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Aircrew Training Manual, Utility Airplane, C-12

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Aircrew Training Manual
Utility Airplane C-12

Contents

***This publication supersedes TC 1-218, dated 13 September 2005.**

Tasks

Figures

Tables

Preface

Training Circular (TC) 3-04.51 standardizes aircrew training programs (ATPs) and flight evaluation procedures. This aircrew training manual (ATM) provides specific guidelines for executing aircrew training. It is based on training principles outlined in Army Doctrine Reference Publication (ADRP) 7-0 at the Army Training Network, located on the web at https://atn.army.mil/index.aspx, under the "Unit Training Management" tab. This ATM establishes crewmember qualification, refresher, mission, and continuation training, and evaluation requirements.

This publication applies to all C-12 series crewmembers and their commanders in the Active Army, the Army National Guard (ARNG) / Army National Guard of the United States (ARNGUS), and the United States Army Reserve (USAR), Department of the Army civilians (DACs), and contractor's unless otherwise stated.

This manual is not a stand-alone document; all the requirements contained in Army Regulation (AR) 600-105, AR 600-106, and TC 3-04.11 must be met.

The operator's manual is the governing authority for operation of the aircraft. If differences exist between the maneuver descriptions in the operator manuals and this publication, this publication is the governing authority for training and flight evaluation purposes only. Implementation of this publication conforms to AR 95-1 and TC 3-04.11. If a conflict exists between this publication and TC 3-04.11, the ATP commander determines the method of accomplishment based upon the requirement and the unit's mission as to which manual takes precedence.

This manual, in conjunction with the ARs and TC 3-04.11, will help aviation commanders at all levels develop a comprehensive ATP. By using this ATM, commanders ensure that individual crewmember and aircrew proficiency is commensurate with their units' mission and that aircrews routinely employ standard techniques and procedures.

Crewmembers will use this manual as a "how to" source for performing crewmember duties. It provides performance standards and evaluation guidelines so that crewmembers know the level of performance expected. Each task provides a description of how the task should be perform to meet the standard. ATP commanders of active Army, National Guard, and Army Reserve units operating the C-12 series aircrafts will use this ATM and TC 3-04.11 to develop individual commander's task lists (CTLs) for assigned aviators. ATP commanders will assign contractor/DAC pilots to assist in developing individual commander's task lists tailored to the current contract position using this ATM, TC 3-04.11, AR 95-20, current flight training guides (FTGs), and/or local command directives.

Standardization officers, evaluators, and unit trainers (UTs) will use this manual and TC 3-04.11 as the primary tools to assist the commander in developing and implementing their ATP.

The proponent of this publication is the United States Training and Doctrine Command (TRADOC)..Submit comments and recommendations utilizing the electronic PureEdge (XFDL) version of Department of the Army (DA) Form 2028 (Recommended Changes to Publications and Blank Forms) found on the Army Publishing Directorate (APD) website, to the Director, Directorate of Training and Doctrine (DOTD), ATTN: Flight Training Branch (FTB) (ATZQ-TDT-F), Building 4507 Andrews Avenue, Fort Rucker, Alabama 36362-5263; via email at usarmy.rucker.avncoe.mbx.atzq-tdt-f@mail.mil; or online at https://www.us.army.mil/suite/page/655026.

This publication implements portions of standardization agreement (STANAG) 3114 (Edition Eight).

This publication has been reviewed for operations security considerations.

Chapter 1
Introduction

This ATM describes training requirements for crewmembers. It will be used with AR 95-1, AR 600-105, TC 3-04.11, and other applicable publications. The tasks in this ATM enhance training in individual and aircrew proficiency. Training focuses on accomplishing tasks that support the unit's mission. The scope and level of training to be achieved, individually by crewmembers and collectively by aircrews, is dictated by the mission-essential task list (METL). Commanders must ensure that aircrews are proficient in the METL.

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), instrument flight examiners (IEs), and maintenance test pilots (MPs) must maintain proficiency in both 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 the use of reverse lettering to signify the difference; 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 is used to indicate a preferred, but non-mandatory, method of accomplishment.

(c) May indicates an acceptable method of accomplishment.

c. **Personnel terminology.**

(1) The rated crewmember (RCM) is an aviator; the terms "rated crewmember," "aviator," and "pilot" are used synonymously.

(2) Pilot in command (PC). The PC has overall responsibility for the operation of the aircraft from pre-mission planning to mission completion and assigns duties to the crew, as necessary. Additionally, the PC is the primary trainer of pilots (PIs) in the development of experience and judgment.

(3) PI. The PI will complete all tasks assigned by the PC.

(4) UT. The UT is a specialized trainer appointed by the commander to assist with unit training. The UT trains readiness level (RL) 2 crewmembers in mission/additional tasks in accordance with (IAW) the ATM and unit METL. To be qualified as an UT, the crewmember must demonstrate a

higher level of knowledge, proficiency, and the ability to train other crewmembers IAW the appropriate ATM and the IP's handbook.

(5) IP. The IP trains and evaluates RCMs, as directed by the commander. The IP may evaluate an IP/SP during a proficiency flight evaluation (PFE) resulting from a lapse in aircraft currency.

(6) IE. The IE trains and evaluates instrument tasks, as directed by AR 95-1 and local requirements.

(7) SP. The SP trains and evaluates RCMs, and supervises and maintains the standardization program.

(8) MP. The MP conducts maintenance test flight (MTF) procedures IAW chapter 5.

1-3. **APPLICABILITY.** Operators of C-12C/D/J/R/U/V–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.

Chapter 2
Training

This chapter describes requirements for qualification, RL progression, and continuation training. Crewmember qualification requirements will be IAW AR 95-1, TC 3-04.11, and this ATM. Training will follow a logical progression sequence. Aviators/crewmembers will demonstrate proficiency in all base tasks in all appropriate modes as noted and be properly progressed prior to being trained on mission tasks.

2-1. QUALIFICATION TRAINING.

a. **Initial fixed-wing (FW) qualification.** Initial FW qualification training will be conducted at the USAACE or a DA-approved training site, according to a USAACE-approved program of instruction (POI).

(1) Active Army and USAR aviators. An Active Army or USAR aviator is qualified in FW aircraft when they have graduated from the qualification course conducted by USAACE. USAR aviators may also attend the ARNG FW qualification course.

(2) ARNG aviators. An ARNG aviator must complete the FW qualification course conducted by the USAACE or a course approved by the Chief, National Guard Bureau and USAACE. 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 FW instrument qualification. However, the crewmember will not be progressed to RL 2 until he or she 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 the following types of training:

a. **Academic training.** Training must include sufficient academic instruction to ensure an aviator has a thorough knowledge of the differences between the aircraft in which he or she is qualified and the aircraft in which he or she is receiving the series qualification training. 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), flight management system (FMS), if installed.

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

(4) Limitations.

(5) Emergency procedures.

(6) Focused training for differences of engine system displays between engine gauges and digital displays across the series.

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 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 enroute 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 / E	A / E	A / E	A	A	A	A / F
C-12D1	A		A	A	A	A / E	A / E	A / E	A	A	A	A / F
C-12D2	A	A		A	A	A / E	A / E	A / E	A	A	A	A / F
C-12R1	C	C	C	C	C	C / E	C / E	C / E	B		C	C / F
C-12U	C	C	C	C	C	D / E	D / E	D / E	C	C		D / F
C-12V	C	C	C	C	C	D / E	D / E	D / E	C	C	D	

A. At 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. At 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. At 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. The aviator will show proficiency in digital system displays specific to the C-12V.
D. At a minimum, an aviator will receive 5 hours of flight instruction to include 1 hour at night, 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 5 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. The aviator will show proficiency in digital system displays specific to the C-12V.
E. 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.)
F. Aviators having completed the C-12 AQC after 1 June 2011 have completed the training requirement for C-12V series qualification and are considered to be C-12V qualified.

2-4. **MODEL 1900C AND 1900D (C-12J) SERIES QUALIFICATION TRAINING**. The C-12J (BE-1900) is a low density aircraft with no established series qualification course. To maintain standardization, all aviators performing duties as IP/SP/MP in the C-12J must attend the Beech 1900 Simulator course taught by Flight Safety International (FSI) in LaGuardia, NY. Commanders will choose pilots with previous C-12U or V experience to begin C-12J qualification.

> ***Note.*** Attending the FSI Beech 1900 simulator refresher course resets all recurrent training requirements for all models of C-12.

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.** At 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 DES-approved C-12 flight simulator (FS) refresher training course prior to beginning 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 any crewmember entering the unit's ATP to undergo refresher training. The commander will base his or her decision on a records check and/or a PFE. The commander will approve 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, at 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 APART requirements in the aircraft in which the training is conducted. The only requirements they have 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, IAW TC 3-04.11, 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 applicable topics in table 2-2 and complete the operator's manual written examination.

Table 2-2. Refresher academic guide

Introduction	Pitot static system
Power plant	Flight controls
Propeller system	Landing gear
Electrical system	Performance charts
Fuel system	Weight and balance
Pressurization system	Performance planning/TOLD
Environmental system	Flight planning, including Department of Defense Flight Information Publications (DOD FLIPs)
Pneumatics system	Instrument departures, enroute navigation, and reporting
Anti-ice and de-ice systems	Instrument approaches (including GPS)
Oxygen system	Crew coordination
Local standing operating procedures (SOPs) and regulations	Terrain awareness and warning system, traffic alert and collision avoidance system (TCAS) operations

(2) Flight training. Table 2-3 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 2-4, page 2-9.

Table 2-3. 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/FS)	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 2-4, page 7. The aviator must occupy the pilot station for this flight. 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. The crewmember who fails to meet standards must be trained and subsequently demonstrate proficiency in the base task(s) determined to be below standard to an 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 any unsatisfactory evaluation, the commander will establish academic requirements applicable to the base task(s) that were evaluated as unsatisfactory. The crewmember will

receive training and demonstrate a working knowledge of these topics to an IP.

(2) Flight training. The commander will determine the task(s) to be trained as part of the crewmember's training plan. At a minimum, the crewmember must receive training and demonstrate proficiency in only 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 3-04.11 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 qualification, series or refresher training, the aviator may perform PI duties while undergoing RL 2 training with a UT, IP, SP, or IE. 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.** Crewmembers 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 series or refresher training and mission training. The commander may designate a crewmember into this phase of training after a records review or PFE. This chapter outlines tasks that 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 FW crewmembers as FAC 3.

Note. UTs, IPs, MPs, SPs, and IEs may credit hours flown while performing assigned duties toward their semiannual flying hour requirements.

Note. Aviators may credit up to 6 hours of flight time in a DES-approved FS toward their semiannual flying hour requirements.

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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 2-4, page 2-7, as well as those mission and additional tasks designated on their 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 as an MP must, in addition to the required minimum annual tasks and iterations, perform at least one iteration of each MTF tasks in table 2-5, page 2-8, semiannually.

(2) FAC 3. There are no provisions to designate FW crewmembers as FAC 3.

(3) Additional aircraft. The requirement to perform task iterations in additional aircraft will be at the discretion of the commander.

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, and D2.

(2) C-12R1.

(3) C-12U.

(4) C-12V.

(4) 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 IAW 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. **AVIATION MISSION SURVIVABILITY TRAINING REQUIREMENTS.** Aviation mission survivability (AMS) training will be performed IAW TC 3-04.11 and current USAACE guidance.

2-10. **ANNUAL CHEMICIAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR TRAINING REQUIREMENTS.** The commander will evaluate the unit mission and determine if chemical, biological, radiological, and nuclear (CBRN) training is required. Commanders determining that their unit does not require CBRN training must request a unit ATP waiver IAW TC 3-04.11. If the commander determines that the unit requires CBRN training, he or she will train all FAC 1 rated crewmembers and selected FAC 2 positions.

CAUTION

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

a. Aviators who require CBRN training or evaluations will perform the tasks indicated by an "**X**" in the CBRN column in table 2-4, page 2-7, at a minimum. The commander may select mission/additional tasks based on the unit's mission.

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

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

(2) Emergency procedures training is not accomplished in flight while any member of the aircrew is wearing mission oriented protective posture (MOPP) gear.

(3) Close coordination is maintained with the local flight surgeon regarding CBRN training.

2-11. **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, 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 websites to find relevant topics to share during academic training sessions.

2-12. **TASK LISTS.**

a. **Base tasks.** Table 2-4, page 2-7, lists the base tasks. An "**X**" under the mode of flight column denotes the task as a base task for that mode of flight. "**D**" is day, "**I**" is instrument, "**N**" is night, **CBRN** is MOPP.

Table 2-4. Aviator base task list

Task	*Task Title*	*D*	*I*	*N*	*CBRN*	*EVAL*
1000	Participate in a Crew Mission Briefing	X	X	X		S & I
1004	Plan a Visual Flight Rules Flight[1]	X				S
1006	Plan an Instrument Flight Rules Flight[1]		X			I
1010	Prepare Department of the Army Form ???? (C-12 Takeoff and Landing Data Card)	X	X			S & I
1012	Verify Weight and Balance	X	X			S & I

Table 2-4. Aviator base task list

Task	*Task Title*	*D*	*I*	*N*	*CBRN*	*EVAL*
1023	Perform Flight at Minimum Control Speed with Critical Engine Inoperative (V_{MCA}) (Simulator Only)[2]					
1029	Perform Preflight Inspection[3]	X	X	X	X	S or I
1034	Perform Engine Start[3]	X	X	X	X	S
1035	Perform Aircraft Taxi[3]	X		X	X	S
1045	Perform Engine Run-Up	X		X		S
1070	Perform Emergency Procedures	X	X			S or I
1077	Perform Procedures for Two-Way Radio Failure	X	X			S or I
1104	Perform Normal Takeoff and Climb[3]	X		X	X	S
1120	Perform Steep Turns	X				S
1122	Perform Climbs and Descents	X				S
1125	Perform Slow Flight	X				S
1144	Perform Touch and Go (Required for IPs/SPs only)	X				S
1145	Perform Normal Landing[3]	X		X	X	S
1148	Perform Fuel Management Procedures	X	X	X		S & I
1177	Perform Go-Around	X		X		S or I
1179	Perform Balked Landing	X				S
1182	Perform Radio Communication Procedures	X	X			
1200	Perform Instrument Takeoff		X			I
1210	Perform Holding Procedures		X			I
1212	Perform Enhanced Ground Proximity Warning System/Terrain Avoidance and Warning System Operations	X	X			S or I
1215	Perform Precision Approach[4]		X			I
1220	Perform Non-precision Approach		X			I
1240	Perform Missed Approach		X			I
1245	Perform Unusual Attitude Recovery	X	X			S or I
1253	Perform Autopilot/Flight Director Operations		X			S or I
1254	Perform Instrument Flight Rules Navigation		X			I
1260	Operate Weather Avoidance System (s)	X	X			S or I
1261	Perform Circling Approach		X			
1264	Perform Global Position System Approach or Area Navigation Approach[5]		X			I
1265	Perform Traffic Alert and Collision Avoidance System Operations	X	X			S or I
1303	Perform Approaches to Stalls	X				S
1310	Perform Emergency Procedures for Engine Failure During 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

Table 2-4. Aviator base task list

Task	*Task Title*	*D*	*I*	*N*	*CBRN*	*EVAL*
1336	Perform Emergency Procedures for Engine Failure During Final Approach	X				S
1340	Perform Emergency Landing Gear Extension[6]					
1352	Perform Rejected Takeoff	X				S
1800	Perform After Landing Tasks[3]	X	X	X	X	S & I

[1] When Tasks 1004 and 1006 are performed in the primary aircraft, they do not have to be performed in the additional aircraft.
[2] Task 1023 is a FS only maneuver and has no annual task iteration or evaluation requirement.
[3] CBRN tasks are for FAC 1 positions and select FAC 2 positions when determined necessary by the commander. Unit should establish a wet bulb globe temperature limit for performing these tasks.
[4]Task 1215 must be evaluated at least once annually while the aircraft is operating single engine.
[5] Units performing GPS or RNAV approaches will train and evaluate Task 1264.
[6] Task 1340 is required only for qualification/refresher training, and has no other annual iteration requirements.

b. **Additional tasks.** The commander may design additional tasks based on the unit METL. Additional tasks are 3000 series tasks.

c. **Maintenance tasks.** Table 2-5 lists the maintenance tasks. These tasks are to be added to the CTL for aviators performing MP duties.

Table 2-5. Maintenance test pilot task list

Task	*Task Title*	*EVAL*
4910	Perform Taxiing Check	
4915	Perform Engine Run-Up/Aircraft Systems Check	X
4921	Perform Before Takeoff Check	
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 [1]	X
4937	Perform Maximum Power-Lever Position Check/Maximum Turbine Gas Temperature/N_1 Availability [1]	X
4939	Perform Engine-Acceptance Check/Engine Performance at Maximum Continuous/Cruise Power[1]	X
4941	Perform Engine Ice Vanes Check	
4943	Perform Trim and Rigging Check	
4945	Perform Autopilot Check	
4948	Perform Stall Warning System Check	X
4949	Perform Flap Operation Check	X
4951	Perform Minimum Elevator Trim Check	X
4953	Perform Auto-Ignition Check	X
4955	Perform Manual Propeller Feathering and Unfeathering Check	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 Communications and Navigation Equipment Check	

[1]Tasks 4935, 4937, and 4939 may be evaluated at an altitude less than 25,000 feet.

d. **Evaluation guidelines**.

1) **APART evaluation tasks.** These 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; 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.

2) **MP evaluation requirements**. MPs will be evaluated annually on performance of selected MP tasks during the APART by a maintenance designated SP/IP. Those tasks in table 2-5, page 2-8, indicated by an "**X**" in the "**EVAL**" column are the minimum tasks to be evaluated during the annual MP evaluation.

3) **Night tasks.** Tasks with an "**X**" in the "**N**" column of table 2-4, page 2-7, are mandatory for annual night iteration performance and indicate the tasks that must be evaluated at night for progression to RL 2.

2-13. FLIGHT SIMULATOR STANDARDS.

a. The flight simulator (FS) must be full motion with outside visual capability level C or better. FS must be compatible with the cockpit design of the individual's assigned aircraft.

