate for holding. Upon arrival at the holding fix, announce the arrival and turn (if required) to the predetermined outbound heading. Have the P note the time, and make the appropriate report to ATC. Check

navigation instruments to confirm the aircraft location in relation to the inbound course. The length of the outbound leg will be attained as specified per DOD FLIP or as directed by ATC. Begin inbound turn at the appropriate DME point and apply normal tracking procedures to maintain inbound course.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1212

Perform enhanced ground proximity warning system/terrain avoidance warning system operations

CONDITIONS: In a C-12 airplane equipped with ground proximity altitude advisory system (GPAAS)/ground proximity warning system (GPWS), enhanced ground proximity warning system (EGPWS), and/or terrain awareness and warning system (TAWS), under visual meteorological conditions (VMC), instrument meteorological conditions (IMC), simulated IMC, in a simulator, or in a classroom environment.

STANDARDS: Appropriate common standards plus these additions/modifications:

1. Correctly turn on, test, adjust, and operate the terrain avoidance equipment according to the operator's manual.
2. Correctly identify terrain avoidance cockpit indications and symbology.
3. Correctly respond to terrain avoidance advisories and warnings.
4. Use correct terrain avoidance phraseology.

Note: TAWS standards addressed within this task will be utilized for aircraft GPAAS/GPWS equipped.

DESCRIPTION:

Crew actions.

a. Prior to takeoff, the crew will check the system for proper operation. Crews will observe precautions specified in the operator's manual, or the equipment-operating handbook.

b. The operation of the terrain avoidance equipment in flight is the responsibility of the pilot not on the controls (P). Crewmembers will adjust the terrain avoidance equipment as required. Normally, the TAWS "pop up" visual display is the priority display on the multifunction display (MFD) and will override the weather and/or traffic alert and collision avoidance system (TCAS) display when there is a terrain alert. If the installation does not include the terrain display as a pop up on the MFD, crewmembers will select the terrain display during flight when there is a TAWS warning or alert. When the particular installation does not include the terrain as a pop up display, and terrain is the overriding concern, as in approaches or departures in mountainous areas or receiving vectors in mountainous areas, the MFD or EGPWS display will be operated in the terrain mode.

c. When in IMC, all flight crews will respond to a TAWS warning to "PULL UP" by executing an immediate climb. If the warning occurs during an instrument final approach, the crew will climb and execute the published or alternate missed approach procedure.

d. When in VMC, flight crews are authorized to disregard a terrain avoidance warning if, and only if, they (both crewmembers) have absolutely identified, beyond any doubt, the terrain that caused the warning, and they are certain of the capability to clear the terrain. If either crewmember has any doubt, then they will correctly respond to the terrain avoidance warning.

e. Crews are authorized to deviate from their air traffic control (ATC) clearance to the extent necessary to comply with a TAWS warning. After a deviation, as soon as workload permits, crews must report to ATC.

f. Upon receiving a terrain avoidance warning during an instrument approach, after completing the before-landing check, the missed approach/go-around procedure must be initiated to assure terrain clearance.

g. The terrain awareness and display (TAD) function should be inhibited by selecting the TERRAIN INHIBIT switch when—

(1) Operating within 15 nautical miles (nm) of takeoff, approach, or landing at an airport not contained in the EGPWS database. (See Allied Signal document #060-4267-000, EGPWS Terrain Database Airport Coverage List.)

(2) The flight management system (FMS) is in dead reckoning (DR) mode.

(3) Conducting repetitive day closed traffic/traffic pattern operations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Equipment operating handbook (instructions)
Allied Signal document #060-4267-000

TASK 1215

Perform precision approach

CONDITIONS: In a C-12 airplane or in a simulator, under instrument meteorological conditions (IMC), or simulated IMC with access to appropriate Department of Defense (DOD) flight information publication (FLIP) and approach clearance received.

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

1. Execute the approach according to AR 95-1, FM 1-240, aeronautical information manual (AIM), and DOD FLIP.
2. Complete before-landing check prior to final approach descent.
3. Maintain Vref +20 ±5 knots indicated airspeed (KIAS) on final approach descent inbound.
4. Once visual with the landing environment, maintain Vref +10, ± 5 KIAS.
5. For an instrument landing system (ILS) approach, remain within full-scale deflection of course deviation indicator (CDI). On final approach, maintain glide-slope indicator within a full-scale deflection.
6. During precision approach radar (PAR) approaches, maintain headings ±5 degrees and make immediate heading and altitude corrections as issued by air traffic control (ATC).
7. Comply with the decision height (DH)/PAR minimums prescribed for the approach.
8. Execute correct missed approach procedure immediately upon reaching DH, if a landing cannot be accomplished.

Note: Flaps will not be extended beyond APPROACH until a visual descent can be made to the runway.

DESCRIPTION:

1. Crew actions.

   a. The main focus of the pilot on the controls (P*) will be on the aircraft instruments. The P* will verify that the pilot not on the controls (P) has set in the proper navigational radio frequencies for the approach. The P* will direct the P to engage the flight director and autopilot functions when performing a coupled approach. See chapter 6 for crew duties and callouts.

   b. Prior to commencing the approach, the crew will obtain weather, winds, current altimeter, active runway, and remarks from automated terminal information service (ATIS), automated surface observing system (ASOS), automated weather observing system (AWOS), or ATC, and brief the approach. The P will assist the P* by tuning in the appropriate radio frequencies, selecting the flight director modes, reading the checklist (CL), and making the appropriate callouts according to chapter 6, for a precision approach and missed approach, if applicable.

   c. The P* and the P will review the approach procedure to be flown. Standard items to review include type of approach, final approach course, DH, approach lighting available that will assist to identify the runway, missed approach procedure, and minimum safe altitude (MSA). They must clarify any questions on crew actions and intentions, and brief any restrictive notes for that approach. It is not required for one crewmember to read the approach aloud to the other. During refresher or qualification training, the instructor pilot (IP)/instrument flight examiner (IE) may require an oral briefing for training purposes.

d. At the end of the briefing, the approach plate should be positioned in view of the P. The following items should be retained in memory by the P*:

(1) Final inbound course.

(2) Glide slope intercept altitude.

(3) Decision height.

(4) The initial missed approach climb, including heading/course, and altitude.

e. During the approach, the P* may have the P refer to the approach plate for information, as necessary. However, unless unforeseen circumstances develop, the P* should be familiar enough with the procedure to not require referring to the items listed above.

2. Procedure.

a. Normal. Refer to FM 1-240 for a complete description of approach procedures. Aviators should practice flying instrument approaches manually, flight director only, and coupled with the autopilot.

(1) Airspeed should be approximately 160 KIAS prior to configuring for the approach, unless ATC requires a different speed. Complete the before-landing check prior to glide slope intercept altitude or as directed by the PAR controller. If descending on the glide slope, the before-landing check should be completed approximately two miles from the final approach fix. The final approach speed is Vref + 20 KIAS. If the approach is being flown manually, pitch to the glide slope and use power to maintain the airspeed. If the approach is coupled, the autopilot will pitch to the glide slope through the flight director and the P* will control the airspeed with power (observe any minimum coupled airspeed limits).

Visual. During the final approach descent, if the P determines the P* can complete the approach to landing visually (chapter 6), the P will report, "**Runway in sight at 12 o'clock, take over visually**." The P* will respond, "**Runway in sight, visual**." The P* will continue to descend on the glide slope. The distance from the runway when the P* transitions visually will determine the next course of action. At the point it is necessary to decelerate to arrive over the threshold at Vref, disconnect the autopilot, if still engaged. Task the P to set "**full flaps**" or "**confirm flaps APPROACH**," if necessary to arrive on angle, on speed (Vref), with landing trim set crossing the threshold. Have the P complete the landing check for the P*, so as not to create a distraction at this critical point.

(2) Missed approach. If the runway environment is not in sight by DH, the P will report, "**DH, negative contact, missed approach**." The P* will initiate a go-around/missed approach.

b. Single-engine considerations.

(1) In the event of an engine failure under IMC or simulated IMC, the P* must continue to fly the approach, while managing the emergency. The P must assist the P* with the appropriate crew callouts and actions outlined in Task 1335, and chapter 6.

(2) If a missed approach is executed, comply with Task 1320, while complying with the published missed approach procedure or ATC instructions.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
FAA-S-8081-5C

TASK 1220

Perform nonprecision approach

CONDITIONS: In a C-12 airplane under instrument meteorological conditions (IMC), simulated IMC, or simulator and given access to appropriate Department of Defense (DOD) flight information publication (FLIP) and approach clearance received.

STANDARDS:

1. Execute the approach according to AR 95-1, FM 1-240, aeronautical information manual (AIM), and DOD FLIP.
2. Complete before-landing check before final descent inbound.
3. Maintain Vref +20, ±5 knots indicated airspeed (KIAS) final approach descent inbound.
4. Once visual with the landing environment, maintain Vref +10, ±5 KIAS.
5. Maintain prescribed courses—
   a. Nondirectional radio beacon (NDB) courses— ±5 degrees.
   b. Very high frequency (VHF) omnidirectional range (VOR), VOR/distance measuring equipment (DME), simplified directional facility (SDF), and tactical air navigation (TACAN) courses—within one-half scale deflection using the course deviation indicator (CDI) or ±5 degrees using the radio magnetic indicator (RMI).
   c. Localizer (LOC), localizer directional aid (LDA) courses—remain within full-scale deflection of the CDI.
6. During airport surveillance radar (ASR) approaches, make immediate heading and altitude changes issued by air traffic control (ATC) and maintain heading ±5 degrees.
7. Comply with descent minimums prescribed for the approach.
8. Establish a rate of descent that will ensure arrival at the minimum descent altitude (MDA) at or prior to reaching, the missed approach point (MAP), with the airplane in a position from which a descent from MDA to a landing on the intended runway can be made at a normal rate using normal maneuvering.
9. Execute the correct missed approach procedure immediately upon reaching the MAP if a landing cannot be accomplished.

DESCRIPTION:

1. Crew actions.
   a. The main focus of the pilot on the controls (P*) will be on the aircraft instruments. The P* will verify that the pilot not on the controls (P) has set the proper navigational radio frequencies for the approach. The P* will direct the P to engage the flight director and autopilot functions required when performing a coupled approach. See chapter 6 for crew duties and callouts.
   b. The P will obtain weather, winds, current altimeter, active runway and remarks from automated terminal information service (ATIS), automated surface observing system (ASOS)/automated weather observing system (AWOS) or ATC, and brief the P*.

c. The P will assist the P* by tuning the appropriate radio frequencies, selecting the flight director modes, reading the checklist, and making the appropriate callouts (chapter 6) for a nonprecision approach and missed approach, if applicable. The P* and the P will review the approach procedure to be flown. Standard items to review include type of approach, final approach course, MDA, circle maneuver (if necessary), approach lighting available that will assist to identify the runway, missed approach procedure, and minimum safe altitude (MSA). The P* and the P will clarify any questions on crew actions and intentions with each other and brief any restrictive notes for that approach.

d. At the end of the briefing the approach plate should be positioned in view of the P. The following items should be retained in memory by the P*:

(1) Final inbound course.

(2) Final approach fix (FAF) altitude and location.

(3) Minimum descent altitude.

(4) Visual descent point.

(5) Missed approach point.

(6) The initial missed approach climb, including heading/course and altitude.

e. During the approach, the P* may have the P refer to the approach plate for information as necessary. However, unless unforeseen circumstances develop, the P* should be familiar enough with the procedure to not require reference to the items listed above.

Note: For those aircraft where the flight director mode controller and autopilot power switches are mounted on the left side, the P* will engage the desired functions.

Note: The instructor pilot/instrument flight examiner (IP/IE) may require that the approach be flown with or without the use of the flight director and/or the autopilot.

2. Procedure.

a. Normal. Refer to FM 1-240 for a complete description of approach procedures.

(1) Aviators should practice flying instrument approaches manually, flight director only, and coupled with the autopilot.

(2) When executing a full approach, the P* may complete the before-landing check and slow to Vref + 20 KIAS to aid in controlling ground speed and rate of descent outbound.

(3) The P* should complete the before-landing checklist and be established at Vref + 20 KIAS no later than final approach descent.

(a) Visual. During the final approach descent, if the P determines the P* can complete the approach to landing visually the P will report, "**Airport in sight at 12 o'clock; take over visually**." The P* will respond, "**Visual**." The P* will continue inbound at MDA until the aircraft is in a position to land. The P* will task the P to "**confirm flaps APPROACH**," or "**Set full flaps**," and when departing the MDA call out "**Leaving MDA**." Have the P complete the landing check for the P* so as not to create a distraction at this critical point. The P* will adjust power and pitch, as necessary, for a normal descent and landing.

Note: The landing check may be completed anytime after the autopilot is disconnected, if performing a coupled approach.

Note: Flaps will not be extended beyond APPROACH until a visual descent can be made to the runway.

(b) Missed approach. If the runway environment is not in sight by the MAP the P will report, "**Missed approach point, negative contact, missed approach**." The P* will initiate a go-around/missed approach.

(4) Visual descent point (VDP). VDPs are being incorporated into nonprecision approach procedures. The VDP is a defined point on the final approach course of a nonprecision, straight-in approach procedure from which a normal descent from the MDA to the runway touchdown point may be commenced, provided visual reference to the runway is established. No special technique is required to fly a procedure with a VDP. If a VDP is published and the crew intends to utilize it, then the airplane must arrive at MDA at the same time or prior to reaching the VDP. If a visual descent point is not published, an acceptable method for determining a VDP is as follows:

(a) MAP based on Time: Inbound Time – (HAT x 10 PERCENT).

Example: Inbound time for the approach is 2:20.

HAT is 600 ft. (HAT x 10 PERCENT) = :60 (sixty seconds).

Adjusted inbound time is 1:20 (2:20 – :60).

VDP will be reached when the elapsed time is 1:20.

(b) MAP is based on DME: DME @ Approach End ± (HAT ÷ 300).

Example: DME at runway approach end is 1.6 NM (for this illustration, the DME source is beyond the approach end of the runway, not prior to it).

HAT is 600 ft. (HAT ÷ 300) = 2 NM.

Adjusted DME is 3.6 NM (1.6 + 2).

VPD will be reached when the DME readout is 3.6 NM.

b. Single-engine considerations.

(1) In the event of an engine failure under IMC or simulated IMC, the P* must continue to fly the approach while managing the emergency. The P must assist the P* with the appropriate crew callouts and actions outlined in Task 1335, and chapter 6.

(2) If a missed approach is executed, comply with Task 1320, while complying with the published missed-approach procedure or ATC instructions.

Note: If performing a single-engine circling approach, the decision to complete the before-landing check prior to the final descent inbound must be tempered with other factors. These include gross weight, weather conditions, and aircraft performance. If the aircraft will not maintain altitude at takeoff safety speed (V_2)/best single-engine, rate-of-speed climb (Vyse) while circling to land, retract the landing gear, and, if required, the flaps. However, once this is done the entire check must be repeated prior to the landing.

Note: If ATC requires that an airspeed be maintained that precludes completing the before-landing check prior to the final descent inbound, the before-landing check will be completed no later than 2 miles from the runway threshold.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
FAA-S-8081-5C

TASK 1240

Perform missed approach

CONDITIONS: In a C-12 airplane under instrument meteorological conditions (IMC) or simulated IMC or in a simulator.

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

1. Comply with air traffic control (ATC) or published missed approach procedures at missed approach point.
2. Maintain prescribed course or heading ±5 degrees.

DESCRIPTION:

1. Crew actions.

   a. The focus of the pilot on the controls (P*) will be inside the aircraft. The P* will apply power to the approximate setting, keeping the main focus on the flight instruments. The P* will verify the climb-out procedure with the pilot not on the controls (P) and acknowledge all P callouts.

   b. The P will assist by monitoring engine and flight instruments, setting power, and reading the checklist. The P will announce when assuming power control and acknowledge all actions requested by the P*. The P will make the required radio transmissions and perform all designated P actions requested by the P*. Refer to chapter 6, crew duties for specific callouts and crew actions.

Note: If this procedure is conducted while operating single engine, the climb airspeed will be V_2, as applicable. The single engine go-around checklist should be used to verify the procedure when time permits.