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

2-14. SIMULATOR TRAINING.

a. All Regular Army, Reserve Component, National Guard, and Department of the Army Civilian (DAC) aviators flying a C-12 as a primary, additional, or alternate aircraft are required to conduct FS refresher/recurrent training as outlined below.

b. FW aviators serving in C-12 assignments will complete an approved FS refresher/recurrent training within 12 to 18 months after completing the C-12 Aircraft Qualification Course (AQC).

c. Aviators qualified in C-12/RC-12 aircraft but not having flown a C-12/RC-12 as a primary, additional, or alternate aircraft in the previous 12 months or more will receive an approved FS refresher/recurrent training prior to progressing to RL 2 or prior to flight without an IP/SP at the controls for DAC aviators.

d. Aviators currently flying C-12 as a primary, additional, or alternate aircraft will receive an approved FS refresher/recurrent training biennially (once every 2 years).

e. FW aviators may apply 6 hours of approved FS flight time to their semiannual flying-hour requirement.

f. Aviators completing the FW IP course that includes time flown in a compatible or similar FS will receive credit for FS requirements listed in paragraph 2-14a through e.

g. Aviators failing to meet the ATP requirements set forth in paragraphs 2-13 and 2-14 will be processed in accordance with AR 95-1.

2-15. MAINTENANCE TEST PILOT.

a. **Prerequisites.** Commanders are authorized to designate individuals as MPs. Candidates for MP are to be selected from the most qualified/experienced aviators. IP qualification in aircraft category is highly desirable. FW MPs are not required to be graduates of the aviation maintenance leader/aviation maintenance manager/MP course IAW AR 95-1.

b. **Qualification requirements.** MP qualification training will be conducted at the unit level. The training will be conducted by a MP 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 MP tasks listed in table 2-5, page 2-8, 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. Tasks in table 2-5, page 2-8, indicated by an "**X**" in the "**EVAL**" column are the minimum tasks to be evaluated 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 2-6 as a guide for developing a mission academic training program for MPs.

(2) Flight training. The MP will receive training and demonstrate proficiency in all tasks listed in table 2-5, page 2-8.

Table 2-6. 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 and Aircraft Systems must be covered in training	

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 IAW AR 95-1, the commander's ATP, TC 3-04.11, and this ATM.

3-1. **EVALUATION PRINCIPLES.** These principles are described as follows:

a. **Selection for evaluators.** 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 ATP.

b. **Method of evaluation.** The method used to conduct the evaluation must be based on uniform and standard objectives. In addition, it must be consistent with the unit's mission and must strictly adhere to the appropriate 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 principles 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.

(1) In such cases, a realistic, meaningful, and planned method should be developed to pass this task back to the examinee effectively. In all other situations, the evaluator must perform as outlined in the task description or as directed by the examinee. At some point, the evaluator may perform a role reversal with the examinee.

(2) The examinee must be made aware of both the initiation and termination of role reversal. The examinee must know that he or she is being supported by a fully functioning crewmember. The purpose of this tool is to determine the proficiency level of the pilot being evaluated, not to transform a dual pilot aircraft into a single pilot aircraft.

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 a crewmember's ability to perform tasks on the CTL and to check their 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) 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 also demonstrate a basic understanding of the appropriate academic subjects from the ATM. In addition, the PI must be familiar with the individual aviator training folder (IATF) and understand the requirements of the CTL.

(2) PC. The PC must meet the requirements in paragraph 3-3a(1). In addition, he or she must demonstrate sound judgment and maturity in the management of the mission, crew, and assets.

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

(4) MP. The MP must meet the PC requirements in paragraph 3-3a(2). In addition, he or she must be able to evaluate the airworthiness of an aircraft and have a thorough understanding of test flight procedures. The commander will select an aviator for performing MP duties based on experience and demonstrated maturity and good judgment. An MP-qualified SP/IP will conduct the training and evaluation.

(5) IP. The IP must meet the PC requirements in paragraph 3-3a(2). In addition, he or she must be able to objectively train, evaluate, and document performance of the PI, PC, MP, and UT, using role-reversal, 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 ATP.

(6) SP/IE. The SP must meet the requirements in paragraph 3-3a(5). The IE must meet the requirements of paragraph 3-3a(2). In addition, the SP/IE must be able to train and evaluate IPs, SPs, IEs, and MPs, using role-reversal as appropriate. The SP must also be able to develop and implement a unit training plan and administer the commander's ATP. 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 failures, IAW AR 95-1. IEs who are not FW IPs/SPs may only perform simulated engine failures and unusual attitude recoveries in cruise flight (these **may not** be performed while on an instrument approach procedure or in the traffic pattern).

Note. Crewmembers must be evaluated in all crew positions authorized on their CTL. Not all tasks are required to be evaluated in the different crew positions. 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, UT, IP, SP, IE, and MP).

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b. **Evaluation criteria.**

(1) PFE. This evaluation is conducted according to AR 95-1, TC 3-04.11, 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 paragraph 3-4b. If the evaluated crewmember is an IP/SP, the SP will evaluate the IP's/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's/SP's ability to instruct instrument-related tasks.

(4) APART MP evaluation. An MP-qualified IP/SP will evaluate a minimum of two topics from the subject areas in paragraph 3-4b(10). 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. **FS.** A compatible FS may be used to conduct instrument flight evaluations IAW AR 95-1 provided the following criteria are met:

(1) The FS must be full motion category C or higher.

(2) The FS must be Super King Air compatible. Contact DES, Fort Rucker, Alabama, for a current listing of approved FSs 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 record folder and IATF records to verify that the examinee meets all prerequisites for the rating and has a current DA Form 4186, *Medical Recommendation for Flying Duty*.

(2) Confirms the purpose of the flight evaluation, explains the evaluation procedure to include role reversal as appropriate, 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 level of understanding of a topic.

(1) Regulations and publications. AR 95-1, Department of the Army Pamphlet (DA Pam) 738-751, *Functional Users Manual for the Army Maintenance Management System-Aaviation (TAMMS-A)*, DOD FLIP, TC 3-04.11, appropriate operator's manual, applicable major Army command (MACOM) supplements, and local and unit SOPs. Topics in this subject area are—

- ATP, IATF/CTL requirements.
- Crew coordination.
- Airspace regulations and usage.
- Flight plan (FPLN) preparation and filing.
- Performance planning/TOLD.
- Inadvertent IMC procedures.
- Forms, records, and publications required in the aircraft.
- Unit SOP and local requirements.
- DOD FLIPs and maps.
- Visual flight rules (VFR)/instrument flight rules (IFR) minimums and procedures.
- Risk management.
- Fuel requirements.
- Crew endurance.
- Weight and balance requirements.
- Aviation life support equipment.
- Mission approval/briefing procedures.

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

- Landing gear.
- Engines and related systems.
- Emergency equipment.
- Propeller systems.
- Transponder.
- Fuel system.
- Flight instruments.
- Servicing, parking and mooring.
- Navigation equipment.
- Electrical system.
- Heating, ventilation, and environmental control system.
- Ice protection.
- Pneumatic system.
- Pressurization.
- Aircraft survivability equipment (ASE).
- Mission equipment.

(3) Instrument planning and procedures (AR 95-1, AR 95-10, *Department of Defense Notice to Airmen (NOTTAM) System*, aeronautical information manual [AIM], DOD FLIP, operator's manual, Field Manual [FM] 3-04.203, *Fundamentals of Flight*, and FM 3-04.240, *Instrument Flight for Army Aviators*). Topics in this subject are—

- Departure procedures.
- Required weather for takeoff, en route, destination, and alternate.
- NOTAM.
- Terminal aerodrome forecasts.
- Aviation routine weather reports, Meteorological Aerodrome reports (METARs).
- DOD FLIP symbology.
- Fuel requirements.
- Weather hazards.
- Army Aviation Flight Information Bulletin.
- Opening and closing FPLNs.
- Airspace–Types, dimensions, and requirements to operate in.
- VFR requirements.
- FPLN preparation.
- Position reports.
- En route weather services.
- Transponder requirements.
- Arrival procedures.
- Computing equal time points (engine or pressurization failure).

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

- Propeller limitations.
- Weather/environmental limitations/restrictions.

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

(5) Aircraft emergency procedures and malfunction analysis (appropriate operator's manual, chapter 9). Topics in this subject area are—

- Emergency terms and definitions.
- Engine malfunctions.
- Single-engine service ceiling.
- Fires.
- Hydraulic system malfunctions.
- Landing and ditching procedures/emergencies.
- Mission equipment malfunctions.
- Duct over-temp caution light illuminated.
- Engine bleed air malfunction.
- Emergency exits and equipment.
- Chip detectors.
- Fuel system malfunctions.
- Electrical system malfunctions/emergencies.
- Flight control malfunctions.
- Loss of pressurization.
- Low oil pressure.
- Auto-pilot malfunctions.

(6) Aeromedical factors (AR 40-8, *Temporary flying Restrictions Due to Exogenous Factors*, TC 3-04.93, *Aero Medical Training for Flight Personnel*, and FM 3-04.203). Topics in this subject area are—

- Flight restrictions due to exogenous factors.

- Stress and fatigue.
- Spatial disorientation.
- Hypoxia.
- Middle ear discomfort.
- Decompression sickness.
- Principles and problems of vision.

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

- Stall and stall characteristics.
- V_{MCA} causes and prevention.
- Torque (TQ) and P factor.
- Hydroplaning.
- Turning performance.
- Crosswind landings.
- Spins and spin recovery.
- Asymmetrical thrust.
- Elements of the lift equation.
- Slow flight.
- Types of drag, drag curve, and V_g diagram

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

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

(9) Tactical and mission operations (FM 3-04.111, *Aviation Brigades*, FM 3-04.203, FM 3-52, *Airspace Control*, the commander's ATP, and unit SOP). Topics in this subject area may be—

- CBRN operations.
- ASE employment.
- Downed aircraft procedures.
- COMSEC.
- Aviation mission planning.
- Fratricide prevention.
- High-intensity radio transmission area (HIRTA).

(10) MP system topics: aircraft systems, avionics, mission equipment description and operation, system malfunction analysis, and trouble-shooting (DA Pam 738-751, applicable operators/MTF manual, and technical manual [TM] 1-1500-328-23, *Technical Manual Aeronautical Equipment Maintenance Management Policies and Procedures*). Topics in this subject area are (for MPs only):

- Local airspace usage.
- Test flight weather requirements.
- Engine start.

- Instruments.
- Electrical systems.
- Caution panel.
- Power plant.
- Fuel system.
- Test flight forms and records.
- Propeller systems.
- Hydraulic (if applicable).
- Engine performance check.
- Flight checks.
- MTF requirements.
- Communications and navigation equipment.
- Maintenance operations checks.

(11) SP, IP, IE, and UT, evaluator/trainer topics (TC 3-04.11 and Instructor Pilot Handbook [IPH]). Topics in this subject area are—

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

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

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

- 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.

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(2) Preflight inspection, engine-start, and run-up procedures. The evaluator will evaluate the examinee's use the 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. At a minimum, the evaluator will evaluate tasks identified in chapter 2, tasks listed on the CTL as mandatory for the designated crew station(s), and those missions or additional tasks selected by the commander. A crewmember designated as an MP will have those tasks designated by an "**X**" in the EVAL column in table 2-5, page 2-8, evaluated during the APART evaluation. An IP, SP, IE, or UT must demonstrate an ability to instruct and evaluate appropriate flight tasks. 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 the operator's manual/CL/MTF manual as appropriate.

d. **Phase 4-Debriefing.** During this phase of the evaluation, the evaluator will—

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

(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 approved by the commander for the crewmember to allow him or her to regain proficiency in tasks that were evaluated as unsatisfactory.

3-5. **ADDITIONAL EVALUATIONS.**

a. **CBRN evaluation.** If the commander determines that CBRN training is required, he or she will establish, in writing, a CBRN evaluation program. Units may conduct CBRN evaluations as part of the commander's no-notice program or the APART.

b. **Post-mishap flight evaluation (PMFE).** These evaluations will be conducted IAW AR 95-1 after any Class A or B accident and any Class C accident at the discretion of the commander. In the event a timely classification of the accident cannot be determined, a PMFE will be conducted prior to the return of the aviator to flight duties. If a PMFE is required, an aviator performing flight duties on more than one ATP is suspended from these duties pending successful completion of the PMFE. The evaluation will be conducted IAW paragraphs 3-3a(1) through (5) and paragraph 3-3b(1). See AR 40-501, *Standards of Medical Fitness*, for medical release requirements before 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 the disability. The flight surgeon may need to be part of the crew to assist in the conduct of the evaluation.

(1) After the examinee has completed the medical flight evaluation, the evaluator will prepare a memorandum. He or she will include in the memorandum—

(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 the Commander, USAACE, ATTN: MCXY-AER, Fort Rucker, Alabama 36362-5333, for board action. Commanders will coordinate with 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 3-04.11 and the unit's SOP. The commander will select the evaluation method: written, oral, and/or a flight in an aircraft or FS. 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 objective questions. Questions from each chapter of the operator's manual should be included in the examination. The aviator must answer 45 of the 50 questions (90 percent) correctly to receive a satisfactory grade. All questions requiring underlined emergency procedure must be answered correctly.

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Chapter 4
Crewmember Tasks

This chapter implements portions of STANAG 3114.

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 along with training and evaluation requirements. Chapter 6 outlines recommended crew callouts and crew duties. The task description is a training aid to assist crewmembers in successfully performing tasks to standard.

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 are 011, United States Army Aviation Center of Excellence, Fort Rucker, AL; 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 FS. 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 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 emergency procedure training is being conducted in a compatible FS, an IP or IE is not required to be a crewmember at the controls to perform emergency procedures tasks. If emergency procedure training is being conducted in the aircraft, the appropriate evaluator must be a crewmember at the controls.

(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 CL as time/crew workload permit. The crew 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 take-off, 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, AP, FMSs, and flight director (FD) mode selections require P* participation, mandating a response such as "**CONFIRMED**" (for example, before landing check—"**GEAR, DOWN/CONFIRM**," the 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) Tasks**.**

(a) Perform crew coordination actions and callouts IAW chapter 6 ATM 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 commensurate with conditions.

(d) Correctly use controls as required for wind conditions.

(e) Appropriate airport diagrams out and available.

(f) Complicated or unexpected clearances shall be written down.

(g) No intersection will be entered without clearing in all directions.

(h) Traversing runways and hotspots requires extra vigilance. Starting engines or completing checklists is prohibited in these areas.

(3) Inflight.

(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 nautical mile (NM) when tracking distance measuring equipment (DME) arcs.

(4) Final spproach. Descent rates greater than 1,000 FPM are prohibited unless briefed and concurred by each crewmember.

(5) Other. Standards other than those listed above will be addressed in that 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 designation P* and P does not refer to PC duties. When required, PC responsibilities are specified. For all tasks, the following responsibilities apply:

(a) Crewmembers. Perform crew coordination actions and announce malfunctions or

emergency conditions. They will 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 he or she commands. The PC will ensure that a crew and passenger briefing is accomplished and that the mission is performed IAW air traffic control (ATC) instructions, regulations, and SOP requirements.

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

(d) P*. The P* is responsible for aircraft control and the proper execution of immediate action emergency procedures. The P*, when verbally being described or referenced, is called the "pilot on the controls". The P* will announce any deviation from normal operating procedures and the reason.

(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 flying" 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, switch, and control positions are in bold type when integrated in the task description (for example **FLAPS-UP**). Chapter 6 contains a consolidated list of callouts. Throughout this manual the intent is for the left seat pilot to select the gear position. The term "will" in this instance is used to highlight this intent. In a heavy workload environment the PC may elect to delegate the movement of the gear handle to appropriately distribute the workload.

f. **Other 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, IAW TC 3-04.11.

g. **Training and evaluation requirements.** Training and evaluation requirements define whether the task will be trained or evaluated in the aircraft, FS, 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. The evaluation must, however, include hands-on performance of the task. Some task procedures allow multiple ways to achieve the standards. The evaluator will determine which method(s) to examine during the conduct of an evaluation. Table 2-4, page 2-7, 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).

- AR 95-1.
- FM 3-04.203.

- Appropriate operator's manual/CL.

(2) All instrument tasks.

- AR 95-1.
- FM 3-04.240.
- FAA-H-8083-15A.
- FAA- H-8261-1A.
- DOD FLIP.
- AIM.

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

4-2. TASK LIST.

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, *Mission Schedule/Brief*, and a unit-approved crew briefing checklist (CL).

STANDARDS:

1. The air mission commander (AMC) or PC will actively participate in and acknowledge an understanding of DA Form 5484.
2. The PC will conduct or supervise an aircrew mission briefing using a unit-approved crew briefing CL.
3. The crewmembers receiving the aircrew mission brief will acknowledge verbally a complete 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, IAWAR 95-1. The PC will acknowledge a complete understanding of the mission brief and initial DA Form 5484.

   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.

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

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

2. Procedures.

   a. Brief the mission using a unit-approved crew mission briefing CL. Figure 4-1, page 4-6, 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.

   Note. Units will develop a passenger briefing checklist. The PC will ensure the briefing is conducted. The PC may delegate the briefing to another crewmember.

1. Mission overview.
2. Weather. Departure, en route, destination and alternate, if required.
3. NOTAMs.
4. Flight route.
5. Fuel/Refueling requirements.
6. Required equipment.
    a. Personal.
    b. Survival.
    c. Mission.
    d. Publications.
7. Crew callouts, duties, and responsibilities–Standard.[1]
    a. Two-Challenge Rule.
    b. Most Conservative Response.
    c. Sterile Cockpit Procedures.

8 Analysis of the aircraft.

    a. Logbook and preflight deficiencies.
    b. Performance planning.
        (1) Takeoff landing data (TOLD).
        (2) Mission deviations required based on aircraft performance, weather, or threat.
        (3) Single-engine capability.
    c. Mission deviations required based on aircraft analysis.

9. Risk assessment considerations.
10. Crewmembers' questions, comments, and acknowledgment of the mission briefing.

1. Use the word “standard” when the crew has been trained on crew callouts, duties, and responsibilities IAW chapter 6 and the unit SOP.

Figure 4-1. Sample crew mission briefing checklist

NIGHT CONSIDERATIONS: Not applicable.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references, DA Form 5484, and unit SOP.