2. Procedure. A missed approach is a go-around with a published or ATC directed procedure to follow. When a missed approach is necessary, perform the go-around, Task 1177, with the following additions and modifications:

   a. The P* will—

      (1) If performing a coupled approach, disconnect the autopilot using the autopilot (AP) disconnect (disc) button or by depressing the go-around button on the power lever no later than the missed approach point (MAP) or decision height (DH).

      (2) If a turn is involved in the procedure, initiate the turn as published, as instructed by air traffic control (ATC) at or above circling minimums.

      (3) Reengage the flight director and autopilot (if desired) above 500 feet above ground level (AGL). Cockpit layout of the mode controllers varies, task the P to assist in engaging desired functions as appropriate.

   b. The P will—

      (1) Direct the P* "**Missed approach point, negative contact, missed approach**."

      (2) Engage flight director/autopilot functions as directed by the P*.

c. Maneuver the aircraft to follow the missed approach path shown on the approach plate or the alternate route assigned by ATC. If the approach is terminated while circling for a landing, make a climbing turn toward the landing runway unless otherwise specified. Remain within the circling obstruction clearance area before turning to intercept the published missed approach course.

d. As soon as practical, the P should inform ATC of the missed approach and state intentions for additional ATC clearance. Do not sacrifice aircraft control for the sake of communicating with ATC. Complete go-around procedure, and verify with the checklist.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1245

Perform unusual attitude recovery

CONDITIONS: In a C-12 airplane, with an instructor pilot (IP)/instrument flight examiner (IE)/standardization instructor pilot (SP), under simulated instrument meteorological conditions (IMC) (day only) or in a simulator with an emergency or full-panel configuration.

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

1. Correctly analyze aircraft attitude.
2. Without delay, use the correct recovery procedure (sequence).

DESCRIPTION:

1. Crew actions.

   a. The IP, IE, or SP will assume control of the aircraft, clear the area, and establish the unusual attitude. After a positive transfer of the controls, the instructor/evaluator will assume the normal role of the pilot not on the controls (P). In the P role, the IP, IE, or SP will monitor aircraft and engine instruments closely, and provide adequate warning for corrective action if operating limitations may be exceeded and assist the pilot on the controls (P*) by performing the requested actions.

   b. An alternate method is to have the P* fly the aircraft with eyes closed. The IP, IE, or SP will then direct turns, climbs, descents and rollouts. When an unusual attitude is reached the instructor/evaluator will direct the P* to open his eyes and recover.

   c. The P*'s main focus will be inside the aircraft. The P* will acknowledge transfer of controls, analyze the condition and attitude of the aircraft, and take corrective action.

2. Procedure. Upon detecting an unusual attitude, the P*, assisted by the P, will immediately initiate a recovery to straight-and-level flight by performing the following procedures:

   a. Recover from nose-high unusual attitude; airspeed is low and decreasing—

      (1) Increase power, as necessary, up to the maximum power available and increase angle of bank, not to exceed 45 degrees in the same direction as the turn. If the aircraft is not in a turn or bank then the P* will initiate a bank not to exceed 45 degrees prior to pitching the aircraft nose to the horizon to prevent "unloading" or experiencing negative gravity.

      (2) As the nose of the aircraft pitches to the horizon, decrease bank to wings level.

      (3) Adjust pitch to reverse the airspeed trend and return to a level flight attitude.

      (4) Adjust power to cruise setting.

      (5) Cross-check the slip indicator.

      (6) Trim the aircraft.

   b. Recover from nose-low unusual attitude; airspeed is fast and increasing—

      (1) Smoothly reduce power as required.

      (2) Level the wings.

      (3) Adjust the pitch up to the horizon.

      (4) Adjust power to maintain desired airspeed and altitude.

      (5) Cross-check the slip indicator.

      (6) Trim the aircraft.

Note: In the absence of properly operating attitude instruments, attain straight-and-level flight by centering the turn needle, adjusting pitch to stop the altimeter and using power to reverse the indications of the airspeed indicator until level flight airspeed is stabilized. The P* may use alternate flight instruments, if installed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1250

Perform autopilot/flight director operations

CONDITIONS: In a C-12 airplane under visual meteorological conditions (VMC), instrument meteorological conditions (IMC), or simulated IMC or in a simulator.

STANDARD: Operate the autopilot (AP)/flight director (FD) system per the appropriate aircraft operator's manual.

DESCRIPTION:

1. Crew actions. The pilot on the controls (P*) is primarily responsible for directing the mode of the AP/FD. The pilot not on the controls (P) will engage the AP/FD mode(s) when requested by the P* and call out the action. The P will monitor the flight instruments and AP/FD annunciator lights and immediately advise the P* of any abnormal indications.

   Note: In those aircraft where the AP/FD controller(s) are mounted on the left side of the cockpit, the P* will engage the desired function(s).

2. Procedure. The P*, assisted by the P, will perform the following procedures:
   a. Perform manual flight responses to the FD commands (climbs, descents, and turns).
   b. Perform coupled flight maneuvers (climbs, descents, and turns) using the P to engage the desired FD function. With the autopilot engaged, fly the desired profile using the appropriate command knob (heading, course, pitch wheel, or turn).
   c. Perform coupled navigation and instrument approaches.

   Note: For those systems with an altitude preselector, the P may reset the new altitude without the P* direction when air traffic control ATC directs an altitude change. The P will announce that the new altitude is set and the altitude arm feature is engaged ("**One zero thousand feet selected, and armed"**).

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1254

Perform instrument flight rules navigation

CONDITIONS: In a C-12 airplane using the flight management system (FMS), global positioning system (GPS), very high frequency omnidirectional range (VOR), tactical air navigation (TACAN), or nondirectional radio beacon (NDB) under visual meteorological conditions (VMC), instrument meteorological conditions (IMC) or simulated IMC conditions or in a simulator.

STANDARDS: Appropriate common standards plus these additions/modifications:

1. Correctly program waypoints into the FMS/GPS.
2. Correctly tune and identify appropriate navigational aids (NAVAIDS).
3. Correctly determine aircraft position.
4. Correctly intercept and maintain desired course.
5. Correctly identify station passage.

DESCRIPTION:

1. Crew actions.

   a. The main focus of the pilot on the controls (P*) (inside/outside the aircraft) will vary depending on whether the aircraft is operating in VMC or IMC. The P* will announce all frequency changes, instrument settings, and air traffic control (ATC) information that the pilot not on the controls (P) does not monitor. The P* will verify the identification of all stations tuned by the P.

   b. The P will assist by keeping the area cleared when operating in VMC, checking the avionics equipment, tuning the required frequencies, and performing actions requested by the P*. The P will verify all frequency changes requested by the P*, follow the position of the aircraft on the chart, and make the required radio transmissions.

2. Procedure. The P*, assisted by the P, will perform the following procedures:

   a. Equipment check. Check or have the P check all radio navigational equipment to be used during the mission. Equipment must be operable and within accuracy tolerances, if applicable, as specified in FM 1-240, the aircraft operator's manual, or equipment manufacturer's technical manual.

   b. Station identification. Obtain correct frequency for desired navigational station and then tune the equipment. Make a positive identification of the station.

   c. Aircraft position. Determine the position of aircraft with respect to a specified navigational ground station per procedures in FM 1-240. Have the P verify the position.

   d. Course interception. After identifying the desired station, determine the location of the aircraft in relation to the desired course. Turn 45 degrees toward the course (90 degrees to expedite). Maintain intercept heading until approaching an on-course indication. Depending on the rate of closure, start a turn to intercept the desired track on course.

   e. Course tracking. Maintain desired heading until navigation instrument shows an off-course condition; then turn 20 degrees toward the course to reintercept. If navigation instruments do not indicate movement toward the course within a reasonable time, increase the intercept angle. When the course is reintercepted, turn toward the course and apply the appropriate drift correction (normally one-half of the intercept angle). Continue to bracket the

course by decreasing corrections until a heading is obtained that will maintain the aircraft on course.

f. Intersection arrival. Determine arrival at radio intersections per procedures in FM 1-240.

g. Station passage. Identify VOR station passage by observing reversal of the TO-FROM indicator or reversal of the RMI needle. Identify nondirectional radio beacon (NDB) station passage by observing reversal of the indicator needle. Identify TACAN station passage by distance measuring equipment (DME) mileage countdown or reversal of the TO-FROM indicator.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

Equipment manufacturer's technical manual

TASK 1260

Operate weather avoidance system(s)

CONDITIONS: In a C-12 airplane under visual meteorological conditions (VMC), instrument meteorological conditions (IMC) or simulated IMC, or in a simulator with weather avoidance systems.

STANDARDS:

1. Correctly test and operate the airborne weather RADAR according to the equipment instruction booklet and the aircraft operator's manual.
2. Correctly test and operate the lightning detection system according to the equipment instruction booklet and the aircraft operator's manual.
3. Correctly perform weather detection, echo interpretation, and hazardous weather avoidance actions according to FM 1-230.

DESCRIPTION:

1. Crew actions.
   a. The crew will test weather RADAR and lightning detection systems prior to takeoff for proper operation. The crew will adhere to object and personnel safety distances specified in the aircraft operator's manual.
   b. The operation of weather RADAR, echo interpretation, and hazardous weather avoidance is the pilot in command's (PC's) responsibility.
   c. The operation of the lightning sensor, interpretation, and hazardous weather avoidance is the PC's responsibility.
2. Procedure.
   a. Ground operation. The pilot not on the controls (P) will ground test all weather avoidance system(s) according to the operator's manual for satisfactory performance. The P will advise the pilot on the controls (P*) should any weather avoidance equipment not be fully functional. The crew will evaluate the effect of the reduced capability toward the performance of the mission and brief alternate course(s) of action.
   b. Departure procedure.
      (1) Before takeoff, the P will operate the weather avoidance equipment if necessary, to determine any potential hazard conflict with departure and emergency return to the departing airfield. Before takeoff, point the aircraft toward the departure area. Tilt the antenna upward at a maximum elevation of 15 degrees. It is only possible to elevate the center of the beam 7,500 feet at 5 miles, and 15,000 feet at 10 miles.
      (2) The crew will review the air traffic control (ATC) departure instructions for conflict with depicted weather display, determine alternatives, and the P will advise ATC of their request. The crew will include in their departure briefing, any redistribution of P duties should intense RADAR operation become necessary. After takeoff and during the climb out, the P will adjust the weather avoidance equipment to maintain effective weather depiction and keep the P* advised of changes. The crew will advise ATC of required or desired changes to routing for weather avoidance.

c. En route procedure.

(1) The P will adjust the weather avoidance system(s) to maximize "early" detection of weather hazards for planning avoidance maneuvers as required. Crew will use all resources available. (For example, center weather advisory [CWA], flight watch, air route traffic control center [ARTCC] advisories, hazardous in-flight weather advisory service [HIWAS], and pilot weather reports [PIREPs] to supplement weather avoidance displays.) Crew will advise ATC of required/desired changes to routing for weather avoidance.

(2) Once established in level flight, adjust weather RADAR tilt until solid ground returns appear at a range equal to your above ground level (AGL) altitude. To set "zero tilt" for the beam center, raise the tilt 10 degrees from this position, then lower it to half the receiver transmitter antenna (RTA) beam width (4 degrees). Zero tilt is a technique for setting the center of the RADAR beam with the longitudinal axis of the aircraft in level flight. For ideal convective detection, adjust the center of the RADAR beam between 18,000 and 25,000 feet. (Rule of thumb: Moving the tilt ±1 degree equates to moving the beam center ±1,000 feet per 10 nautical mile [nm]).

d. Arrival/approach procedure.

(1) The P will adjust the weather avoidance equipment as required to maintain the most accurate weather displays. P will advise P*, if attention will be diverted to intense RADAR operation. Before entering the approach profile, the crew will evaluate each segment of the designated approach, missed approach, and holding area for displayed weather hazards. Crew will advise ATC of required deviations as they become necessary.

(2) A technique for analyzing the arrival area is setting "low-level park." Low-level park is a tilt up of 4 degrees from zero tilt (half the receiver transmitter antenna beam width). This places the bottom of the beam at the aircraft's altitude, eliminating ground returns.

3. Supplemental information.

a. C-12 aircraft are equipped with a 12-inch diameter receiver transmitter antenna (RTA), emitting an 8-degree beam width (X-Band @ 3.2 centimeter wavelength/9,400 MHz). Most C-12 weather RADAR features include—

(1) Range – Range selection is from 5 to 300 nautical mile full scale (240 nautical mile full scale C-12). If FP (flight plan) mode is available, increased ranges of 500 to 1,000 nautical mile may be selected.

Note: Weather RADAR accuracy decreases significantly with the loss of radar energy associated with beam dispersion at increased RADAR ranges (8-degree beam spans 64,000 feet at an 80 nautical mile range). Beam dispersion formula equals the range in nautical mile (x) 100 (x) RADAR beam width.

(2) Rain echo attenuation compensation technique (RCT) – When activated, the system is forced into fixed gain and the RCT circuitry compensates for attenuation of the RADAR signal as it passes through rainfall. The cyan field indicates where further compensation is not possible. Targets detected in the cyan field cannot be calibrated and should be considered dangerous.

(3) Stabilization system (STAB) – The purpose of the stabilization system is to hold the elevation of the antenna beam relative to the earth's surface constant at all azimuths, regardless of aircraft bank and pitch maneuvers. The system uses the aircraft attitude source as a reference. In the OFF position, the weather RADAR platform acts independent of the aircraft attitude source reference.

(4) Ground mapping (GMP) or map mode (MAP) – When activated, the receiver scan sector characteristics are altered to equalize ground-target reflection versus range. The pilot can choose between fixed or variable gain to interpret coastline, mountainous, and water region patterns. Weather targets are not calibrated in the groundmapping mode. Do not use this mode for weather detection.

(5) Target (TGT) – Alert feature selectable in all but the 300 nautical mile range. When selected, target alert monitors beyond the selected range (50 nautical mile beyond) and 7.5 degrees on each side of the aircraft heading. Selecting target alert forces the system to preset gain.

(6) Flight plan (FP) – Navigational feature that forces the RTA to STANDBY. RADAR data is cleared and navigation displays ranging from 5 to 1,000 nautical mile may be selected.

(7) Test (tst) – Displays test pattern to verify system operation.

(8) Gain – Push/pull switch that is used to control the receiver gain. In variable gain, the pilot may adjust receiver gain manually through a rotary control. Fixed gain is recommended for weather (WX) mode operations.

(9) Tilt – Rotary control used to select the tilt angle of the antenna beam with relation to the horizon. Pilot may select tilt angles from –15 degrees to +15 degrees.

(10) Sector (sct/sect) – Selection of the normal 14 looks/minute 120 degrees sector scan, or the faster update 28 looks/minute 60 degrees sector scan.

b. C-12 airborne weather RADAR systems measure precipitation. To aid in echo interpretation, targets are displayed in various colors. Refer to aircraft operator's manual for target color intensity indications. Airborne RADAR is a valuable tool; however, its use is principally as an indicator of storm locations for avoidance purposes while en route. It is not a weather penetration device.

Note: Weather RADAR systems operate on two fundamental concepts. "Echo" or "bounce back" theory applies primarily to energy returned from large objects (pure reflectors) such as landmass. In contrast, most weather precipitation types lack the size required to "bounce back" accurate weather returns. Precipitation "reflectivity" is actually based on an energy exchange or "dipole" process. In this process, RADAR energy "dipoles" or energizes free molecules found in water droplets. Seeking equilibrium, these droplets discharge, emitting energy vectors displayed as weather returns. Because frozen water lacks the free molecules necessary to "dipole," it is not practical to accurately measure the height of a thunderstorm top composed of snow, hail, and cirrus clouds with airborne RADAR.

c. The majority of C-12 aircraft are equipped with a passive lightning sensor system, measuring both visible and high-energy invisible electromagnetic and electrostatic discharges (lightning), indicating areas of turbulent activity. C-12 lightning sensor systems provide bearing and intensity information within a 200 nautical mile range at 360 degrees. Refer to aircraft operator's manual for target rate intensity indications. Providing supplementary information to airborne weather RADAR, the lightning sensor can assist flight crews in the detection and avoidance of hazardous weather systems. It is not a weather penetration device.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
Equipment manufacturer's instruction booklet
Federal Aviation Administration (FAA) Advisory Circular AC 00-24B
Federal Aviation Administration (FAA) Advisory Circular AC 20-68B

TASK 1262

Perform circling approach

CONDITIONS: In a C-12 airplane, under visual meteorological conditions (VMC), or in a simulator.