TASK 1004

Plan a Visual Flight Rules Flight

CONDITIONS: Prior to flight in a C-12 series airplane and given access to weather information; NOTAMS; flight planning aids; necessary charts, forms, publications, local flying rules and weight and balance information.

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

STANDARDS:

1. Determine takeoff and landing capabilities using the operator's manual or the approved electronic TOLD program.
2. Verify that the weight and balance is current and within limits for the planned load, using the appropriate Department of Defense (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 minimums required by AR 95-1.
4. Plan the mission to meet all requirements for VFR flight.
5. Select route(s) that avoid hazardous weather, to ensure mission completion. If appropriate, select altitudes that conform to VFR cruising altitudes.
6. Complete and file a FPLN IAW AR 95-1, DOD FLIP and local or host country procedures.
7. Compute the following for the mission:
   a. Distance within ±5 miles, true airspeed within 10 knots (KTS) 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 IAW AR 95-1.
8. Perform mission risk assessment IAW unit SOP.

DESCRIPTION:

1. Crew actions.
   a. The PC will ensure the required preflight planning items are complete. The PC may direct the PI to complete some portions of the VFR flight planning.
   b. The PI will complete all assigned elements and report the results to the PC.
2. Procedures.
   a. Using appropriate military, FAA or host-country weather facilities, obtain required flight weather information. 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.
   c. Select the course(s) and altitude(s) that will best facilitate mission accomplishment. Compute total distance and flight time and calculate the required fuel using the appropriate charts in the operator's manual. Determine refueling arrangements, if required. Complete the appropriate FPLN 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.

3. Task may be conducted prior to flight in an approved FS.

REFERENCES: Appropriate common references; DD Form 365-4; DD Form 175-1, *Military Flight Plan*; DD Form 175-1, *Flight Weather Briefing,* local flying rules; AR 95-1; Title 14, Code of Federal Regulation (CFR) Part 91; International Civil Aviation Organization (ICAO) host nation regulations; and the unit SOP.

TASK 1006
Plan an Instrument Flight Rules Flight

CONDITIONS: Prior to IFR flight in a C-12 series airplane and given access to weather information, NOTAMS, flight planning aids, 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. Determine takeoff and landing capabilities using the operator's manual or the approved electronic TOLD program.
2. Verify the weight and balance is current and within limits for the planned load using the appropriate DD Form 365-4.
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 IMC flight. Determine the proper departure, en route and destination procedures, and decide if an alternate airfield is required.
5. Select route(s) and altitudes that avoid hazardous weather conditions, 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 KIAS and ETE within ±3 minutes for each leg of the flight.
   b. Ensure IFR fuel and reserve requirements are met IAW AR 95-1.
7. Perform mission risk assessment and crewmember briefing IAW unit SOP and AR 95-1.
8. Complete and file a FPLN IAW AR 95-1, DOD FLIP and local or host country procedures.

DESCRIPTION:

1. Crew actions.
   a. The PC should assign flight planning duties.
   b. Crewmembers will complete the assigned duties and report the results to the PC.
   c. The PC will ensure that the crewmembers are current and qualified. The PC will also determine whether the aircraft is properly equipped and that sufficient flight planning has been completed to accomplish the mission.
2. Procedures.
   a. Using appropriate military, 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, GPS NOTAMS, GPS receiver autonomous integrity monitoring (RAIM) 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 will best facilitate mission accomplishment. When possible, select preferred and alternate routing.
   d. Select altitude(s) that minimize icing and turbulence are above minimum IFR altitudes, conform to the semicircular rule, and do not exceed aircraft or equipment limitations.
   e. Compute the total distance and flight time, and calculate the required fuel. Determine refueling arrangements, if required. Use the appropriate charts, the operator's manual, or a computer flight-planning program, if applicable. If a computer flight-planning program is used, verify aircraft

performance data with the operator's manual before using. Complete the appropriate FPLN and file it with the appropriate agency.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted academically.
2. Evaluation will be conducted academically.
3. Task may be conducted prior to flight in an approved FS.

REFERENCES: Appropriate common references; DD Form 175; DD Form 175-1; DD Form 365-4; AR 95-1; Title 14, CFR Part 91; ICAO/host nation regulations; local SOPs; and regulations.

TASK 1010

Prepare a Department of the Army Form 7739-R, *C-12 Takeoff and Landing Data Card*

Note. A copy of DA Form 7739-R is available on the USAPA web site at http://www.apd.army.mil.

Note. Performance planning computer software may be used to complete TOLD card data. The software must be approved for use by the PEO-AV. DA Form 7739-R must be used during ATP evaluations.

CONDITIONS: Given a completed DD Form 365-4, the aircraft operator's manual, unit SOP, environmental conditions at takeoff, runway information, and a blank DA Form 7739-R.

STANDARDS: Appropriate common standards plus these additions/modifications:

1. Correctly compute performance data according to procedures given in the aircraft operator's manual, the unit SOP, and the description below.
2. Re-compute TOLD card data if conditions increase by 1,000 feet PA, 10 degrees Celsius, or 500 pounds gross weight.

DESCRIPTION:

1. Crew actions.

   a. The PC will compute or direct the other crewmember to compute the aircraft performance data IAW the instructions provided 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.

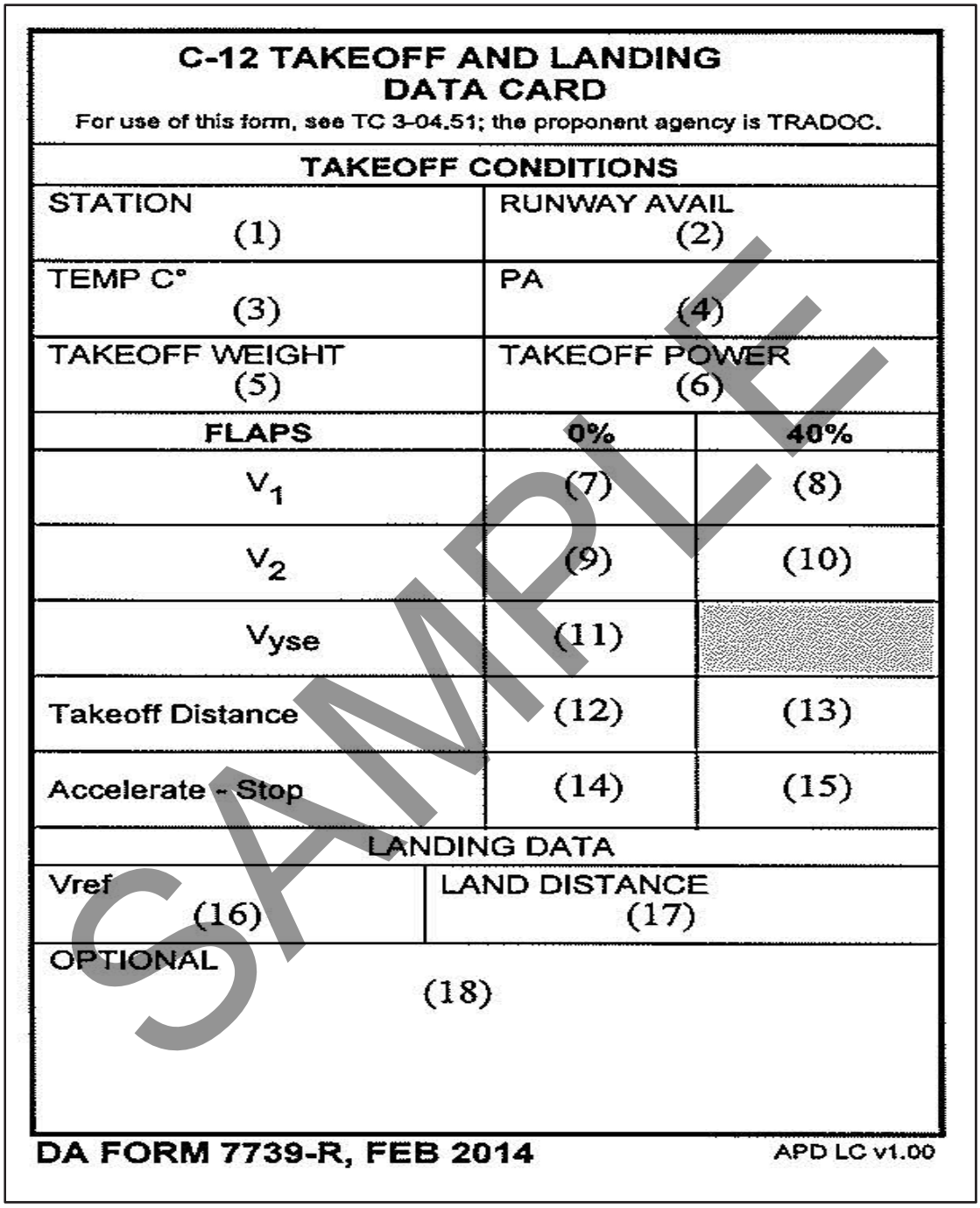
   a. DA Form 7739-R is an aid for organizing takeoff and landing planning data. This form provides an easy reference for the crew for takeoff, takeoff emergencies, and landing at destination. The TOLD card is a guide to expected aircraft performance and will be computed prior to takeoff and should be updated prior to landing. It is a primary risk management tool for the crew and commander to determine the MAX 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 the departure time. Instructions for completing the items indicated by bold numbers in figures 4-2 and 4-3, pages 4-12 and 4-15, are given in the aircraft operator's manual and supplemented by the instructions below. The crew should be aware of variables between pre-computed and actual performance, such as a change in runway conditions.

   Note. The C-12 series 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" or "Net Gradient of Climb" instead of "Single engine Gradient of Climb").

3. Supplemental instructions.

   Note. Speeds that are published as a single number and do not have a chart that varies the speed with weight are required memory items. The TOLD card eliminates the requirement to list speeds that do not change; for example, V_{MC}.



C-12 TAKEOFF AND LANDING DATA CARD

For use of this form, see TC 3-04.51; the proponent agency is TRADOC.

TAKEOFF CONDITIONS		
STATION (1)	RUNWAY AVAIL (2)	
TEMP C° (3)	PA (4)	
TAKEOFF WEIGHT (5)	TAKEOFF POWER (6)	
FLAPS	**0%**	**40%**
V_1	(7)	(8)
V_2	(9)	(10)
Vyse	(11)	
Takeoff Distance	(12)	(13)
Accelerate - Stop	(14)	(15)
LANDING DATA		
Vref (16)	LAND DISTANCE (17)	
OPTIONAL (18)		

DA FORM 7739-R, FEB 2014 APD LC v1.00

Figure 4-2. Sample DA Form 7739-R (front)

a. **Front**. The front of the TOLD card is used to record the departure performance data for the configuration and takeoff weight.

Item (1)-STATION. Enter the three-letter or ICAO identifier for the departure airport.

Item (2)-RUNWAY AVAIL. Enter the runway length of the planned departure runway. Update if ATC changes the departure runway.

Item (3)-TEMP °C. Record the TEMP in °C forecast for the time of departure.

Item (4)-PA**.** Record the PA forecast for the time of departure.

Item (5)-TAKEOFF WEIGHT. Record the takeoff WT obtained from the DD Form 365-4 or the adjusted takeoff WT determined from the reverse side of the TOLD card.

Item (6)-TAKEOFF POWER (Table 4-3, page 4-18). Record the engine torque from the *Minimum Takeoff Power at 2,000 RPM* chart for both ice vanes retracted and extended if conditions require.

Note. Torque should increase approximately 1 percent from 0 to 65 knots. The power (torque) indicated is the minimum value upon attaining 65 knots at which charted takeoff performance can be obtained. Excess power which can be developed without exceeding engine limitations should be utilized.

Item (7)-FLAPS UP V_1 (Table 4-1, page 4-17). In the C-12 series, V_1, and V_R are equivalent. Record the speed from the V_1 column, for the takeoff weight, in the tabular data box at the top of the *TAKEOFF DISTANCE—FLAPS 0% chart*. The decision to use flaps will be based on takeoff gross weight, environmental conditions, available runway length, and climb gradient requirements.

Item (8) – FLAPS 40% V_1. In the C-12 series, V_1, and V_R are equivalent. Record the speed from the V_1 column, for the takeoff weight, in the tabular data box at the top of the *TAKEOFF DISTANCE—FLAPS 40%*. The decision to use flaps will be based on takeoff gross weight, environmental conditions, available runway length, and climb gradient requirements.

Item (9) – FLAPS UP V_2 (Table 4-1, page 4-17). Although not normally the same, for performance planning purposes, utilize V_2 and V_{YSE} as equivalent values. Record the speed from the V_2 column for the takeoff weight, in the tabular data box at the top of the *TAKEOFF DISTANCE—FLAPS 0 %/UP chart*.

Item (10) – FLAPS 40% V_2. Record the speed from the V_2 column for the takeoff weight, in the tabular data box at the top of the *TAKEOFF DISTANCE—FLAPS 40 %.*

Item (11) – V_{YSE} (Table 4-1, page 4-17). Record V_{YSE} from the *Climb Speed~KTS* airspeed block listed on the *Climb-One Engine Inoperative* chart for the departure weight.

Note. Best angle-of-climb speed (V_X). If conducting an obstacle clearance climb, use the speed listed in the V_X column of the tabular data at the top of the *TAKEOFF DISTANCE—FLAPS 40 %* chart.

Item (12) – TAKOFF DISTANCE FLAPS 0% (Table 4-3, page 4-18). Record the runway distance required for takeoff from the *TAKEOFF DISTANCE—FLAPS 0 %/UP* chart . Do not consider head wind during takeoff computations. However, if takeoff must be made downwind, include the tail wind in takeoff computations. Adjust the distance for takeoff with the ice vanes extended, or runway slope if the appropriate charts exist.

Item (13) – TAKOFF DISTANCE FLAPS 40%. Record the runway distance required for takeoff from the *TAKEOFF DISTANCE—FLAPS 40 %* chart . Do not consider head wind during takeoff computations. However, if takeoff must be made downwind, include the tail wind in takeoff computations. Adjust the distance for takeoff with the ice vanes extended, or runway slope if the appropriate charts exist.

Item (14) – ACCELERATE−STOP FLAPS 0% (Table 4-2, page 4-17). Record the accelerate-stop distance from the Accelerate – Stop − FLAPS 0 %/UP chart. This distance must be equal to or less than the runway or the runway plus any runway overrun available in order to safely stop the airplane in the event of an engine failure up to V_1. The crew should not attempt a takeoff from a runway shorter than the Accelerate-Stop-Distance.

Item (15) – ACCELERATE−STOP FLAPS 40%. Record the accelerate-stop distance from the Accelerate – Stop − FLAPS 40 % chart. This distance must be equal to or less than the runway or the runway plus any runway overrun available in order to safely stop the airplane in the event of an engine failure up to V_1. The crew should not attempt a takeoff from a runway shorter than the Accelerate-Stop-Distance.

Item (16) – V_{REF}. Record the **V_{REF}** speed from the *Landing Distance* charts, based on the planned landing weight for an immediate return. The crew will confirm this speed prior to landing and make adjustments based on the actual landing weight. Units have the option of splitting the block (/) and recording the V_{REF} for landing at takeoff gross weight (GWT) or MAX landing WT on one side. On the other side, record the V_{REF} for the landing WT at destination.

Note. The V_{REF} speed is referred to as "Approach Speed" in the aircraft operator's manual. Increase the V_{REF} for gusting wind conditions by adding one half the wind gust spread. Also, increase V_{REF} for anticipated wind-shear encounters.

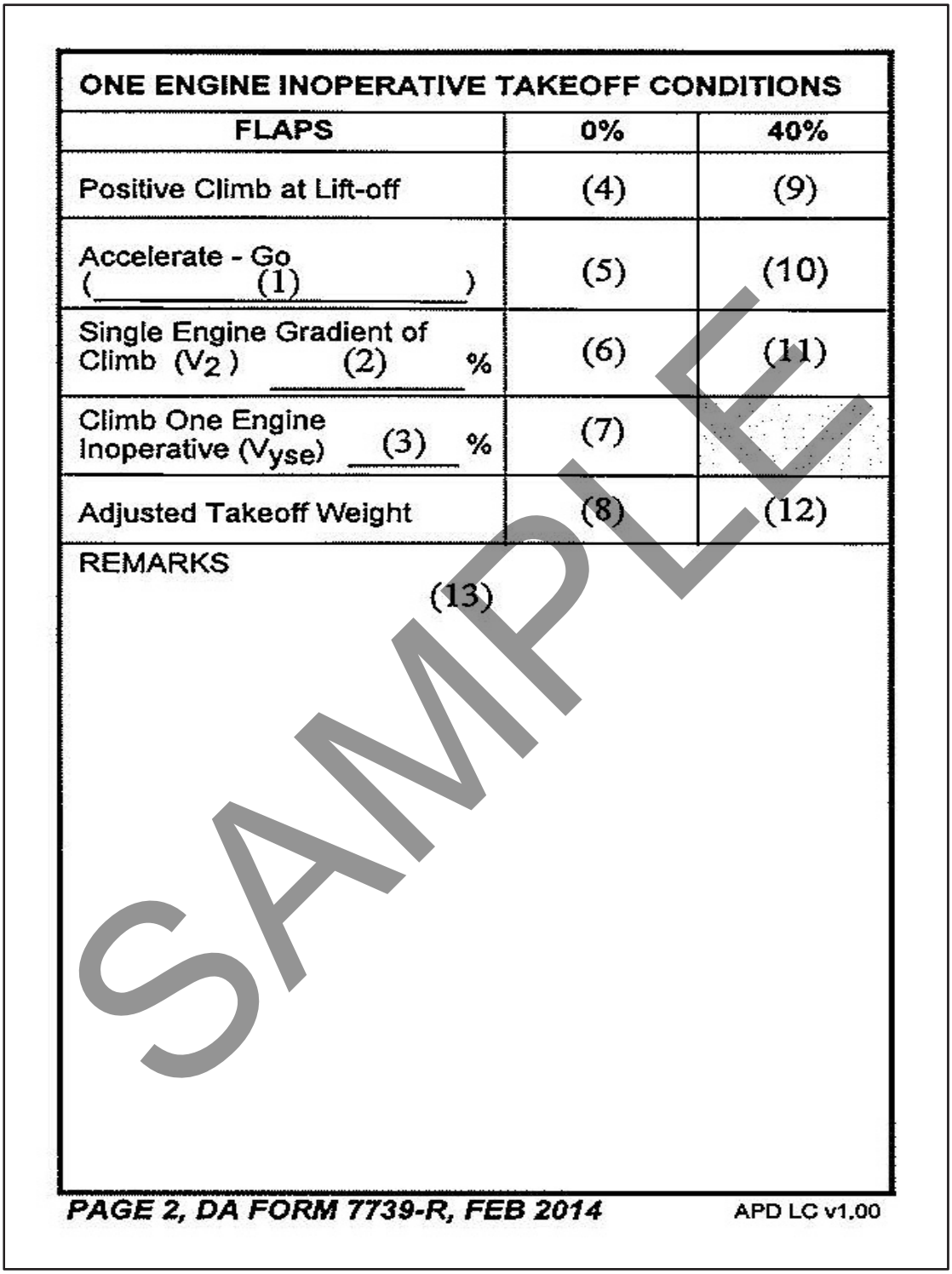
Note. Actual V_{REF} may also be calculated by multiplying 1.3 times the stall speed (stall Speed chart) in the landing configuration. Utilize calibrated airspeed line on stall graph. Convert the calibrated airspeed to indicated airspeed for V_{REF} speed.