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

1. Confirm the direction of traffic and adhere to all restrictions and instructions issued by air traffic control (ATC).
2. Descend at a rate that ensures arrival at minimum decision altitude (MDA) at or before, a point from which a normal circle to land maneuver can be accomplished.
3. Avoid descent below the appropriate circling MDA.
4. Commence the circling maneuver at the appropriate designated point using visual references to maintain a flight path that permits a normal landing on the active runway.
5. Maintain the desired altitude –0, plus100 feet.
6. Turn in the appropriate direction when a missed approach is dictated during the circling approach.

DESCRIPTION:

1. Crew actions. The crew will review the approach plate noting circling MDA and any restrictions on the maneuvering direction. The main focus of the pilot on the controls (P*) will be outside toward the airport. The pilot not on the controls (P) should cross-monitor airspeed and altitude. Applicable crew duties and callouts apply for the segment being flown (for example, normal landing, go-around).
2. Procedure.
   a. Circling maneuver. The P* may depart the final approach course when the P reports the runway in sight and is confirmed by the P*. The P* will maneuver the aircraft—
      (1) No lower than MDA.
      (2) In the appropriate direction, normally a left pattern unless wind, ATC or published procedures dictate otherwise. Maneuver the shortest path to the base or downwind as appropriate, considering existing weather conditions. There are no restrictions from passing over the airport or other runways.

Note: Circling maneuvers may be made while VFR (visual flight rule) or other flying is in progress at the airport. Standard left turns or specific instructions must be considered when circling to land.

      (3) To remain in the obstacle-protected circling area based on the approach category being flown.
      (4) To maintain an identifiable part of the airport continuously in sight.
      (5) The angle of bank should not exceed 30 degrees.

   b. Descent below MDA to land. The P* will descend below circling MDA when one of the runway specific cues associated with the landing runway is in view, and the aircraft is in a position to make a normal descent to landing using normal maneuvers. The P* will announce, "**Leaving MDA**."

c. Missed approach.

(1) If visual reference is lost while circling to land, from an instrument approach, the missed approach for that particular procedure must be followed (unless an alternate missed approach procedure is specified by ATC). To become established on the prescribed missed approach course, the P* should initiate a go-around and make an initial climbing turn toward the landing runway and continue the turn until established on the missed approach course. This will assure the aircraft will remain within the circling and missed approach obstruction area.

(2) The P will advise ATC of the missed approach and intentions.

NIGHT CONSIDERATIONS: Circling at night is inherently more risky than during the day. If weather permits consider circling at a higher MDA.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references
14 CFR 91

TASK 1264

Perform global positioning system approach

CONDITIONS: In a C-12 airplane with an instrument approach-approved global positioning system (GPS), under instrument meteorological conditions (IMC), simulated IMC or in a simulator and given access to appropriate Department of Defense (DOD) flight information publication (FLIP) with approach clearance received.

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

1. Execute the approach, according to AR 95-1, aeronautical information manual (AIM), and the equipment operating handbook for the installed GPS.
2. Complete required check(s) prior to final descent inbound.
3. Do not descend passing the final approach waypoint (FAWP) unless the GPS is in approach/active mode.
4. Maintain Vref +20, ±5 knots indicated airspeed (KIAS) final approach descent inbound.
5. Once visual with the landing environment, maintain Vref +10, ±5 KIAS.
6. Maintain prescribed course within full-scale deflection (when in the navigation (NAV) mode), using the course indicator, or ±5 degrees using the radio magnetic indicator (RMI).
7. Comply with descent minimums prescribed for the approach.

Note: Vertical descent profile guidance provided by an approved flight management system (FMS) is required to utilize lateral navigation (LNAV)/vertical navigation (VNAV) nonprecision approach procedures.

Note: If the receiver does not sequence into the approach mode or a RAIM (receiver autonomous integrity monitoring) annunciation appears prior to the FAWP, the pilot should not descend to minimum descent altitude (MDA), but should proceed to the missed approach waypoint (MAWP) via the FAWP, perform a missed approach, and contact ATC as soon as practical. If the RAIM annunciation appears after the FAWP, the missed approach should be executed immediately.

8. Execute correct missed approach procedure immediately upon reaching the MAWP if a landing cannot be accomplished.
9. Complete landing check and adjust to appropriate airspeed, if landing.

DESCRIPTION:

1. Crew actions.

   a. The focus of the pilot on the controls (P*) will be inside the aircraft. Operating in visual meteorological conditions (VMC), the pilot not on the controls (P) will exercise diligence in keeping clear of traffic. When operating in instrument meteorological conditions (IMC), the P* will remain on instruments until the P advises that the aircraft is in VMC. If required, the P* will direct the P to engage the flight director and autopilot functions when doing a coupled approach.

   b. The crew will obtain weather, winds, current altimeter, active runway and remarks from automated terminal information service (ATIS), automated surface observing system/automated weather observing system (ASOS/AWOS), air traffic control (ATC), as appropriate, prior to commencing the approach and brief the P*. The P will assist the P* by

tuning the appropriate radio frequencies, selecting the flight director modes, if necessary, reading the checklist and making the appropriate callouts for a GPS approach and missed approach, if applicable. If the GPS navigation system does not provide automatic "No receiver autonomous integrity monitoring (RAIM)" warnings prior to the final approach fix (FAF), the P will check RAIM prior to initiating the approach.

c. The P* and the P will brief the approach procedure to be flown and clarify any questions on crew actions and intentions with each other. At a minimum, the briefing will consist of procedure identification (ID), inbound course, minimum descent altitude (MDA)/(DA), MAWP, missed approach procedure and minimum safe altitude (MSA). During refresher or qualification training the instructor pilot/instrument flight examiner (IP/IE) may require additional oral briefing for training purposes.

Note: The IP/IE may require that the approach be flown with or without the use of the flight director and/or the autopilot.

2. Procedure.

a. Normal. Refer to the equipment operating guide for the installed GPS device for particular instructions on executing GPS approaches.

(1) Aviators should practice flying instrument approaches manually, flight director only, and coupled with the autopilot.

(2) When executing a full approach the P* may complete the before-landing check and slow to Vref + 20 KIAS to aid in controlling ground speed and rate of descent outbound.

(3) The P* should complete the before-landing checklist, and be established at Vref + 20 KIAS no later than FAWP.

b. Visual. During the final approach descent if the P determines the P* can complete the approach to landing visually the P will report "**Airport in sight at 12 o'clock, take over visually**." The P* will respond, "**Visual**." The P* will continue inbound at MDA until in a position to descend and land. The P* will task the P to "**Set full flaps**" or "**confirm flaps APPROACH**" and when the P* departs the MDA call out, "**Leaving MDA**." The P* will adjust power and pitch as necessary for a normal descent and landing.

Note: The landing check may be completed anytime after the autopilot is disconnected, if performing a coupled approach.

Note: Flaps will not be extended beyond approach until a visual descent can be made to the runway.

c. Visual descent point (VDP). VDPs are being incorporated into nonprecision approach procedures. The VDP is a defined point on the final approach course of a nonprecision, straight-in approach procedure from which a normal descent from the MDA to the runway touchdown point may be commenced, provided visual reference to the runway is established. No special technique is required to fly a procedure with a VDP. If a VDP is published and the crew intends to utilize it then the airplane must arrive at MDA at or prior to reaching the VDP. If a visual descent point is not published, an acceptable method for determining a VDP is as follows:

(1) MAP based on Time. Inbound Time – (HAT x 10 PERCENT).

Example: Inbound time for the approach is 2:20.

HAT is 600 ft. (HAT x 10 PERCENT) = :60 (sixty seconds).
Adjusted inbound time is 1:20 (2:20 – :60).
VDP will be reached when the elapsed time is 1:20.

(2) MAP is based on DME: DME @ Approach End ± (HAT ÷ 300).

Example: DME at runway approach end is 1.6 NM (for this illustration, the DME source is beyond the approach end of the runway, not prior to it).

HAT is 600 ft. (HAT ÷ 300) = 2 NM.
Adjusted DME is 3.6 NM (1.6 +2).
VPD will be reached when the DME readout is 3.6 NM.

Note: If performing a single-engine circling approach, the decision to complete the required landing checks prior to the final descent inbound must be tempered with other factors. These include gross weight, weather conditions, and aircraft performance. If the aircraft will not maintain altitude while circling to land, retract the landing gear and if required, the flaps. However, once this is completed the entire check must be repeated prior to the landing.

TRAINING AND EVALUATION REQUIREMENTS:

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

Note: Units performing GPS approaches will evaluate GPS approach procedures during readiness level (RL) progression and annual proficiency and readiness test (APART) evaluations.

REFERENCES:

Common references
Manufacturers equipment operating handbook

TASK 1265

Perform traffic alert and collision avoidance system operations

CONDITIONS: In a C-12 airplane under visual meteorological conditions (VMC), instrument meteorological conditions (IMC), simulated IMC, or in a simulator.

STANDARDS:

1. Correctly turn on, test, adjust, and operate the traffic alert and collision avoidance system (TCAS) according to the operator's manual.
2. Correctly identify TCAS symbology.
3. Correctly respond to TCAS traffic advisories (TA) and resolution advisories (RA).
4. Use correct TCAS phraseology.

DESCRIPTION:

1. Crew actions.

   a. Prior to takeoff, the crew will check the system for proper operation. The crew will observe precautions specified in the operator's manual.

   b. The pilot not on the controls (P) is normally responsible for operating the TCAS in flight. Crewmembers will adjust the TCAS as required. Crewmembers will monitor the display frequently during flight and note any potentially conflicting traffic.

   c. For normal takeoff operations, the TCAS should be operated in the TA/RA, 5 nautical miles (nm), and ABOVE setting.

   d. For "closed traffic" (traffic pattern) operations, flight crews are authorized to use the TCAS in the TA mode.

   e. For approach and landing operations, the TCAS should be in the TA/RA, 5 nautical miles, and BELOW setting (unless the flight crew has elected to leave it in TA for closed traffic operations).

   f. Recommended TCAS settings are the following: for climb, 10 nautical miles ABOVE; for cruise, 20 nautical miles NORMAL; for descent/arrival and terminal area operations, 10 nautical miles BELOW.

   g. When IMC flight crews will respond to a TCAS resolution advisory (RA). When VMC, flight crews are authorized to disregard an RA if, and only if, they (both crewmembers) have absolutely identified, beyond any doubt, the traffic which caused the RA. If either crewmember has any doubt, then respond to the RA.

   h. Crewmembers are authorized to deviate from an air traffic control (ATC) clearance and will do so in order to correctly respond to a resolution advisory. Crewmembers will utilize the TCAS as the primary means of collision avoidance.

   i. When operating under IFR (instrument flight rules), and responding to an RA, as soon as workload permits, report to ATC with this report according to Advisory Circular (AC) 120-55B.

"[Call sign] TCAS climb/descent."
For example, if the crew of PAT 123 experienced the following resolution advisory (RA) **"CLIMB, CLIMB, CLIMB**," they would report to ATC as soon as possible as follows:
"Approach/Center, PAT 123 TCAS climb."

j. In the event of an engine failure and subsequent engine out operations, the TCAS will be placed in the TA mode of operation, according to the operator's manual.

k. During approach operations, after the before-landing check has been completed, if the crew receives a "CLIMB, CLIMB, CLIMB" RA, they must immediately accomplish the missed approach-go around procedure in order to attain the required rate of climb.

2. Definitions. According to AC 120-55B and AC 20-131B.
3. TCAS event reporting. Paragraph 1.h. above and AC 120-55B.
4. TCAS event phraseology. According to AC 120-55B.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

FAA Advisory Circular 20-131A
FAA Advisory Circular 120-55B
14 CFR 91.221

TASK 1300

Perform emergency procedures

CONDITIONS: In a C-12 airplane, in a simulator, or academically, given a specific emergency.

STANDARDS: Appropriate common standards; additionally, without error, perform, simulate the performance of, or describe the appropriate emergency procedure, according to the aircraft operator's manual and flight information handbook (FIH).

DESCRIPTION: The pilot on the controls (P*) and the pilot not on the controls (P) will be able to perform all underlined immediate action emergency procedures described in the operator's manual. Aviators will state the actions required in performing those emergency procedures that cannot be practiced or simulated in the aircraft or simulator. Aviators will not be downgraded for minor word errors if it does not change the intent or context of the emergency action step. The discussion will include procedures outlined in the aircraft operator's manual and the FIH, and will include the applicable crew coordination actions.

CREW ACTIONS: The aviator will state the crew callouts and crew duties, according to chapter 6, for the crew station authorized to perform.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Flight information handbook

TASK 1302

Perform procedures for two-way radio failure

CONDITIONS: In a C-12 airplane, or simulator, or a classroom environment.

STANDARDS: Implement correct procedures for two-way radio failure.

DESCRIPTION:

1. Crew actions. The pilot not on the controls (P) is primarily responsible for correcting the loss of two-way radio communication, while the pilot on the controls (P*) focuses on flying the aircraft.

2. Procedure.

a. The P will advise the P* of the communications problem, and attempt to identify and correct the malfunction.

b. If two-way radio failure occurs and communication cannot be reestablished, the crew will perform the following actions:

(1) Visual meteorological conditions. If two-way radio failure occurs while operating under visual flight rules (VFR) or if VMC conditions are encountered during an instrument flight rules (IFR) flight after the failure, continue the flight under VFR, and land as soon as practicable.

(2) Instrument meteorological conditions (IMC).

(a) If two-way radio failure occurs while operating IMC in the National Airspace System (NAS), adjust the transponder and continue the flight according to instructions in the flight information handbook (FIH).

(b) If two-way radio failure occurs while operating outside continental United States (OCONUS), comply with International Civil Aviation Organization (ICAO) rules according to instructions in the FIH or applicable host country regulations.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Host nations' procedures
FIH
Unit SOP

TASK 1303

Perform approaches to stall

CONDITIONS: In a C-12, visual meteorological conditions (VMC) with an instructor pilot (IP) or in a simulator.

STANDARDS: Appropriate common standards plus the following additions:

> **WARNING**
>
> **Due to the increased risk factor while performing stall recognition training, the entry altitude should be no lower than a minimum of 4,000 feet above ground level (AGL).**

1. Correctly recognize the approach to a stall.
2. Correctly perform recovery procedures.
3. Recover with a minimum loss of altitude.

DESCRIPTION:

1. Purpose. The practice of stall recovery and the development of awareness of imminent stalls are of primary importance in training. The objectives in performing imminent stalls are to familiarize the pilot with the conditions that produce stalls, to assist in recognizing an approaching stall, and to develop the habit of taking prompt corrective action. Due to the high "T" tail design in C-12 aircraft, waiting for a pre-stall buffet means the crew has ignored their primary warning device (horn) and are approaching a very critical situation.

2. Crew actions. The instructor pilot (IP) will brief stall/spin characteristics and correct recovery procedures. The pilot on the controls (P*) will acknowledge the briefing. The P*'s main focus will be outside the aircraft. Perform the crew duties and callouts per Task 1177.

> **CAUTION**
>
> Approaching the stall, use rudder instead of aileron as the primary means of keeping the wings level. Be aware of yaw as the aircraft decelerates. If a wing begins to fall as you approach stall, initiate a recovery by using opposite rudder and lowering the nose. Failure to do so could result in the airplane entering a spin.

Note: As an aid to recovery practice, do not use nose up trim below 100 knots indicated airspeed (KIAS).

3. Procedures**.** An imminent stall is one in which the airplane is approaching a stall but is not allowed to completely stall. The approach to stall task is primarily for practice in retaining (or regaining) full control of the airplane immediately upon recognizing that a full stall is likely to occur if timely corrective action is not taken. Perform the recovery at the first indication of the stall by reducing the angle of attack to a level flight attitude and add power, if available.

a. Clean configuration.

(1) Visually clear the area while making a clearing turn.

(2) Turn yaw damper off. Set propellers to HIGH RPM (revolutions per minute).

(3) Set torque to approximately 10 to 20 percent. Maintain heading and altitude.

(4) At the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet), simultaneously release the elevator backpressure and perform go-around procedure.

(5) As the aircraft accelerates, apply backpressure on the elevator to stop the descent, trim as necessary, and resume original airspeed and altitude.

b. Approach flap configuration.

(1) Visually clear the area while making a clearing turn.

(2) Turn yaw damper off. Set propellers to HIGH RPM.

(3) Complete the before-landing checklist.

(4) Set torque to approximately 10 to 20 percent. Maintain heading and altitude. Observe up trim limits.

(5) At the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet), simultaneously release the elevator backpressure and perform a go-around.

(6) As the aircraft accelerates, apply back on the elevator to stop the descent, trim as necessary.

(7) Climb to your initial altitude and complete the go-around checklist.

c. Full flap configuration.

(1) Visually clear the area while making a clearing turn.

(2) Turn yaw damper off. Set propellers to HIGH RPM.

(3) Complete the before-landing checklist. Set flaps to 100 percent when airspeed permits.

(4) Set torque to approximately 10 to 20 percent. Maintain heading and altitude. Observe up trim limits.

(5) At the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet), simultaneously release the elevator back pressure and perform a go-around.

(6) As the aircraft accelerates, apply backpressure on the elevator to stop the descent, trim as necessary.

(7) Climb to initial altitude and complete the go-around checklist.

TRAINING AND EVALUATION REQUIREMENTS:

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

Note: Recovery training for a full-stall condition will only be performed in a simulator.

REFERENCES:

Common references
AC 61-67B
FAA-S-8081-5C

TASK 1310

Perform emergency procedures for engine failure during cruise flight

> **WARNING**
>
> **Simulated engine failures will not be initiated below Vsse. Vsse provides a margin against the occurrence of an unintentional stall when making engine cuts.**

Note: Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the pilot on the controls (P*) must verbally call out the underlined items in the procedure while dealing with an emergency. The underlined items are DO items followed by verification with the checklist, when time and altitude permits.

CONDITIONS: In a C-12 airplane, with an instructor pilot/instrument flight examiner (IP/IE), visual meteorological conditions (VMC), simulated instrument meteorological conditions (IMC) or in a simulator.

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

1. Maintain positive airplane control at all times.
2. Maintain 3- to 5-degree bank angle into operating engine (ball one-half off-center).
3. Set powerplant controls, reduce drag as necessary, correctly identify and verify the inoperative engine after the failure or simulated failure.
4. Maintained indicated airspeed ±10 KIAS no lower than takeoff safety speed (V2)/best single-engine rate of climb (Vyse).
5. Follow the checklist and verify the procedures for securing the inoperative engine.

DESCRIPTION:

1. Crew actions.

   a. The main focus of the P* will be flying the aircraft. The P* will direct the P to assist in identifying which engine failed, and whether or not the propeller feathered. The P* may direct the P to feather the failed engine's propeller after mutual verification of the correct propeller lever.

   b. The IP will initiate the maneuver by either placing a condition lever to FUEL CUTOFF (AR 95-1 restrictions apply) or retarding a power lever to IDLE. The IP will monitor the P* to ensure engine limitations are not exceeded, a safe airspeed is maintained, and the correct engine propeller is feathered. The IP will set zero thrust at the appropriate time, if applicable. The IP will complete the required checks or procedures pertaining to the P's crew station. The IP will also read the checklist and perform all designated P actions and crew callouts per chapter 6, and those actions requested by the P*.

Note: Zero thrust for most C-12 aircraft is propeller at the detent and torque 8 to 12 percent (120 pounds). Use C-12 series specific manufacturer zero thrust settings should a difference occur from those listed above.

2. Procedure. The P*, assisted by the P, will perform the following actions:

   a. The IP/IE will—

      (1) Initiate simulated engine failure utilizing the power lever or perform engine shutdown with the condition lever (above 4,000 feet above ground level [AGL] for complete engine stoppage), as appropriate.

      (2) After the P* confirms that the propeller feathered, the IP will move the propeller lever out of the FEATHER position and place it at the "detent." The IP will then set zero thrust, simulating a feathered propeller for a simulated engine failure.

   b. The P* will—

      (1) Disconnect the autopilot with yoke autopilot (AP) disconnect (disc) button while increasing power, as required, to keep airspeed from decreasing below V_2/Vyse.

      (2) Adjust power at a controllable rate that allows aileron, rudder, and pitch corrections to maintain coordinated flight.

      (3) Verify with the P that the engine failed, state: "**Confirm Engine number one (or two) has failed**."

      (4) Have the P manually feather the propeller after mutual identification and verification by directing the P to "**Identify the number one** (or two as appropriate) **prop lever**." After visually confirming the correct prop lever has been identified, state: "**I agree, feather the prop** or **Negative, re-identify the number __ prop**."

      (5) If the gear and flaps are extended, evaluate whether either needs to be retracted.

      (6) Call for the engine failure checklist for verification and cleanup.

   c. The P will:

      (1) Confirm for the P* that the engine failed and state: "**I confirm number__ has failed** or **Negative the number__** (opposite) **has failed**." Additionally state: "**I confirm number one/two propeller has feathered**."

      (2) Manually feather the failed engine propeller when the P* directs and state: "**Prop feathered**."

      (3) Retract the gear, if directed by the P*.

      (4) Retract the flaps, if directed by the P*.

      (5) Read the checklist and perform designated P items.

      (6) Notify air traffic control (ATC) of the emergency with intentions.

   d. Use power (as required) to cruise at desired airspeed and altitude, if gross weight permits. Use one-engine-inoperative maximum cruise power charts in the operator's manual to obtain this data. If altitude cannot be maintained without going below V_2/Vyse after setting maximum cruise power, establish a controlled descent at V_2/Vyse to an altitude where level flight can be maintained (single-engine absolute ceiling). Perform fuel crossfeed/ management procedures, as required.

   e. All complete engine shutdowns and simulated engine failure flight training will be conducted according to AR 95-1.

3. Basic single-engine procedures.

   a. Know and follow the engine failure procedures in chapter 9 of the operator's manual. However, the basic fundamentals of all procedures are as follows:

      (1) Maintain aircraft control and airspeed at all times.

(2) Usually, apply maximum controllable torque to the operating engine. However, if the engine failure occurs at a speed below minimum control speed with critical engine inoperative airborne (Vmca), or during cruise or in a steep turn, you may elect to use only enough power to maintain a safe speed and altitude and activate the autofeather system. If the failure occurs on final approach, use power (as required) to maintain the airspeed profile for the distance remaining to touchdown.

(3) Reduce drag to a minimum.

(4) Secure the failed engine and related subsystems.

b. The first three steps will be done promptly and from memory. The checklist should then be consulted to be sure that the inoperative engine is secured properly and that the appropriate switches are placed in the correct position. The airplane should be banked about 5 degrees into the live engine, with the trim ball out of center toward the live engine, to achieve rated performance.

Note: Positively identify the dead engine before securing it. Use crew coordination and callouts, according to chapter 6, for mutual verification that the correct power quadrant levers associated with the failed engine are the ones being moved to secure the engine.

Note: If crosswinds are present at the landing airport, IPs should consider failing the downwind engine. This will aid in maximum rudder control on landing.

NIGHT CONSIDERATIONS: The same procedures used for instrument flight should be used at night. Increase cockpit lights or call for P action, as required. Ensure positive identification before adjusting switches, condition levers and controls, which are difficult to see at night.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1315

Perform single-engine landing

CONDITIONS: In a C-12 airplane, with an instructor pilot (IP), under visual meteorological conditions (VMC), or in a simulator.

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

1. Maintain a minimum of takeoff safety speed/best single-engine, rate-of climb speed (V_2/Vyse) or above until landing is assured.
2. Attain landing approach speed (plus half wind gust speed) ±5 knots indicated airspeed (KIAS).
3. Maintain at or above the approach angle on the flight management system (FMS)/instrument landing system (ILS) glide path, visual approach slope indicator (VASI) or precision approach path indicator (PAPI) when available.
4. Cross the runway threshold at Vref (indicated reference speed) plus half wind gust speed ±5 KIAS.
5. Execute touchdown within the first 1/3 of the runway available for landing with the desired runway track between the main gear during landing and rollout.
6. Maintain positive directional control and crosswind correction during the after-landing roll.
7. Use beta, reverse, ground fine, and brakes (as appropriate) to bring the aircraft to a safe stop.

DESCRIPTION:

1. Crew actions. The main focus of the pilot on the controls (P*) will be outside the aircraft. The IP should complete the required checks or procedures pertaining to crew duties for the pilot not on the controls (P). The IP will also read the checklist and perform all designated P actions (such as, monitoring flight and engine instruments) and those actions requested by the P*. (Related tasks are 1320 and 1335.)
2. Procedure. The P*, assisted by the P, will perform the following actions—

   a. Complete the single-engine descent-arrival check or call for P action before entering the traffic pattern or starting an instrument approach. Fly a normal traffic pattern or a normal instrument approach and perform the before-landing check at the same point as with both engines operating. Verify all checklist items as the P calls them out. The P will announce, "**Check complete**" when the last item is verified. Plan for a normal approach, allowing for sufficient time on final so minor alignment, speed, and altitude corrections can be accomplished without excessive low-altitude maneuvering. Turn final and complete the turn at or above 500 feet above ground level (AGL). Maintain a minimum of V_2/Vyse until landing is assured. Landing assured can be defined as the point on final where the decision to extend flaps beyond APPROACH is based on the ability to remain VMC until touchdown and the need to start reducing airspeed gradually so as to arrive at Vref (indicated reference airspeed) plus half the wind gust speed at approximately 50 feet above the landing area.

   b. Reduce airspeed to be at Vref plus half the wind gust speed at approximately 50 feet above the landing area. Avoid abrupt changes in power and anticipate a yaw and roll as power is reduced. Reduce power at a controllable rate that will allow aileron and rudder to be applied to maintain centerline during round out. Make a normal touchdown. After touchdown, use brakes/ground fine and propeller reversing (if applicable) as necessary to

slow the aircraft. Propeller reversing must be limited to a rate consistent with directional control. Perform the after-landing procedure when clear of the runway.

c. Throughout the maneuver, the P should assist the P* by clearing the area and perform all actions requested by the P*. The P will complete all designated P duties and read the checklist when the P* calls for it. The P will inform the P* when any designated or required checks are completed.

Note: The feathered propeller or simulated feathered propeller will produce less drag than a windmilling propeller. It will cause the aircraft to float during the round out and roll out farther than during a normal landing. The tendency to float during round out can be minimized by adjusting the height from which the round out is started.

Note: Do not intentionally cross the threshold with excessive airspeed. Vref is the same for a single engine as it is for two engines. Excessive airspeed increases the sensitivity of control inputs and may result in over controlling. Additionally, the inertia will result in increased "floating" and longer landing distances.

Note: If a crosswind is present at the landing airport, the IP should consider failing the downwind engine. This will aid in maximum rudder control on landing.

NIGHT CONSIDERATIONS: Normal approach and landing techniques are used at night. When visibility is lowered by haze/smoke, the range of the landing light(s) may be insufficient to see obstructions in time to avoid them. An ILS glide slope or VASI, when available, is the most accurate and reliable means of approach angle indication and will be used to maintain a safe glide path. If an ILS glide slope or VASI is not available, the obstruction lights and the threshold lights should be used to establish a sight picture during the approach. The apparent distance between runway lights can also be used as an aid in establishing the flare-out point.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1320

Perform single-engine go-around

CONDITIONS: In a C-12 airplane, in visual meteorological conditions (VMC) with an instructor pilot (IP), or in a simulator.

STANDARDS:

1. Perform single-engine go-around per the aircraft operator's manual.
2. Apply smooth and coordinated inputs.
3. Maintain a 3- to 5-degree bank angle into operating engine (ball no more than one-half off center).
4. Maintain takeoff safety speed/best single-engine, rate-of climb speed (V_2/Vyse) until safe climb out is established (clear of obstacles).

WARNING

A single engine go-around should not be attempted once the flaps are selected beyond APPROACH and the airplane is below 200 feet above ground level (AGL). This does not mean that flaps are limited to approach until short final. It does mean the pilot on the controls (P*) has committed the aircraft to a landing.

DESCRIPTION:

1. Crew actions.
   a. The main focus of the P* will be flying the aircraft.
   b. The pilot not on the controls (P) should assist the P* by completing all designated P checks, duties, and callouts, and read the checklist when the P* calls for it.
2. Procedure.
   a. Discussion. An actual single engine go-around is not a high probability maneuver but can be potentially high risk. Several events have occurred that keep the probability low. The airplane is probably already single engine, which means the crew has declared an emergency. Air traffic control (ATC) will give the aircraft priority, and crash rescue is standing by. The crew has evaluated (based on runway length, weather, and so forth) and selected the airport where they want to land. It is important to fly a normal stabilized approach either visual flight rules (VFR) or instrument flight rules (IFR) to avoid a pilot-induced reason for a single-engine go-around.
      (1) Do not initiate the go-around by increasing the pitch first without applying power. If the pitch is raised without power when the gear and flaps are extended, airspeed will start decreasing rapidly. When power is applied with the nose up and in the landing configuration, the control forces will be higher to keep aircraft in trim and the descent will take longer to arrest.

(2) During single-engine climb, maintain up to a 3- to 5-degree bank and up to one-half ball into the live engine. This is in trim for a single-engine configuration. Failure to do so may degrade controllability and performance to the point where you may actually start descending or lose directional control.

(3) Execute a single-engine go-around when—

(a) At the decision height (DH) or missed approach point (MAP) if runway is not in sight.

(b) When not in a position to make a safe landing.

(c) When visual reference with the airport is lost during a circling approach.

b. Maneuver.

(1) The P* will—

(a) Initiate the maneuver by advancing the power lever toward maximum controllable power and direct the P to "**Go-around, set power**." The P will maintain maximum controllable power as set by the P* and respond, "**Power set**."

(b) Simultaneously increase pitch attitude to approximately 7 degrees to stop the descent. The go-around mode on the flight director may be used as an aid.

(c) Direct the P to bring "**Flaps APPROACH**."

(d) At the "positive rate" call out: "**Gear UP**."

(e) At 105 knots indicated airspeed (KIAS) (minimum), direct the P to bring "**Flaps UP**."

(f) Establish a climb at V_2/Vyse.

(g) Call for the single-engine go-around checklist when time, altitude, and workload permits.

(2) The P will—

(a) Set maintain maximum controllable power as set by the P*, when directed, and respond, "**Power set**."

(b) State "**Flaps APPROACH**" when directed by the P* and the flaps switch has been moved to that position. Verify with flap position.

(c) State "**Positive rate**" after observing two positive climb indications.

(d) Move the gear handle switch to the "UP" position and turn light switches to the "OFF" position, when directed, and respond, "**Gear UP**."

(e) State "**Flaps UP**" when directed by the P* and the flaps switch has been moved to that position. Verify with flap position.

(f) Read go-around checklist, when P* directs.

(g) Advise ATC of the go-around/missed approach and intentions, if applicable.

NIGHT CONSIDERATIONS: For traffic avoidance and aircraft identification, the recognition light(s) should be left on until at least traffic pattern altitude. Monitor heading and altitude instruments closely and be prepared to convert to instrument flight, if the visual horizon is lost or if affected by vertigo.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references.

TASK 1325

Perform emergency procedures for engine failure during takeoff.

Note: Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the pilot on the controls (P*) must verbally call out the underlined items in the procedure while dealing with an emergency.

CONDITIONS: In a C-12 under visual meteorological conditions (VMC) or simulated instrument meteorological conditions (IMC), with an instructor pilot (IP) or in a simulator.

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

1. Maintain positive aircraft control.
2. Confirm the failed engine's propeller has feathered.
3. Maintain 3- to 5-degree bank angle into operating engine (ball one-half off center).
4. Obtain and maintain the appropriate airspeed for the segment being flown (takeoff safety speed [V_2]/Vyse, +5, -0 knots indicated airspeed [KIAS]).
5. Complete and verify the procedure with the checklist.