Item (17) – LAND DISTANCE. Record the runway distance required for a landing at the destination. For planning purposes, Enter the landing distance for the landing weight from the *Landing Distance Without Propeller Reversing-Flaps 100%* chart. Consider using appropriate stopping distance factors for wet or icy runways. It is not necessary to record the landing distance for returning immediately after takeoff. Since the takeoff distance required will always exceed landing distance required, you can assume the runway you departed on is long enough to return and land on in case of an emergency.

Note. Those aircraft utilizing TM 1-1510-225-10, *Operator`s Manual for Army C-12R Aircraft (NSN 1510-01-425-1355), Army C-12T3 Aircraft (1510-01-470-0220), Army C-12F3 Aircraft*, chapter 7, and TM 1-1510-218-10, *Operator`s Manual for Army C-12C Aircraft (NSN 1510-01-070-3661) Army C-12D Aircraft (1510-01-087-9129), Army C-12T Aircraft (1510-01-470-0220)*, 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 %*" (TM 1-1510-218-10, chapter 7, figures 7-30 or 7-31) must be used to obtain landing distances.

Item (18) – OPTIONAL. Use this area as desired.



ONE ENGINE INOPERATIVE TAKEOFF CONDITIONS		
FLAPS	0%	40%
Positive Climb at Lift-off	(4)	(9)
Accelerate - Go ((1))	(5)	(10)
Single Engine Gradient of Climb (V_2) (2) %	(6)	(11)
Climb One Engine Inoperative (V_{yse}) (3) %	(7)	
Adjusted Takeoff Weight	(8)	(12)
REMARKS (13)		

PAGE 2, DA FORM 7739-R, FEB 2014 APD LC v1.00

Figure 4-3. Sample DA Form 7739-R (back)

b. **Back**. Use to determine if takeoff WT needs to be restricted to achieve desired single engine performance if an engine fails during takeoff. If flaps up or flaps 40 percent meets the desired performance, it is not required to compute both. Because WT may have to be restricted, it is suggested that this side be completed first.

Item (1) ACCELERATE GO (Table 4-2, page 4-17). Record the distance from the *Accelerate-Go Distance-Flaps Up* or *Flaps 40%* charts. Use this area to enter the MAX distance of accelerate-go allowed by the commander's policy. This segment is one of the most restrictive for planning because the aircraft will be departing ground effect; the gear will be in transient, creating drag and attempting to accelerate to V_2. As an aid to determining a commander's policy, the following information is provided:

(a) A balanced field is where both Accelerate–Stop and Accelerate-Go are available within the runway available (Best scenario).

(b) Recognize when operating at heavier WTs and or high-density altitudes that, if an engine failed at V_1 or after lift-off, the aircraft is not going to fly and the crew is going to have to stop on the runway or land straight ahead. Consider requiring additional Accelerate-Stop distance for these conditions.

(c) Reducing takeoff WT and/or requiring a minimum runway length are the only options available that can be controlled. Some missions may require operating outside these parameters. **The commander must then assign a higher risk value to these missions**.

Item (2) SINGLE ENGINE GRADIENT OF CLIMB (V_2). Commanders should assign a minimum gradient of climb for the segment that begins at the end of accelerate-go and ends when clear of all obstacles and/or the rate of climb allows acceleration to V_{YSE}.

Item (3) CLIMB – ONE ENGINE INOPERATIVE (V_{YSE})%. Commanders should assign a minimum gradient of climb for the segment.

Item (4) TAKEOFF WEIGHT TO ACHIEVE A POSITIVE CLIMB AT LIFT-OFF – FLAPS 0% (Table 4-2, page 4-17). Determine if the planned takeoff weight is equal to or less than the charted limit. If the planned departure weight exceeds the charted limit consider reducing departure weight to be within limits.

Note. If any of the items (5 to 7 or 9 to 11) exceed the required criteria for takeoff, use the worst criteria and back plan on the chart to determine the weight that will result in meeting requirements. Enter this weight in the Adjusted Takeoff Weight block. This will be the new maximum takeoff weight and used for planning on the front of the TOLD card. If mission requirements do not allow reducing weight, the risk must brief at a higher level.

Note. A climb gradient of 3.3% is required for IFR departures when the weather conditions are IMC. A climb gradient of greater than 3.3 may be required for IFR departures with other than standard takeoff minimums or departure procedures.

Item (5) ACCELERATE – GO – FLAPS 0% (Table 4-2, page 4-17). Obtain from the *Accelerate – Go distance– Flaps 0%* chart.

Item (6) SINGLE ENGINE GRADIENT OF CLIMB – FLAPS 0% (Table 4-2, page 4-17). From *Takeoff Climb Gradient – One Engine – Inoperative – Flaps 0%* chart obtain the climb gradient for a V_2 climb.

Item (7) CLIMB ONE ENGINE INOPERATIVE (Table 4-2, page 4-17). Record the V_{YSE} climb gradient.

Item (8) ADJUSTED TAKEOFF WEIGHT – FLAPS 0%. If the takeoff weight of the aircraft is reduced to meet takeoff criteria (Items 4 to 7), update this block before entering it on the front of the TOLD card as the takeoff weight.

Item (9) TAKEOFF WEIGHT TO ACHIEVE A POSITIVE CLIMB AT LIFT-OFF – FLAPS 40%. Determine if the planned takeoff weight is equal to or less than the charted limit.

Item (10) ACCELERATE – GO – FLAPS 40%. Record the distance from the *Accelerate – Go distance – Flaps 40% chart.*

Item (11) SINGLE ENGINE GRADIENT OF CLIMB – FLAPS 40%. From the *Takeoff Climb Gradient – One Engine – Inoperative – Flaps 40%* chart, determine the climb gradient for a V_2

climb beginning at 35 feet and ending after accelerating to V_{YSE} once clear of obstacles and rate of climb allows acceleration.

Note. Those aircraft utilizing TM 1-1510-218-10 chapter 7, refer to this note. Aircraft required to takeoff with flaps approach due to runway length requirements must use third segment climb gradient for obstacle clearance consideration or reduce load to meet accelerate/stop runway requirements.

Item (12) ADJUSTED TAKEOFF WEIGHT – FLAPS 40%. Record the planned departure weight. If the takeoff weight of the aircraft is adjusted to meet takeoff criteria (Items 9 to 11), update this block before entering it on the front of the TOLD card as the takeoff weight.

Item (13) REMARKS. Space available for crewmember entries.

Note. The same TOLD may suffice for consecutive take offs and landings if the crew verifies that the existing temperature, PA, and weight do not degrade performance.

Table 4-1. Takeoff airspeed terminology

V_1	Takeoff decision speed. For C-12 aircraft, this is the same as V_R (Rotation Speed). If an engine fails at V_1, the pilot decides whether to stop or continue the takeoff.
V_R	Rotation Speed. The speed at which the nose tire is departing the ground and the aircraft is rotated to the takeoff attitude. V_R is equal to V_1 for C-12 aircraft.
V_2	Takeoff safety speed. During engine failure at V_1 takeoff continued this speed must be attained by 35 feet, single engine, above the runway and is the speed to be maintained during single engine climb until clear of obstacles and rate of climb allows acceleration to V_{YSE} (approximately 400 above ground level [AGL]). V_2 is listed on the *Accelerate – Go* and *Take off Distance* charts. V_2 is the "Climb Speed in KTS" on the Net Gradient of Climb charts. During all-engines operating takeoff V_2 should be obtained by 35 feet as the aircraft accelerates to cruise climb airspeed; for example, 160 KIAS. V_2 may be used as obstacle clearance airspeed in conjunction with the takeoff distance charts to determine if the distance flown versus obstacle height will be sufficient to clear an obstacle.
V_{YSE}	Best single engine rate of climb speed is the airspeed that delivers the greatest gain in altitude in the shortest possible time with gear and flaps up. V_{YSE} for the weight can be obtained from the *Climb – One Engine Inoperative* chart.

Table 4-2. Planning chart definitions for a one engine inoperative takeoff

Accelerate – Go Distance Over Obstacle:	This chart is used to determine the total distance required from brake release to accelerate to V_1 (takeoff decision speed); experience an engine failure; continue accelerating to lift-off; then climb and accelerate to achieve takeoff safety speed (V_2) at 35 feet.
Accelerate-Stop	Runway length required if an engine failure occurs at V_1 and the takeoff is aborted. Normal pilot reaction time of 3 seconds is assumed.
Takeoff Weight to Achieve A Positive One Engine Inoperative Climb at Lift- Off	This weight is the maximum at which a positive rate of climb can be achieved with an engine failure at V_1 and allow the aircraft to be able to attain positive rate of climb at lift-off with the landing gear extended. Allows the crew to determine the maximum weight at which Accelerate-Go should be attempted.

Table 4-2. Planning chart definitions for a one engine inoperative takeoff

Takeoff Climb Gradient One Engine Inoperative	This gradient is used to determine the percent of climb gradient for a one engine inoperative climb using V_2 until clear of obstacles or rate of climb allows acceleration to V_{YSE}. Segment begins were Accelerate-Go distance over 35 ft obstacle ends.
Climb-One Engine Inoperative	Used to determine the rate of climb in feet per minute and climb gradient in percent for a one engine inoperative climb using V_{YSE} with the gear and flaps up. Segment begins after the V_2 climb clears any obstacle and the rate of climb allows acceleration to V_{YSE}.

Table 4-3. Two engine takeoff charts

Minimum Takeoff Power at 2000 RPM	The minimum torque required to achieve the takeoff performance in the performance section of the operator's manual as a function of ice vanes position, pressure altitude, and ambient temperature. It represents the minimum power at which takeoff performance charts can be realized. Any excess power that may be developed without exceeding engine limitations may be used.
Takeoff Distance	The distance required to achieve a two engine takeoff, ground roll distances for a paved, level, dry surface, and the total distance required to clear an obstacle from 0 to 50 feet.
Climb – Two Engines Flaps 0%	This chart is not a true V_Y, but will allow a higher rate of climb than the normal climb schedule listed in the '*Time, Fuel, and Distance to Climb*' chart. This chart can be used from sea level to 31,000 feet. The climb speed listed in the '*Climb – Two Engines – Flaps 0%*' chart should not be used routinely when operating in a terminal area because of the high pitch attitude required resulting in a reduction in forward visibility.
Climb – Two Engines Flaps 40%	This chart is not a true V_Y or V_X, but will allow a higher rate of climb than the normal climb schedule listed in the 'Time, Fuel, and Distance to Climb' chart. This chart can be used from sea level to 31,000 feet. The climb speed listed in the '*Climb – Two Engines – Flaps 40%*' chart should not be used routinely when operating in a terminal area because of the high pitch attitude required resulting in a reduction in forward visibility.

c. **Takeoff flight planning.** This section is designed to supplement the explanations of the takeoff charts in the operator's manuals and provide options available for takeoff flight planning. The performance charts in the operator's manuals reflect planning data required for the aircraft type certificate. The pilot is responsible for understanding and using the appropriate charts for takeoff planning. The charts available allow the pilot to determine, if he did lose an engine at the critical point of takeoff (V_1), what his best option would be: continue the takeoff; plan on landing straight ahead; abort the takeoff and stop; or reduce his planned takeoff WT to increase the aircraft's performance. Based on the TOLD performance, the crew should brief which engine failure during takeoff procedures will apply during the departure brief. As an example—

(1) Prior to V_1-Engine malfunction before lift-off (abort).

(2) After V_1 but prior to obtaining V_2—

(a) Heavier than positive climb at lift-off WT–Engine malfunction after lift-off (abort). This performance envelope should be avoided.

(b) Accelerate Go distance beyond Accelerate Stop distance-Engine malfunction after lift-off (abort).

(c) Lighter than Positive climb at lift-off WT and Accelerate Go distance equal to Accelerate Stop distance-Engine malfunction after lift-off (flight continued).

(3) After obtaining V_2 and gear is up (second segment)-Engine malfunction after lift-off (flight continued), assuming a positive takeoff climb gradient.

d. Decision process.

(1) Determine flap setting and takeoff WT for the anticipated departure runway.

(2) Determine if an engine failed at V_1 would the aircraft climb when rotated using the takeoff WT to achieve a positive climb at lift-off chart(s). If the planned departure WT is more that the MAX chart WT for the conditions, continuing the takeoff is not an option unless the takeoff WT is reduced. This performance envelope should be avoided

(3) The next step determines the distance required to climb to 35 feet (one engine inoperative) and obtain V_2 using the *Accelerate-Go Distance* chart. If the distance exceeds the Accelerate-Stop distance, consider reducing the takeoff WT.

(4) The next chart determines the takeoff climb gradient-One engine inoperative from 35 feet using V_2 until clear of obstacles.

(5) Upon accelerating and reaching V_{YSE}, retract the flaps and reduce power to MAX CONT. if possible. Use the one engine inoperative chart to determine the gradient of climb at V_{YSE}.

e. **Profiles.** Figure 4-4 represents a visualization of airspeed and chart usage. Four hundred feet AGL is a representative altitude for obstruction clearance and the point rate of climb permits acceleration to V_{YSE}. The profiles are for illustration and not a requirement to achieve 400 feet before acceleration.

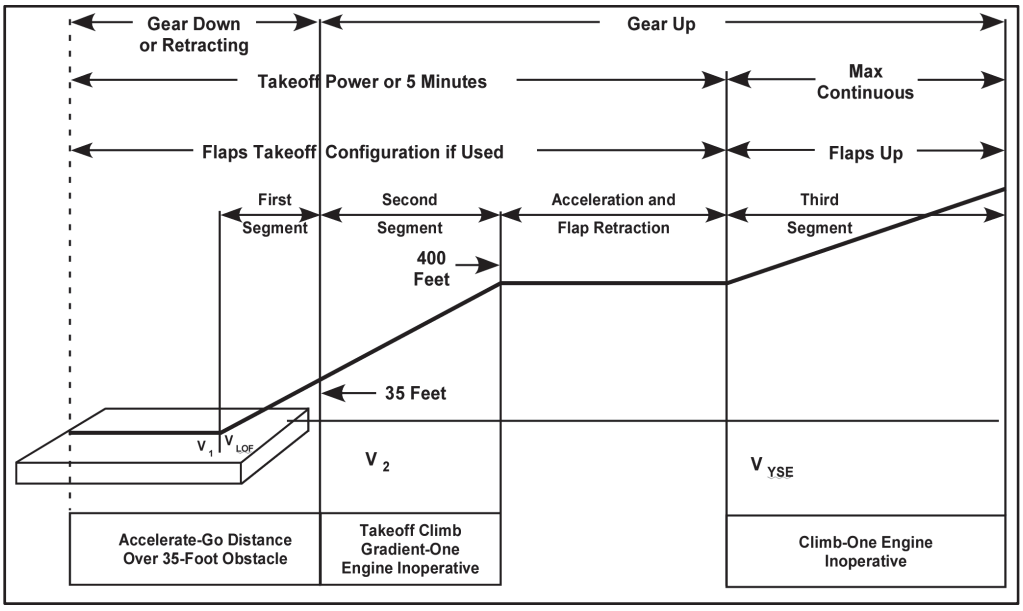


Figure 4-4. C-12 one engine inoperative takeoff profile

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references.

TASK 1012

Verify Aircraft Weight and Balance

CONDITIONS: Given crew WTs, payload WTs, takeoff fuel, aircraft configuration, aircraft weight and balance information, operator's manual (C-12 series), and completed or blank DD Form 365-4, or electronic computer data sheet, IAW AR 95-1.

STANDARDS:

1. Verify the DD Form 365-4 is current.
2. Verify that center of gravity (CG) and GWT remain within aircraft limits for the duration of the flight. Complete form, if applicable.
3. Identify all mission or flight limitations imposed by WT or CG.

DESCRIPTION:

1. Crew actions.

   a. Select the completed DD Form 365-4 from the aircraft logbook, or electronic computer data sheet for the aircraft configuration load and mission. Verify/compute aircraft GWT and CG. Ensure aircraft GWT and CG will remain within the allowable limits for the entire flight. Note all GWT, loading task/maneuver restrictions/limitations.

   b. If there is no completed DD Form 365-4 or electronic computer data sheet that meets mission requirements, refer to the unit weight and balance technician, TM 55-1500-342-23, *Joint Service Technical Manual for Aircraft Weight and Balance*, or 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 WT.

   d. Verify ramp, takeoff, and landing WTs are within the aircraft limits.

TRAINING AND EVALUATION REQUIREMENTS:

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

REFERENCES: Appropriate common references, TM 55-1500-342-23, and DD Form 365-4.

TASK 1023

Perform Fight at Minimum Control Speed with Critical Engine Inoperative (V_{MCA}) (Simulator Only)

CONDITIONS: In an approved FS.

STANDARDS: Appropriate common standards plus these additions/modifications:

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

DESCRIPTION:

1. Crew actions. The main focus of the P* will be outside the aircraft. The 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 V_{MCA} airspeed. Additionally, this maneuver demonstrates the lack of aircraft controllability and recovery methods when directional control is lost when flying below V_{MCA} airspeed. The critical engine, left 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 AGL. Maintain a minimum of V_{REF} or appropriate V_{REF} plus speed 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 indicated reference airspeed (V_{REF}) plus half the wind gust spread at approximately 50 feet above the landing area.

b. At a given altitude, perform the single-engine go-around by applying takeoff power (or MAX 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 V_{MCA}, 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.