DESCRIPTION:

1. Crew actions.

   a. The crew will discuss takeoff abort criteria and crew responsibilities during the departure brief.

   b. The crew will review the takeoff landing data (TOLD) card and determine the course of action if an engine fails at or after liftoff.

   c. The P*'s main focus will be to fly the aircraft.

   d. The IP will initiate the engine failure above Vsse. The IP should not simulate an inoperative autofeather until a safe altitude is reached. The IP will also read the checklist and perform all designated P actions and those crew callouts and duties, according to chapter 6, requested by the P*.

2. Procedure. The P*, assisted by the P, will perform a normal takeoff using standard callouts until the single engine is initiated, then the crew will perform the actions described below:

WARNING

Simulating an engine failure by retarding a power lever to idle during the takeoff run below velocity minimum control ground (Vmcg) will result in loss of directional control. (See Task 1352.)

Note: During the departure briefing, the pilot in command (PC) will review the TOLD card data and discuss a rejected takeoff plan.

Note: Takeoff decision speed/rotation speed (V1/Vr) engine cuts will not be performed in C-12 aircraft and simulated engine failures will not be initiated below Vsse.

a. Discussion. The course of action for an engine failure on takeoff depends on where the failure occurs during the takeoff flight path and the airspeed at that time. Additionally,

temperature, pressure altitude, and weight will affect the aircraft's ability to climb and accelerate. The most critical point to lose an engine is at V_1/Vr. This is the decision point for the crew. Does the crew abort the takeoff or continue? One of the criteria to continue the takeoff has been met by the reaching V_1/Vr. However, that by itself does NOT guarantee the aircraft will safely fly when rotated. TOLD card planning will tell the crew the capabilities based on departure weight, temperature and pressure altitude.

Note: If an engine fails at or immediately after liftoff, climb to 50 feet may be critical. Positive pilot actions will be required to maintain aircraft control. The distance required to attain 50 feet above ground level (AGL) will be significant.

Note: Takeoff power is already applied and the P is responsible for maintaining the power at the appropriate setting.

b. Engine failure immediately after liftoff–flight continued.

(1) The P* will—

(a) Maintain directional control with the rudder and simultaneously establish up to 5-degree bank angle into the operating engine (ball one-half off center) while adjusting pitch to obtain V_2/Vyse. Make pitch adjustments smoothly to avoid a torque roll.

(b) At the "positive rate," call for "**Gear UP**."

(c) Climb at V_2/Vyse for the aircraft configuration.

(d) At 105 KIAS (minimum), call for "**Flaps UP**."

(e) Confirm, "**The propeller feathered**" with the P. All C-12s have an autofeather installed and should feather the propeller. If an actual engine fails, the autofeather will feather the propeller in less than 10 seconds. Visual identification is easy, if one propeller is stationary. If the aircraft is being flown with an inoperative autofeather, direct the P to manually feather the propeller after identification and verification, "**Identify the engine number one (or number two) prop lever**." The P will place the index finger on the appropriate prop lever. The P* visually confirms the correct prop lever has been identified and states, "**I agree, feather the prop** or **Negative, re-identify the number__ prop**."

(f) Identify the failed engine and verify with the P, "**Confirm engine number one (or number two) failed**."

(g) Direct "**Set TCAS to TA**" (if installed).

(h) Call for the "**Engine failure during takeoff checklist**" when time, altitude, and workload permits.

Note: Accelerating to or above 105 KIAS before the flaps are completely retracted will provide an additional margin of speed over minimum single engine control airspeed/power-off stalling speed (Vmca/Vs). If an engine fails during this critical phase, the extra speed will assist in preventing loss of control.

(i) Land at the nearest suitable airport.

(2) The P will—

(a) Set and maintain takeoff power from the beginning of the takeoff roll.

(b) Call "**Positive rate**" when two climb indications are observed.

(c) Raise the gear when directed by the P*, state "**Gear UP**" when the gear handle is moved to the up position.

(d) Raise the flaps when directed by the P*, state "**Flaps UP**" when the flap handle is moved to the up position.

(e) Confirm for the P* "**I confirm engine number one (or number two) has failed**" and "**I confirm engine number one (or number two) propeller has (has not) feathered**." If an actual engine fails, the autofeather will feather the propeller in less than 10 seconds. Visual identification is easy, if one propeller is stationary.

(f) Manually feather the failed engine's propeller when the P* confirms the correct propeller lever has been identified and state, "**Prop is feathered**."

(g) Read the checklist when asked by the P*.

(h) Inform air traffic control (ATC) of the emergency and intentions.

c. Engine failure after V_2/Vyse. Any additional airspeed above V_2/Vyse at the time of the engine failure will result in increased control effectiveness and fewer controllability problems. Additionally, the extra airspeed inertia will allow the aircraft to continue to climb at a positive rate while decelerating. The flying procedure is essentially the same. Takeoff power is already applied, the gear is retracted and airspeed is at or beyond V_2/Vyse. The critical crew actions remaining are to verify the propeller feathered and maintain directional control with the rudder and simultaneously establish up to 5-degree bank angle into the operating engine (ball one-half off center). Complete the remaining applicable procedures.

NIGHT CONSIDERATIONS: The crew should monitor heading and altitude instruments closely and be prepared to convert to instrument flight if the visual horizon is lost or the crew is bothered by vertigo.

TRAINING AND EVALUATION REQUIREMENTS:

1. At V_1 or after liftoff below Vsse–flight continued, task to be trained and evaluated in a flight simulator.

2. Engine failure airborne after obtaining Vsse and above V_1/Vr, task to be trained and evaluated in a flight simulator or aircraft.

Note: For training in the airplane the V_2/Vyse climb gradient must be at least two percent.

REFERENCES:

Common references.

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TASK 1335

Perform emergency procedures for engine failure during final approach.

> **WARNING**
>
> **Simulated engine failures will not be initiated below Vsse. Inadvertent stall or loss of directional control could occur.**

Note: Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the pilot on the controls (P*) must verbally call out the underlined items in the procedure while dealing with an emergency.

CONDITIONS: In a C-12 airplane, with an instructor pilot (IP), under visual meteorological conditions (VMC), or simulated instrument meteorological conditions (IMC), or simulator.

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

1. Maintain positive aircraft control.
2. Apply sufficient power to maintain the appropriate airspeed for the distance remaining.
3. Maintain approach angle.
4. Complete and verify the procedure with the checklist, time permitting.

DESCRIPTION:

1. Crew actions.

   a. The P*'s main focus initially will be to maintain heading, runway/course alignment and the approach angle while applying power.

   b. The IP will initiate the engine failure above Vsse. The IP will complete the required checks or procedures pertaining to the P's crew station. On a long final, the IP will set zero thrust if the aircraft power settings are such that the actual autofeather system would allow the prop to feather.

2. Procedure. The P*, assisted by the P, will perform the following actions:

   a. Long final. Long final is defined, as where the remaining distance from the runway threshold is of sufficient length to permit a complete engine failure procedure (for example, feathering the propeller). Continue the approach to landing, maintaining aircraft control and computed approach speed. The distance from the runway to the point where the engine fails will determine the extent of the corrective procedures to be applied. When an engine fails on final, immediately apply sufficient power to prevent the airspeed from decreasing; simultaneously coordinate pitch, rudder and aileron to maintain runway alignment and approach angle. If the autofeather did not feather the propeller, direct the P to identify the correct propeller. When the P* confirms the correct propeller has been identified, command the P to feather it using callouts according to chapter 6. Once the drag is removed, the aircraft will start accelerating. It will be necessary to reduce power slightly to maintain approach airspeed. If time permits perform procedures for engine failure during flight. Complete the landing, crossing the threshold in normal descent and airspeed profile. If distance remaining (short final) is minimal, perform procedures for engine failure during final approach.

(1) The P* will—

(a) Apply sufficient power to prevent the airspeed from decreasing; simultaneously coordinate pitch, rudder and aileron to maintain runway alignment/course alignment and approach angle.

(b) Verify with the P that the engine failed, "**Confirm engine number one (or two) has failed**."

(c) Confirm, "**The propeller feathered**" with the P. Have the P manually feather the propeller after mutual identification and verification that the prop did not feather by directing the P to "**Identify the engine number one or two** (appropriate) **prop lever.**" After visual confirmation, direct "**I agree, feather the prop**" or "**Negative, re-identify the number__ prop**" then command "**Feather the prop**."

(d) Continue with a normal descent.

(2) The P will—

(a) Verify for the P*, "**I confirm number one (or two) has failed**" and "**I confirm engine number one (or two) propeller has (has not) feathered**."

(b) Manually feather the failed engine's propeller, when the P* directs and state, "**Prop feathered**."

(c) Advise air traffic control (ATC) of the emergency.

b. Short final. Short final is defined as where the remaining distance from the runway threshold is too short to permit a complete engine failure procedure (for example, feathering the propeller). Maintaining control of the aircraft is the prime consideration when an engine failure occurs in this area. Power should be applied immediately and smoothly at a controllable rate to prevent the airspeed from decreasing. If power is applied too rapidly, it may result in controllability problems, particularly if the flaps have been extended to full down and/or the propeller is windmilling. As power is applied, the aircraft will have a tendency to pitch up, roll and yaw. The P* must coordinate pitch, rudder and aileron to maintain the approach angle, heading and runway alignment during the power application. Recheck the gear and complete the landing. The objective in both situations is maintaining the aircraft in a normal approach descent while managing the engine failure.

Note: Accelerating to or above 105 KIAS before the flaps are completely retracted will provide an additional margin of speed over minimum single engine control airspeed/power of stalling airspeed (V_{mca}/Vs). If an engine fails during this critical phase, the extra speed will assist in preventing loss of control.

Note: When conducting this task, the IP should exercise extreme alertness to preclude the P* from inadvertently exceeding maximum allowable/controllable power.

Note: Maintain a minimum of V_2/Vyse until landing is assured. Landing assured can be defined as the point on final where the decision to extend flaps beyond approach is based on the ability to remain VMC until touchdown and the need to start reducing airspeed gradually so as to arrive at Vref plus half the wind gust speed at approximately 50 feet above the landing area.

Note: If crosswinds are present at the landing airport, IPs should consider failing the downwind engine. This will aid in maximum rudder control on landing.

NIGHT CONSIDERATIONS: Use normal approach and landing technique. Do not allow the aircraft to descend below a normal glide path. The visual approach slope indicator (VASI), when available, is the most accurate and reliable means of approach angle indications and will be used to maintain a safe glide path. If VASI is not available, the obstruction lights and the threshold lights should be used to establish a sight picture during the approach. The apparent distance between runway lights can also be used as an aid in establishing the flare-out point.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1340

Perform emergency landing gear extension.

CONDITIONS: In a C-12 airplane, with an instructor pilot (IP), visual meteorological conditions (VMC) (day only), simulated instrument meteorological conditions (IMC) or in a simulator.

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

1. Extend the landing gear according to the aircraft operator's manual.
2. Complete and verify the procedure with the checklist.

DESCRIPTION:

1. Crew actions.

   a. The pilot on the controls' (P*'s) main focus will be inside the aircraft since the extension handle is located on the P*'s side.

   b. The pilot not on the controls (P) will assist by keeping the area cleared, reading the checklist, and performing actions requested by the P*.

   Note: When extending the gear manually, it is recommended that the pilot in the right seat fly the aircraft or engage the autopilot.

2. Procedure. Normally the pilot in the left seat, assisted by the pilot in the right seat, will perform the following actions—

   a. Determine that normal gear extension has not occurred. Have the P confirm this observation. If applicable, recycle the landing gear using the procedures prescribed in the aircraft operator's manual. If recycling does not cause a normal gear extension, perform emergency gear extension according to the aircraft operator's manual.

   b. The P, when directed, will assist the P* by reading the checklist. The crewmember occupying the right seat will function as the P* while the crewmember in the left seat pumps the gear down.

   Note: This task is mandatory during qualification/refresher training. At other times it will be performed only when deemed appropriate by an IP/standardization instructor pilot (SP).

NIGHT CONSIDERATIONS: None.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1352

Perform rejected takeoff

CONDITIONS: In a C-12 airplane, with an instructor pilot (IP) or in a simulator.

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

1. Review malfunctions that would be a cause for a rejected takeoff prior to takeoff decision speed/rotation speed (V_1/Vr).
2. Determine if sufficient runway remains for a rejected takeoff.
3. Safely stop the airplane on the remaining runway.
4. Maintain centerline between the main landing gear.

DESCRIPTION:

1. Crew actions. The pilot on the controls' (P*'s) main focus will be outside the aircraft. The IP will perform normal pilot not on the controls (P) duties and callouts.
2. Procedure.

   a. Discussion. The decision to reject or continue the takeoff primarily depends on the runway remaining and the severity of the malfunction. If a condition arises that would make the takeoff unsafe before reaching V_1/Vr, reject the takeoff. Several common reasons to reject a takeoff are:

      (1) Engine malfunction.
      (2) Fire light illuminates.
      (3) Flat tire.
      (4) Oil pressure light (if equipped).
      (5) Chip detector.
      (6) Smoke/smell in the cockpit.

   There may be other reasons that units may deem critical enough for a rejected takeoff. These reasons should be addressed as a standing operating procedure (SOP) item. The pilot in command (PC) may state "**standard abort criteria"** in the departure briefing if all items are included in the SOP.

> **WARNING**
>
> **Initiating a rejected takeoff by reducing a power lever or placing a condition lever to fuel cutoff is prohibited. Velocity minimum control ground (Vmcg) limits may be exceeded causing loss of control.**

b. Maneuver.

(1) The IP will—

(a) Ensure accelerate-stop distance is available.

(b) Perform normal takeoff P duties and callouts.

(c) Announce, "**Abort, abort**."

(2) The P* will—

(a) Bring both power levers to idle.

(b) Safely stop the airplane using braking and beta/ground fine (as required) and reverse as required.

c. IPs should discuss actions for a rejected takeoff if insufficient runway remains.

d. If a malfunction occurs at V_1/Vr the decision to continue the takeoff depends on several factors that should be discussed in the departure briefing.

(1) The performance data on the takeoff landing data (TOLD) card should support continuing the takeoff (for example, you have a positive climb at liftoff and accelerate-go distance is acceptable).

(2) If a fire occurs, the time it takes to continue the takeoff and return for landing could be more hazardous than staying on the ground.

NIGHT CONSIDERATIONS: Aviators should be aware of runway remaining and runway end lights.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 1800

Perform after-landing tasks.

CONDITIONS: In a C-12 airplane or simulator, with access to the checklist.

STANDARD: Without error, perform after-landing tasks according to the checklist.

DESCRIPTION:

1. Crew actions. The pilot on the controls (P*) will focus attention primarily outside the aircraft, while it is moving. After exiting the active runway, each crewmember will complete the required checks or procedures pertaining to his crew duties according to the checklist and the preflight briefing.
2. Procedure. The P*, assisted by the pilot not on the controls (P), will perform the following procedures—
    a. Accomplish after-landing actions, as required, to include engine shutdown and before-leaving aircraft checks. Verify all checks with the checklist.
    b. The P should assist the P* by reading the checklist and assisting in clearing the area. The P should complete all designated P checks and assist the P*, as required.

NIGHT CONSIDERATIONS: Due to the restricted visibility at night, taxi speeds should be reduced to allow for a greater margin of safety. Outside guidance should be requested whenever taxiing in areas where obstacles are difficult to see. Avoid shining the taxi/landing light into other aircraft cockpits or ground guide's eyes.

Note: The pilot in command (PC) will ensure that the aircraft is secured and that the flight plan is closed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

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 C-12 maintenance test pilots (MPs) in accordance with AR 95-1 and chapter 2 of this manual. This chapter contains tasks and procedures to be used by contractor maintenance test pilots according to AR 95-20, volume 1 (DLAM 8210) section 3.4 (publications). For those aircraft that do not have an Army operator's manual or maintenance test flight (MTF) manual, units are authorized to use the manufacturer's pilot operating handbook (POH) or operator's manuals provided by other services (Air Force, Navy).

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 MP tasks listed in chapter 2 (table 2-5), on page 2-11. The task title identifies a clearly defined and measurable activity. Titles may be the same in several ATMs, but tasks may be written differently for the specific airframe.

b. **Conditions.** The conditions specify the common wartime or training/evaluation conditions under which the MP tasks will be performed. The tasks listed that are common to C-12 are listed as such. Where the task condition is applicable to one group the condition will add the series designator to the C-12. Maintenance test flights will normally be conducted under day, visual meteorological conditions (VMC), in accordance with TM 1-1500-328-23.

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. In adition to the common standards in chapter 4, the following common standards apply to all MP tasks.

(1) Prior to flight, brief the P on the procedures to be performed during the maintenance test flight. Brief the usage of the MTF manual, the MTF check sheet, and the items needed to be recorded.

(2) Perform procedures and checks in sequence according to the appropriate MTF manual, as required.

(3) Perform crew coordination actions according to 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) Complete the appropriate entries on the MTF check sheet and in the aircraft logbook, and record data, as required for the checks to be performed.

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 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 P* indication does not imply PC or MP duties. All tasks in this chapter are to be performed only by maintenance designated IP/SPs or MPs, as outlined in AR 95-1. The MP is the PC in all situations, except when

undergoing training or evaluation by maintenance designated IP/SP. For all tasks, MP actions and responsibilities are applicable to maintenance designated IP/SPs. When two MPs are jointly performing MP tasks, the mission brief will designate the aviator assuming PC responsibilities.

(2) Procedures. This section describes the actions that the MP performs or directs in order to execute the task to standard.

e. **Contracting officer's representative (COR).** The COR has the authority and responsibility to determine when a test flight is required and what items need to be checked on the test flight.

f. **Training and evaluation requirements.** Some of the tasks incorporate more than one check from the MTF manual. This section defines the checks in each task that, as a minimum are required for MP training. Refer to table 2-5 for tasks required for annual MP APART evaluations. The evaluator may select additional checks for evaluation. Training and evaluation requirements define whether the task will be trained or evaluated in the aircraft, simulator, or academic environment. Training and evaluations will be conducted only in the listed environments, but may be done in any or all combinations. Listing only "aircraft" under evaluation requirements does not preclude the maintenance designated IP/SP from evaluating elements of the task academically to determine depth of understanding or troubleshooting 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.

g. **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 MP tasks. These references apply to each of the tasks listed in this chapter and will not be listed for each task:

(1) AR 700-138.

(2) Aircraft logbook and historical records.

(3) TM 1-1500-328-23.

(4) DA Pam 738-751.

(5) Operator's manual, checklist, and MTF manual.

(6) Applicable airworthiness directives or messages from Program Executive Officer Aviation (PEO-AV).

(7) Applicable commercial maintenance manuals.

(8) AR 95-1.

h. **Crew stations.** Aviators designated as MP will occupy the pilot's station (left seat) during conduct of maintenance test flights. Maintenance designated SP/IPs may occupy either pilot station (left or right seat) during maintenance test flights, or MP training/evaluations.

5-2. TASK LIST.

a. **Standards versus descriptions.** MPs are reminded that task descriptions may contain required elements for successful completion of a given task. When a standard for the task is to "brief the P 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 C-12 MP critical tasks.

TASK 4910

Perform taxiing check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew actions. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. Each crewmember will complete the required checks or procedures according to the MTF manual and the preflight briefing.

2. Procedure. Perform the checks according to the appropriate aircraft MTF manual. Other publications and references may be used as necessary. Conduct a briefing to delineate the duties the MP and P may be required to perform stressing safety in ground operations. At least one crewmember will focus attention outside the aircraft at all times during aircraft taxi. Prior to the individual check, review the task in the MTF manual to ensure all required items are completed. Record the data, as required, for the required checks. The MP may dictate the recording be accomplished by the P. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4915

Perform engine run-up/aircraft systems check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. Each crewmember will complete the required checks or procedures according to the MTF manual and the preflight briefing.

2. Procedure. Perform the checks according to the appropriate aircraft MTF manual. Other publications and references may be used, as necessary. Conduct a briefing to delineate the duties the MP and P may be required to perform, stressing safety in ground operations. Crewmembers will focus their attention outside the aircraft, as much as possible, to ensure the aircraft does not move during the checks. Prior to the individual check, review the task in the MTF manual to ensure all required items are available. Record the data, as required, for the required checks. The MP may dictate the recording be accomplished by the P. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4921

Perform before takeoff checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks. The MP will stress ground safety considerations or procedures during the briefing.
2. Procedure. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in ground operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed. The MP may dictate the recording be accomplished by the P. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4923

Perform during takeoff checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedure. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4925

Perform after takeoff checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4927

Perform during climb checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4929

Perform pressurization system checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Since this check is detailed with numerous steps to accomplish, the MP or P performing the check will keep the other crewmember informed of the actions being accomplished. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4931

Perform during cruise checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Since this check is detailed with numerous steps to accomplish, the MP or P performing the check will keep the other crewmember informed of the actions being performed. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4935

Perform speed check at maximum cruise power.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. The MP will obtain the necessary air traffic control (ATC) clearances for the altitudes being flown. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Since data is being recorded for each engine, differential power may have to be set to reach the conditions specified by the figure referred to in the MTF. Set the power on the engine to be checked in accordance with data from the MTF manual. Adjust the power on the other engine to reach the airspeed listed in the MTF manual. After conditions are allowed to stabilize for one minute, record the data required completing the check. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4937

Perform maximum power lever position check/maximum turbine gas temperature/N_1 availability.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the flight not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. The MP will obtain the necessary air traffic control (ATC) clearances for the altitudes being flown. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed. Since this check requires operations that could exceed aircraft or engine limitations, it is imperative that the crew ensures no limitations are exceeded. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4939

Perform engine acceptance check/engine performance at maximum continuous/cruise power.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The exact procedure varies between various models of the C-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. The MP will obtain the necessary air traffic control (ATC) clearances for the altitudes being flown. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. If required, differential power may be required to meet the MTF criteria for the check. Refer to the appropriate aircraft MTF manual for the conditions to be set for the check. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4941

Perform engine ice vanes check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The exact procedure varies between various models of the C-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. In some models of C-12 aircraft, the ice vanes are manually extended during the check. The crew must ensure the electrical mode of ice vane operation is not used until maintenance personnel have reset the extension mechanism (if appropriate). Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4943

Perform trim and rigging check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4945

Perform autopilot checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The exact procedure varies between various models of the C-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4948

Perform stall warning system checks.

CONDITIONS: In a C-12 airplane, visual meteorological conditions (VMC), or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5 plus these additions/modifications:

WARNING

The C-12 may not produce a clean aerodynamic "break" (for example, in the C-12 the nose does not pitch down during a stall). The indication of a stall when the pitch attitude is held constant may be moderate buffet, a loss in control effectiveness, full aft yoke, or any sink rate as indicated on the altimeter or vertical speed indicator (VSI). Generally, 800 feet of altitude will be lost during a normal stall recovery. Begin the maneuver at 160 knots indicated airspeed (KIAS) at an altitude that will allow recovery to be safely completed no lower than 7,500 feet above ground level (AGL).

WARNING

Extreme caution must be used while performing this check since the aircraft is operating close to a stall. If any unusual flight characteristics are encountered, the maneuver will be terminated. If the stall warning horn does not sound in the designated speed range, terminate the maneuver and return the aircraft to maintenance for further adjustments and/or maintenance actions.

WARNING

Delayed recovery from a stall can result in a "deep stall," which is characterized by a level pitch attitude, flight path angle of approximately 45 degrees down, and a sink rate of up to 8,500 feet per minute (FPM). Recovery from a "deep stall" requires a 10 to 15 degree nose-down pitch change to break the stall. Allow the airspeed to increase to at least 25 knots above stall speed before recovery.

1. Correctly compute stall warning horn range.
2. Terminate maneuver, if stall warning horn does not sound at least 4 KIAS above the computed stall speed.
3. Recover with minimum loss of altitude.
4. Maintain bank angle within ± 15 degrees.
5. Maintain coordinated flight (trim ball ¼ out maximum).

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the pilot not on the controls (P). During the briefing, the MP will delineate the duties the MP and P are required to perform. Prior to flight, the MP, with assistance from a maintenance contractor person, will physically check with a measuring tape or other approved device, the proper measurements and installation of the stall strips, in accordance with the appropriate maintenance manual. The MP will consult the stall warning system speed table to determine the stall speed and warning horn speed range for the aircraft at its weight and configuration during the flight. Then, during the MTF, the MP must ensure that the aircraft is not decelerated no lower than 4 KIAS above the computed stall speed. The briefing will include actions to be taken in the event the aircraft begins to roll during the maneuver. MP will stress flight safety considerations and procedures during the briefing.
2. Procedures.

   a. Discussion. Perform the checks according to the appropriate aircraft MTF manual. Since this check is detailed with numerous steps to accomplish, the MP will keep the P informed of the actions being performed. This check calls for various trim speeds for various configurations. The crew will ensure they have enough altitude, while performing this check, to allow recovery to be safely completed by 7,500 feet AGL.

   b. System check. The crew will configure the aircraft for the check, in accordance with the MTF manual. Once the aircraft is configured, the power will be reduced to idle. The crew will adjust aircraft controls and trim to reach the trim speed specified in the appropriate MTF manual. Once the conditions are met, the airspeed will be reduced at a rate no greater than approximately 1 knot per second. The crew will cease all aileron inputs at the activation of the stall warning horn. The MP will maintain wings level with rudder. The crew will note at what indicated airspeed the stall warning horn activates. At the onset of the stall warning horn immediately reduce pitch attitude, apply maximum available power, and complete a go-around. If the crew detects any indication of a stall onset buffet prior to the lower limit of the warning horn speed range reduce the pitch attitude to lower the angle of attack then, if necessary, apply opposite rudder to stop any roll and complete a go-around. Do not attempt to use ailerons to stop the rolling moment. After the go-around, the P will record data, as required, for the checks to be performed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4949

Perform flap-operation check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to the individual check, review the task in the MTF to ensure all items required are noted for data recording. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4951

Perform minimum elevator trim check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Since the aircraft will be in a descent while performing this maneuver, the crew will ensure they have sufficient altitude to safely accomplish the maneuver. Upon recovery, power will be slowly increased to assure even acceleration on the engines and then slowly stop the descent. Record data, as required, for the checks to be performed. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4953

Perform auto-ignition checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Caution must be exercised while performing this task. Engine turbine gas temperature could be exceeded, and care must be exercised to avoid excessive turbine gas temperature. If it appears turbine gas temperature limits will be exceeded, discontinue the task by placing the condition lever for the engine being checked to the fuel cutoff position, then start the engine using a starter assist. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4955

Perform manual propeller feathering and unfeathering checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

> **WARNING**
>
> **Attention must be given to ensure that proper airspeeds are maintained. The pilot on the controls (P*) must be diligent in maintaining altitude, heading, and airspeed throughout this task. Allowing airspeed to decay below Vs or Vmc during this maneuver will cause loss of airplane control.**

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Since this check is detailed with numerous steps to accomplish, the MP or P performing the check will keep the other crewmember informed of the actions being performed. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4957

Perform propeller autofeathering system check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

WARNING

Attention must be given to ensure that proper airspeeds are maintained. The pilot on the controls (P*) must be diligent in maintaining altitude, heading, and airspeed throughout this task. Allowing airspeed to decay below Vs or Vmc during this maneuver will cause loss of airplane control.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Since this check is detailed with numerous steps to accomplish, the MP or P performing the check will keep the other crewmember informed of the actions being performed. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4961

Perform maximum rate-of-descent check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Prior to starting the descent, clear the area for other traffic and obstacles. If any unusual flight characteristics are encountered, immediately stop the descent and slow the airspeed. If unusual flight characteristics are encountered, return the aircraft to maintenance for further action. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4963

Perform landing gear warning horn operation check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4967

Perform emergency landing gear extension check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks, but the MP will verify that all checks have been completed. The exact procedure varies between various models of the C-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.

2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4969

Perform elevator trim check.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks. The exact procedure varies between various models of the C-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

TASK 4980

Perform communication and navigation equipment checks.

CONDITIONS: In a C-12 airplane or simulator with access to the maintenance test flight (MTF) manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The maintenance test pilot (MP) will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the pilot not on the controls (P) to perform or assist in the required checks. The exact procedure varies between various models of the C-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks according to the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety in flight operations. Record data, as required, for the checks to be performed and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. At least one crewmember will focus attention outside the aircraft during this check to ensure obstacles and other aircraft are avoided. Once tasks and procedures are completed, the MP or P will announce that the task has been completed.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES:

Common references

Chapter 6
Crew Coordination

This chapter describes the background of crew coordination development. It also describes the crew coordination elements, basic qualities, and objectives, as found in the Army Aircrew Coordination Enhancement Training Program.

> ***Note:*** Digitization of the crew compartments has expanded and redefined the lines of responsibility for each crewmember. The ability for either crewmember to perform most aircraft/system functions from his crew station breaks down the standard delineation of duties and has added capabilities in training and in combat. This could mean that during an unforeseen event, one crewmember may attempt to resolve the situation rather than seeking assistance from another 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 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 were avoided, these same errors resulted in degraded mission performance. A systematic analysis of these error patterns identified specific areas which 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; and the sender confirms the information, based on the receiver's acknowledgment or action.

b. **Direct assistance.** A crewmember will direct assistance when he cannot maintain aircraft control. He will also direct assistance when he cannot properly operate or troubleshoot aircraft systems without help from the other crewmember.

c. **Announce actions.** To ensure effective and well-coordinated actions in the aircraft, all crewmembers must be aware of the expected movements and unexpected individual actions. Each crewmember will announce actions that affect the actions of the other crewmembers.

d. **Offer assistance.** A crewmember will provide assistance or information that has been requested. He will also offer assistance when he sees that another crewmember needs 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?" or "You are coming in a little fast/slow."

g. **Provide aircraft control and obstacle advisories.** Although the P* is responsible for aircraft control, the other crewmember may need to provide aircraft control information regarding airspeed, altitude, or heading.

h. **Coordinate action sequence and timing.** Proper sequencing and timing ensure that the actions of one crewmember mesh with the actions of the other crewmember.

6-3. CREW COORDINATION BASIC QUALITIES. The crew coordination elements are further broken into a set of 13 basic qualities. Each basic quality is defined in terms of observable behaviors.

a. **Flight team leadership and crew climate are established and maintained.** This quality addresses the relationships among the crew and the overall climate of the flight deck. Aircrews are teams with a designated leader and clear lines of authority and responsibility. The 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 effectively resolve the disagreement. Specific goals include the following:

(1) The PC actively establishes an open climate in which crewmembers talk freely and ask questions.

(2) Crewmembers value each other for their expertise and judgment. They do not allow differences in rank and experience to influence their willingness to speak up.

(3) Occasional alternative viewpoints are normal and part of crew interaction. Crewmembers handle disagreements in a professional manner, avoiding personal attacks or defensive posturing.

(4) The PC actively monitors the attitudes of crewmembers and offers feedback when necessary. Each crewmember displays the proper concern for balancing safety with mission accomplishment.

b. **Premission planning and rehearsal are accomplished.** Premission planning includes all preparatory tasks associated with planning the mission. These tasks include planning for VFR or IFR flight. They also include assigning crewmember responsibilities and conducting all required briefings and briefbacks. Premission rehearsal involves the crew 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 critical items are addressed within the available planning time.

(2) The crew identifies alternate courses of action in anticipation of potential changes in 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 workloads to rehearse upcoming flight segments. Crewmembers continuously review remaining flight segments to identify required adjustments. Their planning is consistently ahead of critical lead times.

c. **Appropriate decisionmaking techniques are applied.** Decisionmaking is the act of rendering a solution to a problem and defining a plan of action. It must involve risk assessment. The quality of decisionmaking 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 decisionmaking 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 decisionmaking and problem-solving process, the PC is the key decisionmaker. Specific goals include the following:

(1) Under high-time stress, crewmembers rely on a pattern-recognition decision process to produce timely responses. They minimize deliberation consistent with the available decision time. Crewmembers focus on the most critical factors influencing their choice of responses. They efficiently prioritize their specific information needs within the available decision time.