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

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 V_{MCA}. In this event, immediate reduction of power and pitch attitude (angle of attack) is required to affect a prompt recovery.

Note. Two conditions will cause actual V_{MCA} 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 an approved FS.
2. This maneuver is not a required evaluation or iteration maneuver.

Note. This maneuver is to be trained for familiarization purposes in an approved FS only.

Note: The IP may physically limit rudder pedal movement to facilitate the onset of $V_{MCA.}$

REFERENCES: Appropriate common references; Title 14, CFR Part 91; and FAA-S-8081-12A.

TASK 1029

Perform Preflight Inspection

CONDITIONS: In a C-12 airplane and given the aircraft operator's manual /CL.

STANDARDS:

1. Without error, perform the preflight inspections IAW the CL.
2. Correctly enter appropriate information on DA Form 2408-12, *Army Aviator's Flight Record*, DA Form 2408-13, *Aircraft Status Information Record*, and DA Form 2408-13-1 *Aircraft Inspection and Maintenance Record*.
3. Determine if inoperable items affect the mission by using the REL.

DESCRIPTION:

1. Crew actions.

   a. The PC is responsible for ensuring that a preflight inspection is conducted using the aircraft CL. He or she 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 will ensure that the appropriate information is entered on DA Form 2408-12, DA Form 2408-13, and DA Form 2408-13-1.

   b. The PC or PI will complete the assigned elements.

2. Procedure.

   a. The PC will ensure a proper preflight is conducted, all checks are verified using the CL and 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 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. FM 3-04.240 contains details about preflight inspection at night. Exercise caution to avoid bodily contact with antennae, static wicks and other aircraft protrusions.

COLD WEATHER CONSIDERATIONS:

1. Brakes and tire-to-ground contact should be checked for freeze lockup. Besides 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. Removal of all ice, snow and frost accumulation is required before takeoff. The wing contour may be sufficiently altered by the ice and snow to cause its lift qualities to be seriously impaired and result in the loss of lift and cause adverse stall characteristics.
2. Propeller blades and hubs will be inspected for ice and snow. Unless engine inlet covers have been installed during snow and freezing rain conditions, the propellers should be turned by hand in the direction of normal rotation to verify they are free to rotate before starting the engines. Remove snow, frost, and ice accumulations IAW procedures described in the operator's manual. After contamination removal from the airframe a full range of motion for all flight controls must be verified.

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: Appropriate common references, FAA-P-8740-24, DA Form 2408-12, DA Form 2408-13, DA Form 2408-13-1, and T.O.1C-12A-1.

TASK 1034

Perform Engine Start

CONDITIONS: In a C-12 series airplane given the aircraft operator's manual/CL.

STANDARDS: Appropriate common standards plus, without error, perform procedures and checks IAW the CL.

DESCRIPTION:

1. Crew actions.

   a. Each crew-member will complete the required checks or procedures pertaining to their crew duties IAW the CL and the preflight briefing.

   b. Both aviators will clear the area around the airplane prior to each engine start.

2. Procedure.

   a. The P* will start the engine(s) IAW the CL and verify system operation. He or she should be prepared to secure engine(s) immediately if any conditions exist which could be detrimental to the engines or auxiliary equipment.

   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: Prior to 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 before starting the engines and remain on during engines' operation, except during conditions that may cause vertigo or other hazards to safety.

COLD WEATHER CONSIDERATIONS:

1. Prior to 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.

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

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and FAA-P-8740-24.

TASK 1035

Perform Aircraft Taxi

CONDITIONS: In a C-12 series airplane with access to the CL.

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

1. Correctly perform procedures and checks IAW the CL.
2. Properly use power, ground fine or beta and brakes to maintain a safe taxi speed.
3. Controls direction and speed without excessive use of brakes.
4. Taxies so as to avoid other aircraft and hazards.

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 (refer to FAA-H-8083-3A). 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. Consult the appropriate operator's manual for use of ice vanes during taxi. Extending ice vanes will assist in FOD protection. If ice vanes are used during ground operations, closely monitor engine oil temperatures.

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

Note. Single pilot taxi and run-up operations are authorized. During single pilot taxi and run-up operations, the pilot will occupy the left seat and must continuously monitor the aircraft for movement during run-up operations.

NIGHT CONSIDERATIONS: Due to restricted visibility at night, taxi speeds should be reduced to allow for a greater margin of safety. Do not "outrun" your visibility. 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 the ground guides eyes.

COLD WEATHER:

1. Before attempting to taxi in a contaminated environment, the brake deice system should be activated. Ensure 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. Whenever possible, avoid taxiing in deep snow, lightweight dry snow, or slush. Under these conditions, more power is required, steering more difficult, and snow and slush will be forced into the brake assemblies. Caution should be exercised 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 any moisture remaining may re-freeze after the system is deactivated. Brakes should be allowed to cool before setting the parking brake.

3. Chocks or sandbags may be use 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. Some ice conditions on taxi ways and runways are extremely difficult to detect visually (black ice). If possible have airfield operations confirm the conditions prior to aircraft movement. If ice is encountered during taxi, differential application of idle, ground fine or beta may be required to maintain aircraft control as brake and nose wheel steering effectiveness becomes minimized.

DESERT AND HOT WEATHER CONSIDERATIONS:

1. Warm-up and Ground Operations. Use normal procedures for warm-up and ground operations. Higher N^1 speeds may be necessary to maintain oil TEMPs 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 the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references, FAA-H-8083-3A, and FAA-P-8740-24.

TASK 1045

Perform Engine Run-Up

CONDITIONS: In a C-12 series airplane given the aircraft operator's manual/CL.

STANDARDS:

1. Without error, perform procedures and checks IAW the CL.
2. 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 IAW the CL and the preflight briefing.
2. Procedure.

   a. Considering the wind and aircraft location, the P* will position the aircraft properly for run-up and ensure the nose wheel is centered. The P* (left seat) will complete the engine run-up checks, if applicable, and ensure the systems and equipment are operating properly. Use the CL to verify that all checks are completed. Record appropriate information on applicable aircraft logbook forms.

   b. The P should read the CL, complete all designated P aircraft systems and mission equipment checks, and assist the P* as required. The left seat crewmember may task the right seat crewmember to complete the engine anti-ice/ice vanes, anti-ice/deice, vacuum and pneumatic and pressurization systems checks. During these checks a visual confirmation by outside personnel should be performed to ensure corresponding inflation and deflation of surface de-ice systems.

   c. 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. During high power checks be especially cognizant of the area to the rear of the aircraft to prevent damage or injury.

   Note. Single pilot taxi and run-up operations are authorized. During single pilot taxi and run-up operations, the pilot will occupy the left seat and must continuously monitor the aircraft for movement during run-up operations.

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, both while maneuvering into position and when stopped.

COLD WEATHER CONSIDERATIONS: Aircraft positioning on a non-slippery surface is critical prior to high power checks to prevent inadvertent aircraft movement.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted academically, in the aircraft or in an approved FS.
2. Evaluation will be conducted academically in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1070
Perform Emergency Procedures

> ***Note.*** Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the 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 CL, when time and altitude permits.

CONDITIONS: In a C-12 series airplane or academically, and given a specific emergency.

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

DESCRIPTION:

1. Crew actions.

   a. The P* and P will be able to perform all underlined immediate action emergency procedures described in the operator's manual. They will also be able to state the actions required in performing those emergency procedures that cannot be practiced or simulated in the aircraft.

   b. Aviators will not be downgraded for minor word errors if it doesn't change the intent or context of the emergency action step. The discussion will include procedures outlined in the aircraft operator's manual and/or the FIH and will include the applicable crew coordination actions.

2. Procedures. The aviator will be able to state the crew callouts and crew duties IAW chapter 6 for the crew stations in which they are authorized to perform duties.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted academically, in the aircraft, or in an approved FS.
2. Evaluation will be conducted academically, in the aircraft, or in an approved FS.

REFERENCES: Appropriate common references and FIH.

TASK 1077

Perform Procedures for Two-Way Radio Failure

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

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

DESCRIPTION:

1. Crew actions. The P is primarily responsible for correcting the loss of two-way radio communication while the P* focuses his attention 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 established, the crew will perform the following actions:

      (1) VMC. If two-way radio failure occurs while operating under VFR or if VMC conditions are encountered during an IFR flight after the failure, remain VMC, adjust the transponder, and land as soon as practicable.

      (2) IMC conditions.

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

         (b) If two-way radio failure occurs while operating outside continental United States, comply with ICAO rules IAW instructions in the FIH or applicable host country regulations.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted academically, in the aircraft, or in an approved FS.
2. Evaluation will be conducted academically, in the aircraft, or in an approved FS.

REFERENCES: Appropriate common references and host nation procedures, FIH, and unit SOP.

TASK 1104

Perform Normal Takeoff and Climb

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

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

1. Without error, complete before-takeoff, lineup, and after-takeoff checks.
2. Maintain a predetermined track (normally runway centerline between the main landing gear during the takeoff roll.
3. Obtain computed static takeoff power prior to reaching 65 KTS.
4. Rotate at V_R -0/+5 KIAS.
5. Perform climb after lift-off at 160 KIAS or per climb schedule.

Note. The crew must ensure that minimum takeoff power is obtainable prior to brake release on or prior to the first takeoff of the day for aircraft.

Note. The two engine climb airspeed from SL to 10,000 listed in the Time, Fuel, and Distance Climb chart of the operator's manual may be used if required for mission considerations

DESCRIPTION:

1. Crew actions.

   a. The P*'s main focus will be outside the aircraft during the maneuver. While initiating power application, the P* will monitor engine instruments carefully and be prepared to announce an abort if the aircraft performance is not satisfactory.

   b. The P will assist the P* by verifying the P*'s flight instruments settings, monitoring engine instruments, adjusting power, making the crew callouts, and reading the CL. The P will perform those items directed by the P*.

   c. As part of the departure brief, the crew will discuss criteria for a rejected takeoff and an emergency return plan. The crew also will review the TOLD card to determine the course of action if an engine failed at V_1, immediately after liftoff and when the aircraft has obtained V_2.

   Note. Static takeoffs are only required when limited by accelerate-stop distance and runway length or first flight of the day.

   Note. The normal flap setting for takeoff is FLAPS UP unless TAKEOFF (40 percent) is required for runway length as determined by the TOLD data.

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

   a. Normal takeoff.

      (1) Lineup. Complete the before-takeoff check and departure briefing. Complete the lineup check using the CL. Aircrews should start the lineup check when cleared onto the active runway. Align the aircraft with the runway heading and cross check instruments to ensure aircraft is on the correct runway.

      Note. The aircraft may produce power in excess of the minimum T/O power charted TQ value. The P should monitor and adjust power as required to maintain MAX available takeoff power without exceeding engine limits.

      (2) Power. P* smoothly advances the power levers to within 5 percent of computed power. Transfer the power to the P for the final setting with a **"SET POWER"** callout. The P will set

takeoff power (at a minimum the minimum takeoff power or the MAX allowable power) and state, **"POWER SET."** When runway length permits, the normal takeoff may be modified by starting the takeoff roll before attaining takeoff power. In this case, initially advance power until both propellers are on the primary governors and TQ is equal; then continue to advance power transferring the power control to the P with the same callouts.

Note. The P* does not relinquish control of the power levers to the P until the takeoff decision speed ($V_{1)}$ callout. The P will assist the P* by setting and maintaining the takeoff power as briefed. If there is a need to abort the take-off during the takeoff roll, either pilot may call the abort but the P* will retard the power levers.

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(3) Takeoff. During takeoff, maintain directional control with nose wheel steering and rudder so that the predetermined track is between the main landing gear. Keep the wings level with ailerons. Although the P is managing power to 400 feet, the P* should retain a light hold on the power levers until V_1 is attained and be ready to initiate abort procedures, if required. The P should ensure that the autofeather advisory lights are illuminated. Monitor instruments for proper indications to ensure that the engine limitations are not exceeded. Passing 65 KIAS, the P will call out, **"NORMAL,"** if all indications are proper. As the elevator starts becoming effective (about 80 KIAS), the P* should start increasing back pressure on the yoke at rate that will allow the nose tire to be just departing the ground at V_R. The P will announce "**V_1**" upon attaining $V_{1.}$ The P* will remove his hand from the power levers and place it on the control yoke. The P will call, **"ROTATE,"** at $V_{R.}$ The P* will increase aft pressure on the elevator and smoothly rotate to the pitch attitude that will result in obtaining a 10-degree pitch attitude after liftoff. The P will continue to monitor instruments for proper indications and physically guard the power levers.

Note. If a power change is needed, the P* should direct the P to make the change. This principle may be essential in the event of an emergency.

(a) When two positive rate-of-climb indications are noted, the P will announce "**POSITIVE RATE**", The P* will call "**GEAR UP**." The left seat crewmember will move the landing gear handle to the UP position, turn off the landing/taxi lights, and announce **"GEAR UP."** Adjust pitch to a 10 to 12-degree attitude and allow the aircraft to accelerate. When passing V_{YSE} the P* will call for **"FLAPS UP OR CHECK FLAPS UP".** The P will retract the flaps and announce **"FLAPS UP".**

(b) P* will allow the aircraft to continue to accelerate to 160 KIAS, adjusting forward trim as necessary to relieve the control pressures. When 160 KIAS is obtained, adjust pitch to maintain 160 KIAS until 400 feet AGL. Climb schedule speeds may be used as the mission dictates and takeoff weight allows not to exceed a 15-degree pitch up attitude.

(4) Climb. After passing 400 feet AGL, the P* will task the P to **"SET CLIMB POWER."** Climb power is set by adjusting the TQ and propeller RPM IAW the operator's manual. After setting climb power, The P will announce "**CLIMB POWER SET, YOUR POWER**" and transfer the power back to the P* with a **"MY POWER"** callout from the P*. Complete the after-takeoff check. P should monitor the engine instruments and advise the P* of any abnormal condition.

b. Crosswind takeoff. During crosswind conditions, position the aileron control into the wind at the start of the takeoff roll. In strong crosswinds, consider delaying the point where the P* would normally apply aft pressure for rotation to later in the takeoff roll. This allows the aircraft WT to stay on the wheels longer before transferring it to the wings, thereby minimizing the chance the aircraft will skip and skin a tire before liftoff. As the nose wheel comes off the ground, use the rudder as necessary to prevent turning (crabbing) into the wind. To prevent damage to the landing gear if the airplane were to settle back onto the runway, remain in a slip until well clear of the ground. Then crab into the wind to continue a straight flight path.

c. Obstacle clearance climbs. If an obstacle at the end of the runway must be cleared, the take-off will be made by applying maximum available takeoff power prior to brake release and using flaps at the

APPROACH or 40 percent position. Establish the initial climb at the V_X speed obtained from the tabular data box of the TAKE-OFF DISTANCE FLAPS 40 % chart. Do not exceed a 20-degree pitch attitude and accept the additional airspeed. Once the obstacle is cleared accelerate, retract the flaps at V_{YSE}, and proceed with the normal take-off procedures.

NIGHT CONSIDERATIONS:

1. The cockpit lights should be at a low intensity and a serviceable flashlight must be readily accessible. Use taxi/landing light(s) to check that the entire takeoff path is clear before starting the takeoff run. Reduced visual references during the takeoff and the takeoff climb may make it difficult to maintain the desired ground track. Knowing the surface wind direction and velocity will assist in establishing the crab angle required to maintain the desired ground track. Monitor heading and attitude instruments closely and be prepared to convert to instrument flight if the visual horizon is lost or if the P* experiences vertigo.

2. Terrain will not be visible unless back-lighted. If ground lights unexpectedly disappear, then it is highly likely that terrain has appeared between the aircraft and the ground lights. It is critical that crews maintain an altitude or course that guaranties terrain clearance when descending or departing the airport.

COLD WEATHER CONSIDERATIONS:

1. Prior to takeoff. Activate all anti-icing systems, allowing sufficient time for the equipment to become effective. If any ice, snow, or frost is present on the flying surfaces, do not attempt to take off. Comply with the holdover times of any anti-icing and deicing applications; holdover time starts when the last application has begun. Accumulations of slush/snow on the runway detrimentally impacts the takeoff distance and braking action and will be considered during mission planning.

2. Takeoff. Procedures are the same as for a normal takeoff, except for a possible decrease in aircraft performance caused by the use of the anti-icing/de-icing equipment. Additional takeoff distance should be allowed if snow or slush is on the runway. Contaminated runway adjustments will be applied to performance planning. Before starting the takeoff roll, check all controls including trim for full travel and freedom of movement. Smoothly apply power to avoid asymmetrical thrust conditions. In conditions conducive to the formation of ice, a phenomenon often occurs that results in an icy buildup on the painted surface of the runway centerline. Under these conditions, during the take off roll, a slight off set of the nose gear to either side of the centerline is permissible. After takeoff, it is recommended that, when flight considerations permit, the landing gear should be left down without braking action long enough for rotational forces and forward speed to remove most of the moisture, snow, and slush. Extra cycling of the landing gear shortly after takeoff can help dislodge moisture on moving parts of the retraction system.

3. After takeoff. If the takeoff was made from a runway covered with snow or slush, refer to the aircraft operator's manual for after-takeoff procedures. Climb at a higher-than-normal airspeed (shallower pitch angle if possible and still make climb gradients) to prevent ice accumulation on unprotected surfaces. Allow ice to accumulate IAW the aircraft operator's manual before activating the surface de-icing equipment. Higher-than-normal stall speeds should be expected and, as ice accumulates, the stall warning system may become unreliable. Turns should be wide and shallow.

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

MOUNTAIN CONSIDERATIONS:

1. Takeoff distance, rate of climb. Use normal takeoff procedures but remember, because of the higher elevation, your takeoff distance will increase, rate of acceleration and your rate of climb will decrease.

2. Mountain wave. Avoid flight at low altitudes over mountainous terrain, particularly near the lee slopes. Mountain waves occur when air is being blown over a mountain range or even the ridge of a sharp bluff area. As the air hits the upward side of the range, it starts to climb, thus creating what is generally a smooth updraft that turns into a turbulent downdraft as the air passes the crest of a ridge. From this point, for many miles downwind, there will be a series of downdrafts and updrafts. All it takes to form a mountain wave is wind blowing across the range at 15 KTS or better at an intersection angle of not less than 30 degrees. If the wind velocity near the level of the ridge is in excess of 25 KTS and about perpendicular to the ridge,

mountain wave conditions are likely over and near the lee slopes. If the wind velocity at the level of the ridge exceeds 50 KTS, a strong mountain wave is probable with extreme up and down drafts and severe turbulence. The worst turbulence will be encountered in, and below, the rotor zone, which is usually 8 to 10 miles downwind from the ridge. This zone is sometimes characterized by the presence of altocumulus lenticular clouds or roll clouds if sufficient moisture is present. Mountain wave turbulence can occur in dry air and with no visible clouds. A mountain wave downdraft may exceed the climb and power capability of your airplane.

3. Effects of density altitude. Aircraft operations at altitudes above sea level, and at higher than standard TEMPs, are commonplace in mountainous areas. Such operations quite often result in a drastic reduction of aircraft performance capabilities because of the changing air density. Density altitude is a measure of air density. It is not to be confused with PA, true altitude or absolute altitude. It is not to be used as a height reference, but as determining criteria in the performance capability of an aircraft. Air density decreases with altitude. As air density decreases, density altitude increases. The further effects of high TEMP and high humidity are cumulative, resulting in an increasing high density altitude condition. High-density altitude reduces all aircraft performance parameters.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references, unit SOP, and FAA ground deicing holdover charts for current year.

TASK 1120

Perform Steep Turns

CONDITIONS: In a C-12 series airplane under VMC.

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

1. Maintain angle of bank within 45 to 60 degrees.
2. Roll out on the desired heading ±10 degrees.
3. Roll into a coordinated turn of 180 or 360 degrees with a bank of at least 45 degrees and MAX 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 any structural or operating limitation during any part of the maneuver.

DESCRIPTION:

1. Crew actions. The P* should monitor pitch attitude and bank angles by a combination of inside references (instruments) and outside the aircraft (horizon). The P will monitor flight and engine instruments, keeping his or her area of observation cleared, and perform actions requested by the P*. The P* will call out the direction of turn before starting the turn so that the P can thoroughly clear the area of observation. The P should acknowledge the area is clear before the turn is started.
2. Procedure. A steep turn is classified as 45- to 60-degree bank angle.

   a. Entry. Establish level flight at a designated altitude at 160 KIAS in the clean configuration. If desired, set the heading bug or course deviation indicator (CDI) on the desired rollout heading. Increase power as required to maintain airspeed in the turn. Look over the instrument panel to determine a visual reference for level flight (adjust pitch to maintain altitude if the power application caused the nose to rise). When the altimeter is stationary, begin the turn by banking the aircraft with the aileron and coordinated rudder, which will result in a smooth and uniform rate of change in the bank angle.

   b. Turn. For steep turns, the first 30 degrees of bank is a level turn. As approximately 30 degrees is being passed, adjust back pressure on the yoke to maintain the pitch attitude on the horizon, which 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 hold the desired bank angle (compensates for over-banking 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. The P* should begin the rollout to the desired heading using a smooth and uniform reduction of bank at the same rate used during the roll-in. Coordinate pitch attitude, power, and re-trim as required during the rollout to maintain altitude and airspeed.

Note. The description above is a way to achieve meeting standards. Pilots may change the sequence to suit individual preferences as long as the standards are met.

Note. EGPWS systems may announce an aural BANK ANGLE call if the roll exceeds 55 degrees of bank angle despite being within standards for the task.

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 in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1122

Perform Climbs and Descents

CONDITIONS: In a C-12 series airplane.

STANDARDS: Appropriate common standards.

DESCRIPTION:

1. Crew actions. The P*'s main focus will be outside the aircraft. The P will monitor flight and engine instruments, keep his or her 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; for example, cruise climb. Monitor instruments to ensure that operating limitations 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 pitch attitude. The rate of descent will depend on the amount of power reduced. 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.

      (2) Slow cruise descents. Reduce power to a setting below that required for level flight at slow cruise. Maintain altitude while decelerating to slow cruise. While approaching slow cruise airspeed, adjust pitch attitude and power to maintain slow cruise airspeed and the desired rate of descent. During the descent, control airspeed by adjusting pitch attitude. The rate of descent will depend on the amount of power that is reduced. 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 according to the procedures in the operator's manual. Adjust pitch to maintain at or below the operator's manual emergency descent speed. Caution should be exercised not to exceed the limiting speeds especially if descending in turbulent air or in the vicinity of mountainous terrain. Maintain positive G-forces. To properly clear altitudes below the aircraft, a 25- to 45-degree bank should be established in the initial descent. Call out the direction of the turn before starting turns so that the P can thoroughly clear their 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, terrain permitting. During the descent, control airspeed by adjusting pitch attitude. Trim the aircraft as required throughout the maneuver. Unless an actual emergency exists, the maneuver should be performed only during daylight hours under VMC. Besides 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 MAX. 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 MAX glide airspeed; if unknown, use the flaps up V_2. 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 the pitch attitude as required to stop the descent. The **P*** will retract the landing gear with a "**GEAR UP**" call out and direct the P **"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 his 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 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 MAX glide distance or the glide speed recommended in the aircraft operator's manual; if unknown, use flaps up V_2. 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 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 in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1125

Perform Slow Flight

> **CAUTION**
> Select an altitude that will allow the task to be completed no lower than 4,000 feet AGL.

CONDITIONS: In a C-12 series airplane under VMC.

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

1. Stabilize and maintain the airspeed at V_{REF} +5/-0 KTS, no lower than V_{MCA}.
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.

Note. Intentional or simulated engine failures below (V_{SSE}) are prohibited.

DESCRIPTION:

1. Crew actions. The P*'s main focus will be outside the aircraft. The P will monitor flight and engine instruments, keep their 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 such as those experienced during takeoffs, landings and go-arounds. It provides practice of control techniques and shows the capabilities and limitations of the aircraft in the low-speed regimes. The P* should monitor pitch attitude and bank angles by a combination of inside references (instruments) and outside the aircraft (horizon). The P*, assisted by the P, will perform the following actions:

Note. The minimum airspeed is red line (V_{MCA}).

a. Prior to commencing the maneuver, note V_{REF} speed for the aircraft's current weight. While maintaining heading and altitude, set propeller speed to high RPM; turn yaw damper off; complete the Before Landing checks IAW the CL, and when airspeed permits extend the flaps to FULL. Allow the aircraft to decelerate to V_{REF}. It may be necessary to reduce power at lighter WTs to obtain V_{REF}. Adjust pitch attitude as necessary to maintain airspeed and power 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 indicated 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 KIAS in the clean configuration to a predetermined altitude. Use power as necessary to accelerate to 160 KIAS. The recovery may be level or climbing.

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.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and FAA-S-8081-12B.

TASK 1144

Perform Touch-and-Go Landing (Required for IP/SPs only)

CONDITIONS: In a C-12 series airplane, with an IP, given access to the CL, on a non-contaminated (Contaminated runway as defined by the AIM) suitable runway (length must exceed accelerate-stop distance by 2,000 feet), with both engines operating, and cleared by ATC.

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

1. Attain landing approach speed (V_{REF}) (plus one-half the wind gust spread) ±5 KIAS.
2. Maintain at or above the approach angle on the 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 one-third of the runway available for landing with the desired runway track between the main gear during landing and rollout.
4. Maintain runway centerline between the main landing gear after touchdown and during rollout.

DESCRIPTION:

1. Crew actions. On downwind leg, the IP will inform the P* that the landing will be a touch-and-go unless he later calls out, "**FULL STOP**" or "**ABORT, ABORT, ABORT**." Each crewmember will complete the required checks or procedures pertaining to their crew duties IAW the CL and the preflight briefing. The IP will, in addition to performing IP duties, also perform normal P duties. The IP will read the CL, monitor flight and engine instruments, keep their area of observation cleared, and perform actions requested by the P*.
2. Procedure. The IP will perform the following actions after the aircraft has landed with both power levers at idle, prop levers high, and aircraft is on the rollout:

   a. The IP will state, **"STABILIZE POWER."** The P* will smoothly push the power levers up to about the 12 o'clock position on the throttle quadrant to stabilize propellers on the primary governors. This power lever position is normally accompanied with an engine and propeller surge.

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

   c. The IP will state, **"ADVANCE POWER"** when takeoff RPM is achieved and engine TQs are approximately equal. The P* will advance power levers to an approximate power setting previously briefed by the IP and state, **"SET POWER."**

   d. The IP will assume control of the power levers and state, **"POWER SET"** when takeoff power is reached.

   e. The IP will call, **"V_1"** and **"ROTATE"** at the appropriate times.

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

Note. It is the IP's responsibility to obtain ATC clearance for the touch-and-go landing and to advise ATC if the procedure is later changed to a full stop landing. Using the phrase "request the option" in coordination with ATC enhances training flexibility and lessens radio traffic.

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/VASI/PAPI, when available, is the most accurate and reliable approach-angle indicator and will be used to maintain a safe glide path coupled with an ILS when available. If VASI/PAPI 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 round-out point.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1145

Perform Normal Landing

CONDITIONS: In a C-12 airplane.

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

1. Attain landing approach speed (V_{REF} plus one-half the wind gust spread) ±5 KIAS.
2. Maintain at or above the approach angle on the FMS/ILS glide path, visual approach slope indicator (VASI) or precision approach path indicator (PAPI) when available.
3. Cross the runway threshold at V_{REF} (indicated reference speed) plus half wind gust spread ±5 KIAS.
4. Execute touchdown within the first one-third 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 or exit the runway at a safe speed.

DESCRIPTION:

1. Crew actions. Each crewmember will complete the required checks or procedures pertaining to their crew duties IAW the CL and the preflight briefing. The P will also read the CL, monitor flight and engine instruments, keep their 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. Discussion**.** The normal traffic pattern approach should be a stabilized descent and deceleration, excluding deviations required by ATC or environmental considerations. After the initial power reduction, a stabilized descent resulting in a normal 3-degree approach angle can be maintained with minor pitch adjustments. The airspeed can be managed through use of power and flaps to achieve the desired 'V_{REF} + 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 MAX recommended angle of bank in the traffic pattern is 30 degrees.

   b. Arrival**.** Complete the descent-arrival check or task P before entering the traffic pattern. Maneuver the aircraft into position to enter the downwind leg at midfield at a 45-degree angle (or IAW local procedures), at traffic pattern altitude, and at 160 KIAS in the clean configuration. Alternate entries may be used if approved by air traffic control.

   c. 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 V_{REF} +30 by lowering flaps to APPROACH (call for P action – "**FLAPS APPROACH"** and by extending the landing gear (left seat crewmember) and announcing **"GEAR DOWN, BEFORE LANDING CHECK.**") Hold altitude with pitch. As the aircraft decelerates to V_{REF} +30 the P will verify the before-landing CL .and report **"CHECK COMPLETED**" when the last item has been verified.

   d. Base**.** Upon reaching V_{REF} +30, reduce power and allow the aircraft to begin its descent, adjusting to a pitch attitude that will result in about V_{REF} +20 on base. Trim, as required, and begin the turn to base. After rollout 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, as required, (call for P action –"**PROPS HIGH RPM, FLAPS XX**") to maintain the airspeed profile.

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 prior to final 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 as soon as possible before the final descent. The P* may perform these procedures earlier. If the P* performs the before-landing procedure early, maintain airspeed at V_{REF} +30 KIAS, at a minimum, until turning base leg.

Note. When landing on an instrumented runway and the descent angle is at the aiming point markers, the V_{REF} position will be 50 feet above the runway threshold. If landing on an unmarked runway or landing strip, the V_{REF} 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 above 500 feet 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 V_{REF} +10 on final. The landing check may be performed at anytime once the propellers are placed to HIGH RPM. By 500 feet above airport elevation the P* should have stabilized the approach by setting landing flaps, set landing trim, and adjusting power, as required, to maintain V_{REF} +10 until such time as is necessary to reduce power to arrive at V_{REF} (plus half the wind gust spread) 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.

Note. If operators manual allows a flaps approach or flaps up landing, appropriate V_{REF} and approach speeds will used for intended flap position during landing.

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. When haze or smoke lowers visibility, the range of the landing light may be

insufficient to see obstructions in time to avoid them. The VASI/PAPI, when available, is the most accurate and reliable means of approach angle indications and should be used to maintain a safe glide path. If VASI/PAPI 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 round-out 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 in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and FAA-P-8740-24.

TASK 1148

Perform Fuel Management Procedures

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

STANDARDS: Appropriate common standards and 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. P. As part of the cruise checklist the P will check and record fuel data, as appropriate. Using on board equipment 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. 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, such as a FMS, it may be used provided fuel load and fuel flow are verified.

2. Procedures.

   c. Before-takeoff fuel check. The pilot in command (PC) will ascertain total fuel on board, and compare with mission fuel requirements determined during pre-mission planning. If fuel load is improper, adjust as necessary. 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.

   d. 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.

   e. 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.

   f. 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.

TRAINING AND EVALUATION REQUIREMENTS:

2. Training will be conducted academically, in the aircraft, or in an approved FS.
3. Evaluation will be conducted academically, in the aircraft, or in an approved FS.

REFERENCES: Appropriate common references and equipment operating handbook.

TASK 1177

Perform Go-Around

CONDITIONS: In a C-12 airplane.

STANDARDS: Appropriate common standards and perform a go-around IAW the aircraft operator's manual.

DESCRIPTION:

1. Crew actions. The P*'s main focus will be outside the aircraft. The P will monitor flight and engine instruments, keeping area of observation cleared and perform actions requested by the P*. The P will assist the P* with the setting of power and flaps and perform the appropriate crew callouts IAW chapter 6.

Note. This maneuver may be combined with upper air work recovery procedures, instrument and circling or missed approach procedures:

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 MAX allowable power and direct the P to "**GO-AROUND, SET POWER**."

(2) Simultaneously increase pitch attitude to about 7 degrees to stop the descent. The Go-Around mode on the FD may be used as an aid.

(3) After the "**GO-AROUND, SET POWER**" callout and MAX allowable power has been set, if flaps are set beyond approach, direct "**FLAPS APPROACH**".

(4) Once a positive rate of climb has been established the P will call out: **"POSITIVE RATE"** The left seat crewmember will retract the gear if extended, state "**GEAR UP**", and turn the landing and taxi light switches to the OFF position.

(5) At V_{YSE}, direct the P to select **"FLAPS UP."**

(6) State **"MY POWER"** when ready to resume full control. The P may transfer it back to the P*, stating **"YOUR POWER"** if his workload requires.

(7) Establish a normal climb at cruise climb airspeed; call for P to **"SET CLIMB POWER"**

(8) Call for the go-around CL when time, altitude and workload permits.

b. The P will:

(1) Set MAX allowable power, when directed, and respond, "**POWER SET**."

(2) When directed by the P* move the flap switch to approach and state **"FLAPS APPROACH".**

(3) State **"POSITIVE RATE"** after observing two positive climb indications.

(4) At V_{YSE}, select the flaps to the UP position when directed by the P* and state **"FLAPS UP".**

(5) Set propeller RPM to 1,900, when directed by the P* and state, "**CLIMB POWER SET**"**.**

(6) Read go-around CL when P* directs.

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

Note. If a go-around is initiated to avoid an obstacle close to the ground, the crew must perform Task 1179.

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 in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1179

Perform Balked Landing

CONDITIONS: In a C-12 series airplane, with flaps beyond approach, gear down, VMC, both engines operating and airspeed no less than V_{REF}.

STANDARDS: Use appropriate common standards and the following additions/modifications:

1. Ensure the aircraft has cleared all obstacles before resuming a normal climb.
2. Resume a normal climb once clear of obstacles.
3. Retract the flaps from full DOWN to APPROACH (if applicable) at or above Full Flap V_{REF} +10 KIAS.
4. Retract flaps from APPROACH to UP at or above V_{YSE}.

DESCRIPTION:

1. Crew actions. The P*'s main focus will be outside the aircraft. The P will monitor flight and engine instruments, keep their area of observation cleared, and perform actions requested by the P*. The crew must be aware of airspeed and configuration at the point the balked landing is initiated. The P will assist the P* with the setting of power and flaps and perform the appropriate crew callouts per chapter 6.

2. Procedure. The P*, assisted by the P, will perform the following actions when performing a balked landing.

a. Discussion. A balked landing is normally initiated at 50 feet, gear down, flaps full down and at V_{REF}. This allows the aircraft to get away from the ground quickly and efficiently. The procedure can be broken down into two phases:

(1) The first phase is the maximum climb segment. It is initiated by applying power and allowing the power to take effect. Rather than allowing the aircraft to accelerate, pitch is adjusted to maintain V_{REF} not to exceed 20 degrees pitch up. Maintaining this pitch attitude, and the flaps in the full down position, coupled with the power application, results in a rapid climb away from the ground and obstacles.

(2) The second phase begins when clear of all obstacles. At this point, the pitch is lowered to begin a normal acceleration and climb, at V_{REF} + 10 KIAS retract the flaps to APPROACH, continue the acceleration. The increase in airspeed serves to increase lift and provides an additional margin above stall. Next retract the gear. While gear had a negligible effect on performance during the climb phase, it creates parasitic drag during the acceleration phase, decreasing the rate of acceleration. After obtaining V_{YSE} task the P to retract the flaps to UP.

b. The P* will—

(1) Initiate the maneuver by advancing the power levers toward MAX allowable power and direct the P to **"BALKED LANDING, SET POWER".**

(2) The P* will adjust the pitch attitude to maintain V_{REF} until clear of obstacles.

(3) Once clear of obstacles, adjust pitch to accelerate and climb (approximately 5 to 7 degrees).

(4) Direct **"FLAPS APPROACH"** at V_{REF} +10 KIAS.

(5) On the P's **"POSITIVE RATE"** callout. The left seat crewmember will retract the landing gear and state "**GEAR UP**"

(6) At V_{YSE} (minimum) direct the P to select **"FLAPS UP".**

(7) State **"MY POWER"** when ready to resume full control. The P will transfer the power back to the P* stating **"YOUR POWER,"** if his workload allows.