(2) Under moderate- to low-time stress, crewmembers rely on an analytical decision process to produce high quality decisions. They encourage deliberation when time permits. To arrive at the most unbiased decision possible, crewmembers consider all important factors influencing their choice of action. They consistently seek all available information relative to the factors being considered.

d. **Actions are prioritized and workload is equitably distributed.** This quality addresses the effectiveness of time and workload management. It assesses the extent to which the crew, as a team, avoids distractions from essential activities, distributes and manages workload, and avoids individual task overload. Specific goals include the following:

(1) Crewmembers are always able to identify and prioritize competing mission tasks. They never ignore flight safety and other high priority tasks. They appropriately delay low priority tasks until those tasks do not compete with more critical tasks. Crewmembers consistently avoid nonessential distractions so these distractions do not impact on task performance.

(2) The PC actively manages the distribution of mission tasks to prevent 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. **Unexpected events are managed effectively.** This quality addresses the crew's performance under unusual circumstances that may involve high levels of stress. Both the technical and managerial aspects of coping with the situation are important. Specific goals include the following:

(1) Crew actions reflect extensive rehearsal of emergency procedures in prior training and premission planning and rehearsal. Crewmembers coordinate their actions and exchange information with minimal verbal direction from the PC.

(2) Each crewmember appropriately or voluntarily adjusts individual workload and task priorities with minimal verbal direction from the PC. The PC ensures that each crewmember is used effectively when responding to the emergency and that the workload is efficiently distributed.

f. **Statements and directives are clear, timely, relevant, complete, and verified.** This quality refers to the completeness, timeliness, and quality of information transfer. It includes the crew's use of standard terminology and feedback techniques to verify information transfer. Emphasis is on the quality of instructions and statements associated with navigation, obstacle clearance, and instrument readouts. Specific goals include the following:

(1) Crewmembers consistently make the recommended 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 acknowledgement from another crewmember. They always acknowledge understanding of intent and request clarification when necessary.

g. **Mission situational awareness is maintained.** This quality considers the extent to which crewmembers keep each other informed about the status of the aircraft and the mission. Information reporting helps the aircrew maintain a high level of situational awareness. The information reported includes aircraft position and orientation, equipment and personnel status, environmental and battlefield conditions, and changes to mission objectives. Awareness of the situation by the entire crew is essential to safe flight and effective crew performance. Specific goals include the following:

(1) Crewmembers routinely update each other and highlight and acknowledge changes. They take personal responsibility for scanning the entire flight environment, considering their assigned workload and areas of scanning.

(2) Crewmembers actively discuss conditions and situations that can compromise situational awareness. These include, but are not limited to, stress, boredom, fatigue, and anger.

h. **Decisions and actions are communicated and acknowledged.** This quality addresses the extent to which crewmembers are kept informed of decisions and actions 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. **Supporting information and actions are sought from the crew.** This quality addresses the extent to which supporting information and actions are sought from the crew by another crewmember, usually the PC. Crewmembers should feel free to raise questions during the flight regarding plans, revisions to plans, actions to be taken, and the status of key mission information. Specific goals include the following:

(1) The PC encourages crewmembers to raise issues or offer information about safety or the mission. Crewmembers anticipate impending decisions and actions and offer information as appropriate.

(2) Crewmembers always request assistance from others before they become overloaded with tasks or before they must divert attention from a critical task.

j. **Crewmember actions are mutually cross-monitored.** This quality addresses the extent to which a crew uses cross-monitoring as a mechanism for breaking error chains that lead to accidents or degraded mission performance. Crewmembers must be capable of detecting each other's errors. Such redundancy is particularly important when crews are tired or overly focused on critical task elements and thus more prone to make errors. Specific goals include the following:

(1) Crewmembers acknowledge that crew error is a common occurrence and the active involvement of the entire crew is required to detect and break the error chains that lead to accidents. They constantly watch for crew errors affecting flight safety or mission performance. They monitor their own performance as well as that of others. When they note an error, they quickly and professionally inform and assist the crewmember committing the error.

(2) The crew thoroughly discusses the two-challenge rule before executing the mission. When required, they effectively implement the two-challenge rule with minimal compromise to flight safety.

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 decisionmaker, usually the PC, when a decision must be made or an action taken. Specific goals include the following:

(1) Crewmembers anticipate the need to provide information or warning to the PC or P* during critical phases of flight. They provide the required information and warnings in a timely manner.

(2) Crewmembers anticipate the need to assist the PC or P* during critical phases of flight. They provide the required assistance when needed.

l. **Advocacy and assertion are practiced.** This quality concerns the extent to which crewmembers are proactive in advocating a course of action they consider best, even when others may disagree. Specific goals include the following:

(1) While maintaining a professional atmosphere, crewmembers state the rationale for their recommended plans and courses of action, when time permits. They request feedback to make sure others have correctly understood their statements or rationale. Time permitting, other crewmembers practice good listening habits; they wait for the rationale before commenting on the recommended plans or courses of action.

(2) The PC actively promotes objectivity in the cockpit by encouraging other crewmembers to speak up when they disagree with senior members; they understand that more experienced aviators can sometimes commit errors or lose situational awareness. Every member of the crew displays a sense of responsibility for adhering to flight regulations, operating procedures, and safety standards.

m. **Crew-level after-action reviews are conducted.** This quality addresses the extent to which crewmembers review and critique their actions during or after a mission segment, during periods of low workload, or during the mission debriefing. Specific goals include the following:

(1) The crew critiques major decisions and actions. They identify options and factors that should have been discussed and outline ways to improve crew performance in future missions.

(2) The critique of crew decisions and actions is professional. “Finger pointing” is avoided; the emphasis is on education and improvement of crew performance.

6-4. CREW COORDINATION OBJECTIVES. The crew coordination elements and basic qualities are measured to determine if the objectives of the crew coordination program have been met. The objectives of the program have been defined by five crew coordination objectives. They are—

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. **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 of the commander's intent.

c. **Establish and maintain workloads.** Manage and execute the mission workload in an effective and efficient manner with the redistribution of task responsibilities as the mission situation changes.

d. **Exchange mission information.** Establish 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 impacting mission performance and safety.

6-5. STANDARDIZED COCKPIT PROCEDURES.

a. **General.** The intent of clearly defining a division of cockpit responsibilities is to ensure that duties that may distract the pilot on the controls (P*) are transferred to the pilot not on the controls (P). Clear division of cockpit responsibilities is of particular importance during the arrival and departure phases of flight. Due to the different cockpit designs in the C-12 fleet, units should adapt standardized cockpit procedures based on how aircraft are equipped. All C-12 are designated as two-pilot aircraft by the individual operator's manuals. The crew callouts and responsibilities outlined in this chapter should serve as a guide to fully integrate the P* and P as a flight crew.

b. **P* responsibilities.** The P* is responsible for flying the aircraft. If the autopilot is coupled, the P* is responsible for ensuring that the autopilot correctly captures and maintains selected altitudes and courses. Unless required by a safety consideration, the P* shall avoid tasks that distract from the primary responsibility of flying the aircraft by directing the P to accomplish these tasks. As a general rule, if the P can do it, the P should do it, particularly during the departure and arrival phases. It is the P*'s responsibility to manage the workload placed upon the P during periods of high cockpit workload.

c. **P responsibilities.** The P is responsible for cross-monitoring the P* and for accomplishing tasks that may distract the P* from the P*'s duties. The primary duty of the P is to keep the P* free to simply fly the airplane. Basic P duties include—

(1) Radio communications.

(2) Change navigational aid (NAVAID) and communications radio frequencies.

(3) Change transponder codes.

(4) Copy clearances, local weather broadcasts, and other flight information.

(5) Read and complete checklist items as required.

(6) Set/adjust pages, switches, and systems as required.

(7) Operate the FMS/GPS/onboard navigational system at the direction of the P*.

(8) Change aircraft configuration at the direction of the P*, such as—
   (a) Power and propeller settings.
   (b) Flap selection.
   (c) Operating the gear handle.

(9) Operate the weather avoidance equipment.

(10) Set and arm altitude on the altitude preselector (if installed).

(11) During IFR operations.
   (a) Note takeoff time.
   (b) Calculate and monitor times for holding and approaches.
   (c) When on approach, watch for the runway environment.
   (d) Be prepared to direct and assist the P* with the missed approach procedure, if required.

d. **Management of the P*'s flight director panel.**

(1) The P will make changes to the altitude controls as required by newly assigned altitudes without direction of the P*.

(2) The P will not make other changes to the P*'s flight director system without the direction of the P*.

(3) The P* will direct the P to make changes to the P* flight director system. If the P is unable to assist, the P* may make minor changes to his flight director system. Examples of minor changes include—

(a) Arming the approach mode.
(b) Selecting indicated airspeed (IAS) or vertical speed (VS).
(c) Selecting heading (HDG) or navigation (NAV).
(d) Selecting standby (STBY).

(4) Changes to the status of the flight director system that is coupled to the autopilot should be announced and mutually verified. In general, when something is selected, it should be announced to the other pilot. An announcement should also be made when the flight director captures a selected mode.

e. **Management of power levers.** The P* does not relinquish control of the power levers to the P. The P is limited to assisting the P* by setting and maintaining the takeoff power as briefed. During the takeoff roll, if there is a need to abort the takeoff, the P* will retard the power levers.

f. **Standardized calls.** (See paragraph 6-8.)

g. **Deviations.** Certain circumstances may require deviation from guidelines published in this chapter. Such deviations, when clearly communicated between the crew, reflect good resource management and coordinated crew actions.

h. **Checklists.** The P and P* will use the "challenge and response" method of reading the checklist. This is the most positive way to proceed through a checklist as it allows for both pilots to remain aware of all checklist related activities. Flexibility with this method is required. During periods of high cockpit workload (taxiing, departure or takeoff, traffic pattern, descent and approaches) the P* may not be able to respond in a quick and positive manner. As a result, the benefits of the challenge and response do not justify the additional workload it places on the P*. Under these circumstances, the checklist should still be read aloud; however, the P now also provides the response. The P should only accomplish non-critical functions with command or acknowledgment. The operation of systems such as landing gear, flaps, autopilot, FMS and flight director mode selections require P* participation, mandating a response of "Confirmed." (For example, before landing, P initiates "**Gear DOWN/confirm**," P* responds – "**Confirmed**.")

6-6. STERILE COCKPIT. The definition of a sterile cockpit is "only that conversation required for safe aircraft operation." A sterile cockpit shall exist—

a. From the start of the takeoff run through the climb to 10,000 feet, or the en route phase of flight when cruise altitude is less than 10,000 mean sea level (MSL).

b. During the descent from 10,000 feet, or the en route phase of flight, into the terminal area for the approach and landing.

6-7. TWO-CHALLENGE RULE. The two-challenge rule allows one crewmember to automatically assume the duties of another crewmember who fails to respond to two consecutive challenges or when aircraft control is in question. (For example, the P* becomes fixated, confused, task overloaded, or otherwise allows the aircraft to enter an unsafe position or attitude.) The P first asks the P* if he is aware of the aircraft position or attitude. If the P* does not acknowledge this challenge, the P issues a second challenge. If the P* fails to acknowledge the second challenge, the P assumes control of the aircraft.

6-8. 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) and Federal Aviation Administration (FAA) manual 7110.65, contain 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	to terminate a preplanned maneuver (for example, an aborted takeoff).
Affirmative	yes.
Braking	announcement made by the P* who intends to apply brake pressure.
Break	immediate action command to perform a maneuver to deviate from the present ground track; will be followed by “RIGHT,” or “LEFT.”
Callout	command by the P* for a specified procedure to be read from the checklist by another crewmember.
Clear	no obstacle present to impede aircraft movement along the intended direction of flight or while taxiing on the ground; will be followed by direction of movement (for example, “CLEAR (right or left).” Also, when preceded by the number one or two, indicates engine area has been visually checked for personnel or other hazards before engine start.)
Contact	traffic in sight or establish communication with…..
Correct	confirms a statement as being accurate; do **not** use the word “right” to indicate correct.
Correcting	statement that the P* is taking positive action to correct an out of tolerance flight parameter (for example, drift or altitude).
Drifting	an alert of the unannounced movement of the aircraft on final approach or takeoff; will be followed by direction (for example, drifting right or left).
Egress	immediate action command to get out of the aircraft.
Execute	initiate an action.
Expect	anticipate further instructions or guidance.
Fire light	announcement of illumination of the master fire warning light.
Hold	command to maintain present position.
I have the controls	used as a command or announcement by the rated crewmember (RCM) assuming control of the flight controls.
Inside	primary focus of attention is inside the aircraft.
In sight	preceded by the word “traffic,” “target,“ “obstacle,” or descriptive term. Used to confirm the traffic, target, or obstacle is positively seen or identified.
Maintain	command to keep or continue the same.
Move forward	command to taxi the aircraft forward, followed by distance. Also used to announce intended forward or backward movement.
My power	the P* resumes control of the power levers from the P.
Negative	“No” or “that is not correct.”
Normal	65-knot check on the takeoff roll. Outside – The primary focus is outside the aircraft.

Table 6-1. Examples of standard words and phrases	
Standard Word or Phrase	***Meaning of Standard Word or Phrase***
Put me up	command to place the P*'s radio transmit selector switch to a designated position or to place a frequency in a specific radio.
Report	command to notify.
Right	used to indicate a direction only, not to be used in place of "correct."
Rotate	the P callout when the aircraft has obtained takeoff decision speed (V_1).
Set power	command by the P* for the P to set takeoff power or maximum available power during a go-around or missed approach.
Stop	command to go no further; halt present action.
Traffic	refers to any friendly aircraft that presents a collision hazard; will be followed by a clock position, distance, and reference to altitude.
Up on	indicates the radio selected; will be followed by the position number on the intercommunication system (ICS) panel (for example, "Up on 3").
Verify	request confirmation of information.
You have the controls	used as a command or announcement by the crewmember relinquishing the flight controls.
Your power	pilot not on the controls (P) returning control of the power levers to the pilot on the controls (P*).
You're up	announces a specific radio frequency is selected on a selected radio. You're up on 121.7 on number one.

6-9. CREW COORDINATION CALLOUTS. Bold type identifies the crewmember who should initiate the call.

a. **Takeoff.** Applies to a normal takeoff and an instrument takeoff (see figure 6-1).

TAKEOFF		
ACTION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
Power levers advance	**"SET POWER"**	"POWER SET"
65 knots indicated (airspeed indicators checked, and systems normal)		**"NORMAL"**
Airspeed at V_1		**"V_1 ROTATE"**
Abnormal or emergency condition prior to V_1 (identified by P)	"ABORTING"	**"ABORT, ABORT"**
P* elects to abort prior to V_1	**"ABORTING"** (state problem)	"ROGER"
Positive rate of climb (two indications)	After P "POSITIVE RATE" call, "GEAR UP"	**"POSITIVE RATE"** "GEAR IS UP" or "GEAR DID NOT RETRACT"
Airspeed at 105 KIAS (flaps at takeoff position)	**"FLAPS UP"**	"FLAPS UP"
Legend: V_1 - Takeoff decision speed (same as Vr)		

Figure 6-1. Takeoff

b. **Climb, cruise and descent.** If passing the 1,000-foot prior point and air traffic control (ATC) communications is preventing the callout, either crewmember may indicate the 1,000-foot prior point by raising the index finger in the view of the other crewmember (see figure 6-2).

CLIMB/CRUISE/DESCENT		
ACTION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
1,000 feet prior to level off	"ROGER"	**"1,000 TO GO"**
Descending through transition altitude	"XX.XX SET (left or right as applicable)"	**"ALTIMETER XX.XX"**
Climbing through transition altitude	"29.92 SET LEFT"	**"29.92 SET RIGHT"**

Figure 6-2. Climb, cruise, and descent

c. **All phases of flight** (see figure 6-3)**.**

ALL PHASES OF FLIGHT		
OBSERVATION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
Bank angle exceeds 30 degrees	"CORRECTING"	**"BANK ANGLE"**
Airspeed deviates ± 10 KIAS	"INCREASING (DECREASING) AIRSPEED"	**"AIRSPEED, __ KNOTS LOW (HIGH)"**
Altitude deviates ± 100 feet	"INCREASING (DECREASING) ALTITUDE"	**"ALTITUDE, __ FEET LOW (HIGH)"**
Heading deviates ± 10 degrees	"CORRECTING LEFT/RIGHT"	**"HEADING, __ DEGREES LEFT (RIGHT)"**

Figure 6-3. All phases

d. **Instrument approach.** Applies to all instrument approaches except ground-controlled approach (GCA) (see figure 6-4).

INSTRUMENT APPROACH		
ACTION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
Initial course/localizer movement	"ROGER"	**"COURSE (LOCALIZER) ALIVE"**
Course/localizer capture	"ROGER"	**"COURSE (LOCALIZER) CAPTURED"**
Initial glide slope movement (precision approach)	"ROGER"	**"GLIDE SLOPE ALIVE"**
Glide slope capture (precision approach)	"ROGER"	**"GLIDE SLOPE CAPTURED"**
FAF	**"TIME"**	"TIME STARTED"
1,000 feet before DH/MDA	"ROGER"	**"1,000 TO GO"**
500 feet before DH/MDA	"ROGER"	**"500 TO GO"**
100 feet before DH/MDA	"ROGER"	**"100 TO GO"**

Figure 6-4. All instrument approaches

e. **Missed approach.** These callouts (see figure 6-5) apply when—

(1) The aircraft has reached decision height (DH), missed approach point (MAP), the missed approach waypoint (MAWP) at the published minimum descent altitude (MDA), and the appropriate visual reference has not been called in sight.

(2) Wind shear is encountered and is affecting the safe operation of flight.

(3) If, after passing the final approach fix inbound, either the localizer, VOR, or GPS deviation indictor, or glideslope reaches full-scale deflection or if RAIM annunciation appears.

(4) If, upon reaching the DH or MAP, the aircraft is not continuously in a position from which a descent to landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and at a descent rate that will allow touchdown to occur within the touchdown zone of the runway of intended landing.

(5) If, while circling to land, visual contact with the runway environment is lost.

MISSED APPROACH		
ACTION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
Straight in approach – reaching missed approach point, runway environment not in sight	"ROGER, MISSED APPROACH" (followed by missed approach actions)	**"DH" or "TIMES UP" or "MISSED APPROACH POINT, NEGATIVE CONTACT, MISSED APPROACH"**
Circling approach – visual contact with the runway lost (the crewmember monitoring outside while circling will initiate the callout)	**"VISUAL CONTACT LOST, EXECUTING MISSED APPROACH"** (followed by missed approach actions) "ROGER, MISSED APPROACH" (followed by missed approach actions)	"ROGER" **"VISUAL CONTACT LOST, EXECUTE MISSED APPROACH"**
Go around segment after P* initiates the power application	**"SET POWER"**	"POWER SET"
After verifying two positive climb indications	"GEAR UP"	**"POSITIVE RATE"**
Flaps beyond approach	**"FLAPS APPROACH"**	"FLAPS APPROACH"
Airspeed reaches 105 KIAS	**"FLAPS UP"**	"FLAPS UP"
When time and altitude permits	**"MY POWER"**	"YOUR POWER"

Figure 6-5. Missed approach

f. **Visual transition from instruments** (see figure 6-6)**.**

(1) The P will seek outside references during the approach while cross-monitoring the P*'s instruments. Should visual reference deteriorate after a sighting call has been made, call "**Visual contact lost**." If the aircraft has not reached the missed approach point, the approach may be continued to DH/MDA. If the aircraft has passed the missed approach point and visual contact is lost, call "**Missed approach**," and complete the missed approach actions.

(2) The key words to indicate to the P* to transition from instruments is when the "CLOCK" position is stated along with a visual cue. The callout indicates that the P* can remain in constant visual contact with the runway environment from the callout to landing. The P* must call "**Visual**" before the aircraft continues below DH/MDA. After such call is made, the P assumes primary responsibility for monitoring instrument reference to touchdown, and immediately calling out any deviation from normal operations.

(3) While at MDA on straight in or circling approaches, the P should call out any deviation in altitude or abnormal approach speeds. If level at MDA, the P* will stay level at this altitude until calling "**Leaving MDA**."

(4) During a circling maneuver, when the runway is on the P's side, use appropriate callouts to direct the P* when to make turns with respect to the landing runway, traffic, or any necessary deviations.

INSTRUMENT REFERENCE TO VISUAL		
ACTION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
Appropriate visual references in sight	"ON INSTRUMENTS" (or other intentions)	**"APPROACH LIGHTS** (or other features identifiable with runway environment) **IN SIGHT CONTINUE APPROACH** (or other recommended action)**"**
Runway in sight	"RUNWAY IN SIGHT, VISUAL"	**"RUNWAY IN SIGHT** (clock position), **TAKE OVER VISUALLY"**
P* departs MDA to land	**"LEAVING MDA"**	"ROGER"

Figure 6-6. Visual transition from instruments

g. **Approach deviations.** The two-challenge rule applies to these callouts (see figure 6-7).

APPROACH DEVIATIONS		
OBSERVATION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
± one dot of glide slope	"CORRECTING (UP/DOWN)"	**"ONE DOT (HIGH/LOW) AND INCREASING/DECREASING"**
± one dot of localizer/ very high frequency omnidirectional range (VOR)/global positioning system (GPS)	"CORRECTING (LEFT/RIGHT)"	**"ONE DOT (LEFT/RIGHT) AND INCREASING (DECREASING)"**
± 5 degrees on nondirectional radio beacon (NDB) approach	"CORRECTING (LEFT/RIGHT)"	**"FIVE DEGREES (LEFT/RIGHT) AND INCREASING (DECREASING)"**
± 10 knots from approach speed	"INCREASING (DECREASING) AIRSPEED"	**"AIRSPEED, TEN KNOTS LOW (HIGH)"**
Rate of descent exceeds 1,000 feet per minute	"REDUCING SINK RATE"	**"SINK RATE** (amount) **INCREASING (DECREASING/HOLDING)"**

Figure 6-7. Approach deviations

h. **Touch and go** (see figure 6-8)**.**

TOUCH AND GO		
OBSERVATION	***P* CALL/RESPONSE***	***IP CALL/RESPONSE***
Upon landing with all three gear on the ground.	Advances power levers	**"STABILIZE POWER"**
With trim and flaps reset to takeoff position and engines spooled	Continues power advance to predetermined power setting	**"ADVANCE POWER"**
Adjusts to takeoff power	**"SET POWER"**	"POWER SET" when takeoff power is set
Airspeed at V_1	Rotates	**"V_1 ROTATE"**

Figure 6-8. Touch and go

i. **Engine failures.** The callout sequence (see figure 6-9) begins after power has been applied and aircraft is stabilized.

ENGINE FAILURE		
OBSERVATION	***P* CALL/RESPONSE***	***P CALL/RESPONSE***
Loss of an engine (one or two) by control pressures and/or instrument indications	**"CONFIRM ENGINE NUMBER (ONE OR TWO) HAS FAILED"** **"DID THE PROPELLER FEATHER?"**	"I CONFIRM ENGINE NUMBER (ONE OR TWO) HAS FAILED or NEGATIVE NUMBER __ (OPPPOSITE) HAS FAILED" "YES, THE NUMBER ___ PROP FEATHERED" or "NO, IT DID NOT FEATHER"
Propeller did not feather	**"IDENTIFY THE NUMBER ONE OR TWO** (appropriate) **PROP LEVER"** P* visually confirms the correct prop lever has been identified **"I AGREE, FEATHER THE PROP"** or **"NEGATIVE, REIDENTIFY THE NUMBER __ PROP"**	P places index finger on the appropriate prop lever. "NUMBER ONE OR TWO PROP LEVER IDENTIFIED" When directed by the P* move the prop to feather. "PROP FEATHERED"
Reaching the designated airspeed, according to the operator's manual	**"FLAPS UP"**	"FLAPS UP"

Figure 6-9. Engine failure

Glossary

AC	advisory circular
acc	accelerate
AGL	above ground level
AIM	aeronautical information manual
ALSE	aviation life support equipment
alt	altitude
APART	annual proficiency and readiness test
AP	autopilot
AR	Army regulation
ARNG	Army National Guard
ARTCC	air route traffic control center
ASR	airport surveillance radar
ATC	air traffic control
ATIS	automated terminal information service
ATM	aircrew training manual
attn	attention
avn	aviation
AWOS	automated weather observing service
C	Celsius
CBI	computer-based instruction
CDI	course deviation indicator
CFR	Code of Federal Regulations
CG	center of gravity
clb grad alt	climb gradient altitude
CNGB	Chief, National Guard Bureau
CONUS	continental United States
COR	contracting officer's representative
CTL	commander's task list
CWA	center weather advisory
DA	Department of the Army, decision altitude
DD	Department of Defense (form)
DES	Directorate of Evaluation and Standardization (Fort Rucker, Alabama)
DH	decision height
disc	disconnect
DLAM	Defense Logistics Agency manual

DME	distance measuring equipment
DOD	Department of Defense
DP	departure procedure
DR	dead reckoning
EGPWS	enhanced ground proximity warning system
ETE	estimated time en route
equip	equipment
F	Fahrenheit
FAA	Federal Aviation Administration
FAC	flight activity category
FAF	final approach fix
FAWP	final approach waypoint
FD	flight director
FIH	flight information handbook
FLIP	flight information publication
FM	field manual
FMS	flight management system
FPM	feet per minute
G	gravity
GCA	ground-controlled approach
GP	general planning
GPS	global positioning system
GPWS	ground proximity warning system
gwt	gross weight
Hg	mercury
HIWAS	hazardous in-flight weather advisory service
HQDA	Headquarters, Department of the Army
IAP	instrument approach procedure
IAS	indicated airspeed
IATF	individual aircrew training folder
ICAO	International Civil Aviation Organization
ICS	intercommunication system
IE	instrument flight examiner
IFF	identification, friend or foe (radar)
IFR	instrument flight rules
ILS	instrument landing system
IMC	instrument meteorological conditions

INS	inertial navigation system
IP	instructor pilot
ITO	instrument takeoff
KIAS	knots indicated airspeed
KLN-90	satellite navigation system manufactured by Allied Signal
lb	pound
LDA	localizer directional aid
LOC	localizer
LNAV	lateral navigation
LS	left seat
MACOM	major Army command
MAP	missed approach point, MAP mode (RADAR)
MAWP	missed approach waypoint
max	maximum
MDA	minimum decision altitude
METAR	aviation routine weather reports
METL	mission essential task list
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, civil considerations
MHz	megahertz
MM/MTPC	maintenance manager/maintenance test pilot course
MP	maintenance test pilot
MOPP	mission-oriented protective posture
MSA	minimum safe altitude
MSL	mean sea level
MTF	maintenance test flight
N_1	gas generator revolutions per minute
NAS	National Airspace System
nav	navigation
NAVAID	navigational aid
NBC	nuclear, biological, and chemical
NDB	nondirectional radio beacon
NGR	National Guard regulation
nm	nautical mile
NOTAM	notice to airmen
OCONUS	outside continental United States
P	pilot not on the controls

P*	pilot on the controls
PA	pressure altitude
PAPI	precision approach path indicator
PAR	precision approach radar
PC	pilot in command
PEO-AV	Program Executive Officer – Aviation
PFE	proficiency flight evaluation
PI	pilot
PIREP	pilot weather reports
POH	pilot operating handbook
POI	program of instruction
RA	resolution advisory
RAIM	receiver autonomous integrity monitoring
RCM	rated crewmember
RCT	rain echo attenuation compensation technique
REL	required equipment list
RL	readiness level
RMI	radio magnetic indicator
RNAV	area navigation
RPM	revolutions per minute
RS	right seat
RTA	receiver transmitter antenna
S	satisfactory, standardization
sct/sect	sector
SDF	simplified directional facility
SE	single engine
SOP	standing operating procedure
SP	standardization instructor pilot
STAB	stabilization system
STANAG	standardization agreement
TA	traffic advisory
TACAN	tactical air navigation
TAF	terminal aerodrome forecast
TAMMS-A	The Army Maintenance Management System – Aviation
TAWS	terrain awareness and warning system
TC	training circular
TCAS	traffic alert and collision avoidance system

temp	temperature
TGT	target; turbine gas temperature
TM	technical manual
T/O	takeoff
TOD	top of descent
TOLD	takeoff landing data
TRADOC	United States Army Training and Doctrine Command
U.S.	United States
USAR	United States Army Reserve
USAAVNC	United States Army Aviation Center
USAF	United States Air Force
UT	unit trainer
V_1	takeoff decision speed (same as Vr)
V_2	takeoff safety speed
Va	maximum-design maneuvering speed
Vapp	approach speed (Vref + xx)
VASI	visual approach slope indicator
Vb	turbulent penetration speed
Vc	design-cruising speed
VDP	visual descent point
Vf	design-flap speed
Vfe	maximum flap-extended speed
VFR	visual flight rules
VHF	very high frequency
Vle	maximum landing-gear extended speed
Vlo	maximum landing-gear operating speed
Vlof	lift-off speed (rotation speed +3 knots)
Vmca	minimum single engine control airspeed
VMC	visual meteorological conditions
Vmcg	minimum control speed with critical engine inoperative, ground
VNAV	vertical navigation
VOR	very high frequency omnidirectional range
VORTAC	very high frequency omnidirectional range/tactical air navigation —VOR and TACAN (collocated)
Vr	rotation speed (same as V_1 in most C-12 aircraft)

V_{ref}	indicated reference airspeed that the airplane should be at when the airplane is approximately 50 feet higher than the intended touchdown point in the landing configuration.
Vref+10 KIAS	final-approach speed for visual or instrument with landing environment in sight
Vref+20 KIAS	base-leg speed or instrument approach speed
Vref+30 KIAS	speed after landing gear has been lowered on downwind.
Vs	power-off stalling speed
Vs_1	the power-off stalling speed (clean) with flaps and landing gear in a specified configuration
VSI	vertical speed indicator
Vso	power-off stalling speed in the landing configuration
Vsse	the safe twin-engine operative speed selected to provide a reasonable margin against the occurrence of an unintentional stall when making intentional dynamic (abrupt) engine cuts during the climb after takeoff.
Vx	best angle-of-climb speed
Vyse	best single-engine, rate-of-climb speed
wt	weight
WX	weather

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C-12 TAKEOFF AND LANDING DATA (TOLD)

For use of this form, see TC 1-218; the proponent agency is TRADOC.

TAKEOFF		
STATION	FIELD LENGTH AVAIL.	
TEMP C°	P.A.	
TAKEOFF WEIGHT	MINIMUM TAKEOFF POWER	
CONFIGURATION: FLAPS 0% ____ FLAPS 40% ____		
T.O. FLD. LENGTH REQUIRED	ACC/GO DISTANCE	
V_1 / V_R	V_2 / Vyse	Vx
CLB. GRD. ALT.		

LANDING
RUNWAY LENGTH AVAILABLE
LANDING WEIGHT
Vref _____ Vapp _____ Flaps 100% (1.3 X Vso @ Ldg. Wt.) Inst. App. = Vref + 20 KIAS Flaps 40% to 99% + (1.3 X Vs1@ Ldg.Wt.) Visual App. = Vref + 10 KIAS
LANDING DISTANCE

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TAKEOFF WEIGHT WORKSHEET		
FIELD LENGTH AVAILABLE		
TEMP C°	P.A.	
TAKEOFF CONFIGURATION	**FLAPS**	
	UP	**40%**
Maximum Weight to Achieve SE Climb		
Maximum Weight for ACC/STOP		
*Maximum Weight for Required SE CLB GRAD (MIN 3.3%)		
MAXIMUM ALLOWABLE TAKEOFF WEIGHT		

*SE Climb Conversion

$$\frac{\text{Ft. per nm}}{6{,}076'} \times 100 = \underline{\qquad\qquad}\ \%$$

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TC 1-218
13 September 2005

By order of the Secretary of the Army:

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