(8) Establish a normal climb at cruise climb airspeed; call for P to **"SET CLIMB POWER"**.

(9) Call for the go-around CL.

c. The P will—

(1) Set MAX allowable power when directed and respond **"POWER SET"**.

(2) State **"**V_{REF} +10 KIAS**"** after the P* begins to establish a normal climb clear of obstacles.
(3) When directed by the P* move the flap switch to approach and state "**FLAPS APPROACH".**
(4) State **"POSITIVE RATE"** after observing two positive climb indications.
(5) At V_{YSE}, select the flaps to the UP position when directed by the P* and state **"FLAPS UP".**
(6) Set propeller RPM to 1,900, when directed by the P* and state, "**CLIMB POWER SET."**
(7) Read go-around CL when P* directs.
(8) Advise ATC of the go-around and intentions.

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 revert to instrument flight if the visual horizon is lost or if affected by spatial disorientation.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references; Super King Air B200 pilot's operating handbook (POH); FAA-approved airplane flight manual; Federal Aviation Regulation (FAR) Part 23, Section 23.77; AR 95-1; AIM; FIH; operator's manual/CL; and DOD FLIP.

TASK 1182

Perform Radio Communications Procedures

CONDITIONS: In a C-12 series airplane, with two-way radio communications established.

STANDARDS:

1. Without error, adjust avionics to the proper frequencies.
2. Establish radio contact with the appropriate ATC facility.
3. When communicating with ATC facilities, use correct radio communications procedures and phraseology IAW the DOD FLIP and FAA publications.
4. Acknowledge each radio communication with ATC by using the correct call sign.
5. Acknowledge and comply with ATC instructions to change frequencies.

DESCRIPTION:

1. Crew actions. Radio communication is primarily the P's responsibility. However, if crewmembers independently monitor multiple frequencies simultaneously, they will keep each other informed of 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 FPLN changes, as required.
   c. When advised to change frequencies, the 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 his actions/communications with the P.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft, academically or in an approved FS.
2. Evaluation will be conducted in the aircraft, orally or in an approved FS.

REFERENCES: Appropriate common references, unit SOP, and FAA Order 7110.65.

TASK 1200

Perform Instrument Takeoff

CONDITIONS: In a C-12 series airplane, under IMC or simulated IMC.

STANDARDS: Appropriate common standards and 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.

4. Without error, correctly identify non-standard climb gradient and/or additional restrictions prior to departure

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Note. A minimum climb gradient of 3.3 percent is required for IFR departures when the weather conditions are IMC. A climb gradient of greater than 3.3 may be required for IFR departures with other than standard takeoff minimums.

DESCRIPTION:

1. Crew actions.

a. The P*'s main focus will be inside the aircraft except during the start of the takeoff. The P* will direct the P to engage the FD/AP modes, as requested, and acknowledge all P callouts.

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

c. As part of the departure brief, the crew will discuss criteria for a rejected takeoff and an emergency return plan. The crew also will review the TOLD card to determine the course of action if an engine failed after V_1.

d. The P* assisted as necessary by the P will confirm take off minimums and climb gradient requirements are met.

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

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

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

Note. Some FDs will not allow an initial pitch adjustment while the WT is on the wheels. For these systems, use the heading mode. After liftoff, adjust the pitch attitude to 10 degree and slave the FD pitch bar to the aircraft pitch attitude using the TCS or CWS switch.

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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 that erroneous sensory inputs can be ignored. At the "Rotate" callout, establish a 10-degree takeoff pitch attitude on the attitude indicator/FD. Maintain this pitch attitude and wings-level attitude until the aircraft becomes airborne. When both the vertical velocity indicator and altimeter show positive climb indications, the P will make the **"POSITIVE RATE"** callout. The left seat crewmember will then retract the landing gear and announce **"GEAR UP"**. After the landing gear is retracted, adjust pitch to obtain a 10- to 12-degree attitude and allow the aircraft to accelerate. If the FD is being used press the CWS or TCS button to keep the "V" bar or pitch bar in synch with the aircraft pitch attitude. If takeoff required flaps, direct the P to retract flaps, **("FLAPS UP")** at V_{YSE}. Control the bank attitude to maintain the desired heading. Cross-check supporting instruments as required throughout the maneuver. The climb profile is the same as a normal takeoff.

d. Climb. Same as normal takeoff.

e. Assist the P*. Throughout the maneuver, the P should assist the P* by verifying instrument settings, monitoring engine instruments, maintaining takeoff power, engaging the FD and AP 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.

ENVIRONMENTAL CONDITIONS: Refer to Task 1104.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1210

Perform Holding Procedures

CONDITIONS: In a C-12 series airplane, IMC, or simulated IMC.

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

1. Execute holding IAW FM 3-04.240, AIM, and DOD FLIP and Host Country regulations.
2. Correctly tune and identify the appropriate navigational aids (NAVAIDs).
3. Correctly enter holding pattern.
4. Adjust speed to cross the fix at or below MAX holding speed.
5. Comply with ATC reporting requirements.
6. Correctly time and track holding pattern legs.

DESCRIPTION:

1. Crew actions.

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

   b. The P will assist by keeping the area cleared when operating in 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. Adjust 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 IAW 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 IAW appropriate host nation procedures. When holding at a NAVAID or a GPS WPT, 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. DME Holding. Before arrival at the holding fix (normally a radial and DME fix from a VORTAC/tactical air navigation [TACAN] station), determine holding pattern and entry. When within 3 minutes of the holding fix, adjust 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's location in relation to the inbound course. The length of the outbound leg will be attained as specified IAW DOD FLIP or as directed by ATC. Begin inbound turn at the appropriate DME point and apply normal tracking procedures to maintain inbound course.

   c. FMS Holding. Prior to arriving at the holding fix ensure the FMS has been properly programmed IAW the operators manual and the holding clearance received. Verify the course, direction of turn and leg length prior to arming the holding pattern. Upon entry verify the Flight Director is in the correct pattern.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1212

Perform Enhanced Ground Proximity Warning System/Terrain Avoidance Warning System Operations

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

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

1. Correctly turn on, test, adjust, and operate, the terrain avoidance equipment IAW the aircraft flight manual (AFM) and supplements, operator's manual or manufacturer's operating handbook.
2. Correctly identify terrain avoidance cockpit indications and symbology.
3. Correctly respond to terrain avoidance advisories and warnings.

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

DESCRIPTION:

1. Crew actions.

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

   b. The operation of the terrain avoidance equipment in flight is the P's responsibility. 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 TCAS display when there is a terrain alert. If the installation does not include the terrain display as a pop-up on the MFD, then crewmembers will select the terrain display during flight whenever 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 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 to assure terrain clearance.

   d. When 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 correctly respond to the terrain avoidance warning.

   e. Crews are authorized to deviate from their 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. The terrain awareness and display (TAD) function should be inhibited by selecting the TERRAIN INHIBIT switch when:

      (1) Operating within 15 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 FMS or other long-range navigation system providing position information to the TAWS, is in the dead reckoning mode (if applicable).

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

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft, academically, or in an approved FS.
2. Evaluation will be conducted in the aircraft, academically, or in an approved FS.

REFERENCES: Appropriate common reference and equipment operating handbook

TASK 1215

Perform Precision Approach

CONDITIONS: In a C-12 series airplane, under IMC or simulated IMC with access to appropriate DOD FLIP and approach clearance received.

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

1. Execute the approach IAW AR 95-1, FM 3-04.240, AIM, and DOD FLIP.
2. Complete before-landing check before the final approach descent.
3. Maintain a speed of V_{REF} +20 (±10) KIAS final approach descent inbound.
4. For an ILS approach, remain within one full-scale deflection of CDI. On final approach, maintain glide slope indicator and CDI within a one full-scale deflection.
5. During precision approach radar (PAR) approaches, maintain headings ±5 degrees and make immediate heading and altitude corrections as issued by ATC.
6. Comply with the decision altitude/decision height/PAR minimums prescribed for the approach.
7. Execute correct missed approach procedure immediately upon reaching decision altitude/decision height if a landing cannot be accomplished.

DESCRIPTION:

1. Crew actions.

   a. The main focus of the P* will be on the aircraft instruments. The P* will verify that the P has set in the proper navigational radio frequencies for the approach. The P* will direct the P to engage the FD and AP functions as the P* requires when performing a coupled approach. See chapter 6 for crew duties and callouts.

   b. Prior to commencing the approach, the P will obtain weather, winds, current altimeter, active runway, and remarks from an approved source when available and brief the P*. The P will assist the P* by tuning in the appropriate radio frequencies, selecting the FD modes, reading the CL , and making the appropriate callouts IAW 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 and verify that the FMS entry is correct (as required). Standard items to review include type of approach, final approach course, decision altitude/decision height, circle maneuver, if necessary, approach lighting available that will assist identifying the runway, missed approach procedure, and minimum safe altitude (MSA). They must clarify any questions on crew actions and intentions with each other and brief any restrictive notes for that approach. It is not required for one crewmember to read the approach aloud to the other. An IP/IE may require an oral briefing for training purposes.

   d. At the end of the briefing, the approach plate, if only one is available, 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.

Note. The IP/IE may require that the approach be flown with or without the use of the FD and/or the AP.

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2. Procedure.

a. Normal. Refer to FM 3-04.240 for a complete description of approach procedures. An aviator should practice instrument approaches flying manually (raw data), FD only and coupled with the AP.

(1) The aircraft 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 prior to glide slope intercept, the before-landing check should be completed as soon as possible. The final approach speed is V_{REF} +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 AP will pitch to the glide slope through the FD and the P* will control the airspeed with power.

(2) If the P determines the P* can complete the approach to landing visually (chapter 6), the P will report, **"RUNWAY IN SIGHT, 12 O'CLOCK, GO VISUAL."** The P* will respond, **"VISUAL."** The P* will continue to descend on 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 V_{REF}, disconnect the AP, if still engaged. so as to arrive on angle, on speed (V_{REF}), 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.

(3) If the runway environment is not in sight by decision altitude/decision height, the P will report, **"MISSED APPROACH."** The P* will initiate a go-around/missed approach.

b. Single-engine considerations.

(1) The P will assist the P* with the appropriate crew call-outs and emergency actions.

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

Note. If operators manual allows a flaps approach or no flaps landing, appropriate V_{REF} and approach speeds will used for intended flap position during landing.

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

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COLD WEATHER CONSIDERATIONS: Correct the decision altitude/decision height IAW the "Temperature Correction Chart" in the FIH, section D.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and FAA-S-8081-5C.

TASK 1220

Perform Non-Precision Approach

CONDITIONS: In a C-12 series airplane, under IMC, or simulated IMC with access to appropriate DOD FLIP and approach clearance received.

STANDARDS:

1. Execute the approach IAW AR 95-1, FM 3-04.240, AIM, and DOD FLIP.
2. Complete before-landing check before final approach fix.
3. Maintain a speed of V_{REF} +20 (±10) KIAS final approach descent inbound.
4. Maintain prescribed courses as follows:
   a. Non-directional radio beacon (NDB) courses ±5 degrees.
   b. Very high frequency omni directional range (VOR), VOR/DME, simplified directional facility (SDF), and TACAN courses within one-half scale deflection using the 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/horizontal situation indicator.
5. During airport surveillance radar approaches, make immediate heading and altitude changes issued by ATC and maintain heading ±5 degrees.
6. Comply with descent minimums prescribed for the approach.
7. 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) or visual descent point (VDP) if published, 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.
8. Execute 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 P* will be on the aircraft instruments. The P* will verify that the P has set in the proper navigational radio frequencies for the approach. The P* will direct the P to engage the FD and AP functions as the P* requires when performing a coupled approach. See chapter 6 for crew duties and callouts.
   b. Prior to commencing the approach, the P will obtain weather, winds, current altimeter, active runway, and remarks from an approved source when available and brief the P*. The P will assist the P* by tuning in the appropriate radio frequencies, selecting the FD modes, reading the CL , and making the appropriate callouts IAW chapter 6, for a non-precision approach and missed approach, if applicable.
   c. The P* and the P will review the approach procedure to be flown and verify that the FMS entry is correct (as required).. Standard items to review include: type of approach, final approach course, MDA, and orientation of the runway to the final approach course, circle maneuver, if necessary, approach lighting available that will assist to identify the runway, missed approach procedure, and MSA. They must clarify any questions on crew actions and intentions with each other and brief any restrictive notes for that approach. It is not required for one crewmember to read the approach aloud to the other. An IP/IE may require an oral briefing for training purposes.
   d. At the end of the briefing, the approach plate, if only one is available, 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 above items.

Note. The IP/IE may require that the approach be flown with or without the use of the FD and/or the AP.

2. Procedures.

a. Normal. Refer to FM 3-04.240 for a complete description of approach procedures.

(1) Aviators should practice flying instrument approaches manually (unaided), FD only, and coupled with the AP. However, full use of the automation is encouraged to lessen crewmember's workload, especially in terminal areas.

(2) When executing a full procedure approach, the P* may complete the before landing check and slow to V_{REF} +20 KIAS at his or her discretion to aid in controlling ground speed and rate of descent outbound.

(3) The P* should complete the before landing CL, to be established at V_{REF} +20 KIAS no later than final approach fix.

(a) 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, 12 O'CLOCK, GO VISUAL."** The P* will respond, **"VISUAL".** The P* will continue inbound at or above MDA until the aircraft is in a position to land. When departing the MDA, call out **"LEAVING MDA."** The P* will direct the P to 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 AP is disconnected, if performing a coupled approach.

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

(4) Visual descent point (VDP). The VDP is a defined point on the final approach course of the non precision, 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 the MDA at the same time or prior to reaching the VDP.

b. Single engine considerations.

(1) The P will assist the P* with the appropriate crew call outs and emergency actions.

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

Note. If ATC requires that a specific airspeed be maintained that precludes completing the before-landing checks prior to the final descent inbound the before-landing check will be completed as soon as possible on the final descent.

Note. If operators manual allows a flaps approach or no flap landing, appropriate V_{REF} and approach speeds will used for intended flap position during landing.

COLD WEATHER CONSIDERATIONS: Correct the MDA IAW the "Temperature Correction Chart" in the FIH, section D**.**

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and FAA-S-8081-5C.

TASK 1240

Perform Missed Approach

CONDITIONS: In a C-12 series airplane, under VMC, IMC, or simulated IMC.

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

1. Comply with ATC or published missed approach procedures at missed-approach point.
2. Maintain prescribed course or heading ±5 degrees.

DESCRIPTION:

1. Crew actions.

a. The P*'s focus will be inside the aircraft. The P* will apply power to the approximate setting, keeping his main focus on the flight instruments. The P* will verify the climb-out procedure with the P and acknowledge all P callouts.

b. The P will assist by monitoring engine and flight instruments, setting the final power and reading the CL. The P will announce when he assumes 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_{YSE}. The single engine go-around CL should be used to verify the procedure when time permits.

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

a. The P* will—

(1) Apply MAX available power while simultaneously pitching the aircraft to 7 degrees and state "**MISSED APPROACH, SET POWER**". If flaps are set beyond approach, direct "**FLAPS APPROACH**". If performing a coupled approach disconnect the AP using the AP disconnect (DISC) button or by depressing the go-around button no later than MAP or decision altitude/decision height.

(2) After receiving the "**POSITIVE RATE"** call out from the P, retract the gear (left seat crewmember).

(3) Task the P **"FLAPS UP"** at V_{YSE} or greater.

(4) If a turn is involved in the procedure, initiate the turn as published, or as instructed by ATC. The FMS may require manual NAV sequencing to the missed approach procedure.

(5) Re-engage the FD and AP (if desired) above 400 feet AGL, or IAW operators manual. Cockpit layout of the mode controllers vary. Task the P to assist in engaging desired functions as appropriate and call for the "Go Around" CL.

b. The P will—

(1) Direct the P*, **"DECISION ALTITUDE/DECISION HEIGHT"** or "**TIMES UP**", "**MISSED APPROACH**."

(2) Set MAX allowable power when directed by the P* and state "**POWER SET**".

(3) Retract the flaps to APPROACH when directed by the P*.

(4) After observing two positive climb indications, call "**POSITIVE RATE**".

(5) Retract the flaps from APPROACH to UP when directed by the P*. Respond "**FLAPS UP**" when the flap indicator shows flaps in the up position.

(6) Engage FD/AP 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 visual reference is lost 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. Upon reaching a safe altitude complete the go-around/missed approach procedure, and verify with the CL.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1245

Perform Unusual Attitude Recovery

CONDITIONS: In a C-12 series airplane, with an IP/IE/SP, under simulated IMC (day only), with an emergency or full-panel configuration.

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

1. Correctly recognize and confirm aircraft attitude.
2. Without delay, use the correct recovery procedure (sequence) for aircraft attitude.

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 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 P* by performing the requested actions.

   b. An alternate method is to have the P* fly the aircraft with his eyes closed. The IP, IE, or SP will then direct turns, climbs, descents and rollouts. When an unusual attitude is reached, 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. While these procedures are categorized into two basic situations, the P* must determine what course of action will be taken to recover the aircraft safely and with minimal altitude deviation and gravitational (G) loading. These maneuvers should be flown smoothly and deliberately in order to avoid an additional unusual attitude or overstressing the aircraft by performing the following procedures:

   a. Recover from nose-high unusual attitude; airspeed decreasing:

      (1) Increase power as necessary (up to the MAX 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 and to change some of the vertical component of lift to a horizontal component.

      (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 and trim the aircraft.

   b. Recover from nose-low unusual attitude; airspeed increasing:

      (1) Smoothly adjust 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 for normal flight.

Note. Instrument cross checks must be through so as to avoid improper inputs based on faulty attitude information. 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 in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1253

Perform Autopilot/Flight Director Operations

CONDITIONS: In a C-12 series airplane, under VMC, IMC, or simulated IMC.

STANDARDS: Operate the AP/FD system IAW the appropriate aircraft operator's manual.

DESCRIPTION:

1. Crew actions. The P* is primarily responsible for directing the mode of the AP/FD. The 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.
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 AP 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 pre-selector, the P may reset the new altitude without the P* direction when ATC directs an altitude change. The P will announce that the new altitude is set and the "ALT ARM" feature is engaged ("**ONE ZERO THOUSAND SET, AND ARMED"**). The P* will confirm the new altitude setting: **"CONFIRM ONE ZERO THOUSAND SET, AND ARMED".**

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common reference and aircraft operator's manual.

TASK 1254

Perform Instrument Flight Rules Navigation

CONDITIONS: In a C-12 series airplane, using the FMS, GPS, VOR, TACAN, or NDB under VMC, IMC, or simulated IMC.

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

1. Correctly program WPTs into the FMS and/or GPS.
2. Correctly tune and identify appropriate NAVAIDs.
3. Correctly determine aircraft position.
4. Correctly intercept and maintain desired course.
5. Correctly identify station passage.

DESCRIPTION:

1. Crew actions.

   a. The P*'s main focus (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 ATC information that the P does not monitor.

   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*s, assisted by the P, will perform the following procedures:

   a. Station identification. The P will obtain correct frequency for desired navigational station and then tune and identify the station, as applicable. The P* will verify the frequency.

   b. Aircraft position. Determine the position of aircraft with respect to a specified navigational ground station or WPT IAW procedures in FM 3-04.240 or manufacturers manual. Have the P verify the position.

   c. 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), and 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.

   d. Course tracking. Maintain desired heading until navigation instrument shows an off-course condition; then turn 20 degrees toward the course to re-intercept. If navigation instruments do not indicate movement toward the course within a reasonable time, increase the intercept angle. When the course is re-intercepted, 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.

   e. Intersection arrival. Determine arrival at radio/WPT intersections IAW procedures in FM 3-04.240.

   f. Station passage. Identify VOR station passage by observing reversal of the TO-FROM indicator or the RMI needle. Identify NDB station passage by observing reversal of the indicator needle. Identify TACAN station passage by DME mileage countdown or reversal of the TO-FROM indicator.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references, aircraft operator's manual, and equipment manufacturer's TM.

TASK 1260

Operate Weather Avoidance System(s)

CONDITIONS: In a C-12 series airplane, under VMC, IMC, or simulated IMC with weather avoidance systems.

STANDARDS:

1. Correctly test and operate the airborne weather radar IAW the equipment instruction booklet and the aircraft operator's manual.
2. Correctly test and operate the lightning detection system IAW the equipment instruction booklet and the aircraft operator's manual.
3. Correctly perform weather detection, echo interpretation, and hazardous weather avoidance actions.

DESCRIPTION:

1. Crew actions.

   a. The crew will test weather radar and lightning detection systems before 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 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 P will ground test all weather avoidance system(s) IAW the operator's manual for satisfactory performance. The P will advise the 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, 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 and tilt the antenna upward. With a MAX of 15-degree upward tilt, it is possible only 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 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 re-distribution of P duties should intense radar operation workload increase. After takeoff and during the climb out, 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. The crew will use all resources available (for example center weather advisory, flight watch, Air Route Traffic Control Center advisories, hazardous in-flight weather service, 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 AGL altitude. To set "zero tilt" (sometimes referred to as normal antenna position [NAP]) for the beam center, raise the tilt 10 degrees from this position, and then lower it 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 miles [nm]).

d. Arrival/approach procedure.

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

(2) A technique for analyzing the arrival area is setting "low-level park" (also called threat identification position [TIP]). Low-level park is a tilt up of 4 degrees from zero tilt (half the RTA beam width). This places the bottom of the beam at the aircraft's altitude, eliminating ground returns.

3. Supplemental information.

a. C-12 series aircraft are equipped with a 12-inch diameter receiver RTA, emitting an 8-degree beam width (X-Band at 3.2-cm wavelength/9,400 MHz). Aircraft may be configured with an integrated weather radar/lightning sensor controller and dual electronic flight instrument system (EFIS) display indicators. Aircraft may have independent weather radar and storm scope controllers and display indicators. Most weather radar features include:

(1) Range–Range selection from 5 to 300 nm full scale (240 nm full scale). If FPLN mode is available, increased ranges of 500 to 1,000 nm 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-nm range). Beam dispersion formula equals the range in nm (x) 100 (x) radar beam width.

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(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 when further compensation is not possible. Targets detected in the cyan field cannot be calibrated and should be considered dangerous.

(3) Stabilization (STAB) system. 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, despite aircraft bank and pitch maneuvers. The system uses the aircraft attitude source as a reference. In the OFF position, the weather radar platform acts independently of the aircraft attitude source reference.

(4) Ground mapping (GMP) or map mode. 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 and mountainous and water region patterns. weather targets are not calibrated in the ground mapping mode. Do not use this mode for weather detection.

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

(6) FPLN. Navigational feature that forces the RTA to STANDBY. Radar data is cleared and NAV displays ranging from 5 to 1,000 nm 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 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). Selects either the normal 14 looks/minute 120-degree sector scan, or the faster update 28 looks/minute 60-degree sector scan.

b. C-12 series airborne weather radar systems measure precipitation. To aid in echo interpretation, targets are displayed in various colors. Refer to the 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 land mass. 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.

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c. The majority of C-12 series aircraft are equipped with a passive lightning sensor system. The system measures both visible and high-energy, invisible electromagnetic and electrostatic discharges (lightning) indicating areas of turbulent activity. C-12 series lightning sensor systems provide bearing and intensity information within a 200-nm 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 in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references, aircraft operator's manual, and equipment manufacturer's TM.

TASK 1261

Perform Circling Approach

CONDITIONS: In a C-12 series airplane, under VMC.

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

1. Confirm the direction of traffic and adhere to all restrictions and instructions issued by ATC.

2. Descend at a rate that ensures arrival at MDA at or before a point from which a normal circle to land maneuver can be accomplished.

3. Maneuver the airplane, after reaching the authorized circling approach altitude at the appropriate point, by visual references to maintain a flight path within the protected circling area for the approach category that permits a normal landing on the active runway,

4. The angle of bank will not exceed 30 degrees.

5 Maintain the desired altitude –0, +100 feet.

6. Maintain appropriate circling MDA and airspeed of V_{REF} +20 KIAS minimum until in a position to make a normal landing

7. 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 P*'s main focus will be outside toward the airport. The 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. Procedures.

a. Circling maneuver. The P* may depart the electronic 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 there is a deviation published or issued by ATC.

(3) In 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 traffic or other flying is in progress at the airport. Standard left turns or specific instructions must be considered when circling to land.

Note. Flaps may remain in approach during the circling maneuver until final approach to the landing runway.

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 GWT, weather conditions, and aircraft performance. If the aircraft will not maintain altitude or V_{YSE} 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.

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(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 so it is continuously in sight.

(5) To ensure a 30-degree angle of bank is not exceeded.

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.

COLD WEATHER CONSIDERATIONS: Correct the MDA IAW the "Temperature Correction Chart" in the FIH, section D.

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 in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and Title 14, CFR Part 91.

TASK 1264

Perform Global Position System Approach or Area Navigation Approach

CONDITIONS: In a C-12 series airplane, equipped with an instrument approach-approved GPS, under IMC, simulated IMC and given access to the appropriate DOD FLIP with approach clearance received.

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

1. Execute the approach, IAW AR 95-1, FM 3-04.240 AIM, DOD FLIP, and the equipment operating handbook for the installed GPS.

2. Complete the before landing check prior to final fix.

3. Do not descend passing the final approach waypoint (FAWP) unless the GPS is in approach/active mode.

4. Determine if receiver autonomous integrity monitoring (RAIM) is available, or lost during approach

5. Maintain V_{REF} +20, ±10 KIAS final approach descent inbound.

6 Maintain prescribed course within one half-scale deflection (when in the navigation mode), using the course indicator, or ±5 degrees using the RMI.

7. Comply with the appropriate 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) or visual descent point (VDP) if published, 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 correct missed approach procedure immediately upon reaching the MAWP if a landing cannot be accomplished, or if RAIM is lost during the approach procedure.

DESCRIPTION:

1. Crew actions.

a. The main focus of the P* will be on the aircraft instruments. The P* will verify that the P has correctly selected the approach in the GPS or FMS. The P* will direct the P to engage the FD and AP functions as the P* requires when performing a coupled approach. See chapter 6 for crew duties and callouts.

b. Prior to commencing the approach the P will obtain weather, winds, current altimeter, active runway and remarks from an approved source and brief the P*. The P will assist the P* by tuning the appropriate radio frequencies, programming the GPS or FMS, selecting the FD modes, reading the CL, and making the appropriate callouts IAW chapter 6 for a GPS approach and missed approach if applicable. If the GPS NAV system does not provide automatic loss of RAIM warnings prior to FAF, the P will check RAIM prior to initiating the approach.

Note. Vertical descent profile guidance provided by an approved FMS as stipulated in the appropriate -10, AFM, STC, Supplement etc. is required to utilize lateral navigation (LNAV)/vertical navigation (VNAV/LPV) non-precision 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 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

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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, MDA/DA/DH, and orientation of the runway to the final approach course, circle maneuver, if necessary, approach lighting available that will assist to identify the runway, missed approach procedure, and MSA. They must clarify any questions on crew actions and intentions with each other and brief any restrictive notes for that approach. It is not required for

one crewmember to read the approach aloud to the other. The IP/IE may require an oral briefing for training purposes.

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

(1) Final inbound course.

(2) FAF altitude and location.

(3) Minimum descent altitude/decision altitude.

(4) Missed approach point.

(5) 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 above items.

Note. The IP/IE may require that the approach be flown with or without the use of the FD and/or the AP.

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2. Procedure.

a. Normal. Refer to FM 3-04.240 for a complete description of approach procedures and the equipment operating guide for the installed GPS device for particular instructions on executing GPS approaches.

(1) Aviators should practice flying instrument approaches manually (unaided), FD only, and coupled with the AP. However, full use of the automation is encouraged to lessen crewmember's workload, especially in terminal areas.

(2) When executing a full procedure approach, the P* may complete the before-landing check and slow to V_{REF} + 20 KIAS at his or her discretion to aid in controlling ground speed and rate of descent outbound.

(3) The P* should complete the before landing CL, to be established at V_{REF} +20 KIAS no later than final approach descent.

(a) If the P determines the P* can complete the approach to landing visually (chapter 6), the P will report, "**RUNWAY IN SIGHT, 12 O'CLOCK, GO VISUAL**." The P* will respond, "**VISUAL**." The P* will continue inbound at MDA until the aircraft is in a position to land (or continue below the DA/DH to land the airplane) and when departing the MDA call out "**LEAVING MDA**." The P* will direct the P to 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 AP is disconnected, if performing a coupled approach.

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

(4) Visual descent point (VDP). VDPs are being incorporated into non-precision approach procedures. The VDP is a defined point on the final approach course of a non-precision, 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.

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 emergency actions.

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

Note. If ATC requires that an airspeed be maintained that precludes completing the before landing check prior to the final approach fix, the before-landing check will be completed as soon as possible on the final descent.

Note. If operators manual allows a flaps approach or no flap landing, appropriate V_{REF} and approach speeds will used for intended flap position during landing.

COLD WEATHER CONSIDERATIONS: Correct the MDA IAW the "Temperature Correction Chart" in the FIH, section D.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and the manufacturer's equipment operating handbook.

TASK 1265

Perform Traffic Alert and Collision Avoidance System Operations

CONDITIONS: In a C-12 series airplane, under VMC, IMC, simulated IMC, or in a classroom

STANDARDS:

1. Correctly turn on, test, adjust, and operate the TCAS IAW the operator's manual, or manufacturer's operating handbook.
2. Correctly identify TCAS symbology.
3. Correctly respond to TCAS traffic advisories (TAs) and resolution advisories (RAs).
4. Use correct TCAS phraseology.

DESCRIPTION:

1. Crew actions.

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

   b. The operation of the TCAS in flight is normally the P's responsibility. Crewmembers will adjust the TCAS as required. Crewmembers will monitor the display frequently during flight and note any potentially conflicting traffic.

   c. During normal operation for TCAS II, the TCAS should be operated in the TA/RA mode. Crewmembers should set TCAS II displays to make potential traffic conflicts rapidly recognizable for each phase of flight (takeoff, climb, cruise, descent and landing). In highly congested terminal areas, the crew should consider setting the display to a less cluttered mode and adjust the range as necessary to make possible traffic conflicts more distinguishable.

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

   e. When IMC, all flight crews will respond to a TCAS 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 that caused the RA. If either crewmember has any doubt, then respond to the RA.

   f. Crewmembers are authorized to deviate from an ATC clearance and will do so in order to correctly respond to an RA. Crewmembers will utilize the TCAS as the primary means of collision avoidance.

   g. When operating under IFR, and responding to an RA, as soon as workload permits, report to ATC with this report IAW FAA AC 120-55C: **"(APPROACH/CENTER), (CALL SIGN), TCAS RA."** For example, if the crew of CUSHY 2 experienced the following resolution advisory (RA), "CLIMB, CLIMB, CLIMB," they would report to ATC as soon as possible as follows: "ATLANTA CENTER, CUSHY 2 TCAS RA."

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

   i. 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. IAW AC 120-55C.
3. TCAS Event Reporting. Paragraph 1g (above) and AC 120-55C, appendix 2.
4. TCAS Event Phraseology. IAW AC 120-55C, appendix 5.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft, academically, or in an approved FS.
2. Evaluation will be conducted in the aircraft, academically, or in an approved FS.

REFERENCES: Appropriate common references; FAA Advisory Circular 120-55C; Title 14, CFR Part 91.221; and the AIM.

TASK 1303

Perform Approaches to Stall

> **WARNING**
>
> **Because of the increased risk factor while performing stall recognition training, the entry altitude will be no lower than an altitude that will allow recovery to be safely completed at a minimum of 4,000 feet AGL.**

CONDITIONS: In a C-12 series airplane under VMC with an IP.

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

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 preventative or corrective action. Because of 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 is approaching a very critical situation.

2. Crew actions. The IP will brief stall characteristics and correct recovery procedures. The P* will acknowledge the briefing. The P*'s main focus will be outside the aircraft. During all recoveries related to this task, initial power application will be made by the P* with minor power adjustments performed by the P when called for by the P*.

Note. As an aid to recovery practice, do not use nose up trim below 100 KIAS.

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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 preventative action is not taken. At the first indication of an approaching stall; for example, stall warning horn, pre-stall buffet, or other indications, simultaneously reduce the angle of attack and apply power. The power application will lower stall speed and will increase airspeed. The net result is an immediate increase in the separation from the stall speed and the actual indicated airspeed. Additionally, if flaps are extended, when they are retracted stall speed increases. To avoid stalling the aircraft during recovery it is important to gain airspeed before retracting flaps to APPROACH or UP.

a. Clean configuration.

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

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

(3) Set TQ to approximately 10 to 20 percent or 300 feet/pounds. Maintain heading and altitude. Observe up trim limits.

(4) At the first indication of an approaching stall (for example stall horn, lack of control responsiveness, buffet), simultaneously apply power and positively reduce the angle of attack as necessary to obtain a level flight attitude, and recover.

(5) As the aircraft accelerates, trim as necessary, and resume the original airspeed and altitude. The P* will call for the go-around CL and recover with minimum loss of 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 CL.

(4) Set TQ to approximately 10 to 20 percent or 300 feet/pounds. Maintain heading and altitude. Observe up trim limits.

(5) For a level recovery, at the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet, etc.) simultaneously apply power and positively reduce the angle of attack sufficiently to obtain a level flight attitude for a level recovery. Once the aircraft is level with increasing airspeed, the P will announce "**POSITIVE RATE**", the P* announces "**GEAR UP**". The left seat pilot will retract the gear. At V_{YSE} or greater the P* will direct "**FLAPS UP**", call for the go-around CL and recover with minimum loss of altitude.

(6) For a climbing recovery, at the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet) simultaneously apply power and release the elevator back pressure sufficiently to obtain a level flight attitude then after the power application and increasing airspeed is noted, the P* should adjust pitch to a normal climb attitude, verify the aircraft is climbing. The P will announce "**POSITIVE RATE**". The P* will call for "**GEAR UP**" and the left seat pilot will retract the gear. At V_{YSE}, the P* will direct "**FLAPS UP**", call for the go-around CL and recover with minimum loss of altitude.

(7) If simulating a circling approach when the approach to stall is encountered, the gear may be left down and the flaps should remain at APPROACH. The P* should obtain and maintain V_{REF} +20 and return to the initial altitude.

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 CL. Set flaps to FULL when airspeed permits.

(4) Set TQ to approximately 10 to 20 percent or 300 feet/pounds. Maintain heading and altitude. Observe up trim limits.

(5) At the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet), perform the following procedures:

(a) P* applies MAX available power and tasks the P to **"SET POWER".**

(b) Positively reduce the angle of attack and simultaneous apply power as necessary to recover the aircraft then adjust elevator to achieve a normal climb attitude (approximately 5 to 7 degrees).

(c) Accelerate a minimum of 10 KIAS above the pre-stall warning indication, and then direct P to "**SET FLAPS APPROACH**".

(d) Left seat pilot will retract the landing gear on the P's "**POSITIVE RATE**" callout.

(e) At V_{YSE}, the P* will direct the P to select "**FLAPS UP**", call for the go-around CL and recover with minimum loss of altitude.

Note. The P's callouts during the recovery are listed in Task 1177.

Note. Intentional entry and recovery from a full-stall condition will only be performed in an approved FS.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references, Advisory Circular (AC) 61-67C, and FAA-S-8081-5C.

TASK 1310

Perform Emergency Procedures for Engine Failure During Flight

WARNING

Simulated engine failures will not be initiated below V_{SSE}. V_{SSE} 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 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 CL, when time and altitude permits.

CONDITIONS: In a C-12 series airplane with an IP/IE, VMC simulated IMC.

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

1. Maintain positive airplane control at all times.

2. Establish a bank up to 5 degrees, if required, to maintain coordinated flight, and properly trim for that condition (ball ½ off center).

3. Set power-plant controls, reduce drag as necessary, and correctly identify and verify the inoperative engine after the failure or simulated failure.

4. Maintain indicated airspeed ±10 KIAS no lower than V_{YSE}.

5. Follow the CL 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 the 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 may 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 CL and perform all designated P actions and crew callouts per chapter 6, and those actions requested by the P*.

   Note. For most C-12 aircraft zero thrust is propeller at the feather detent, TQ 8 to 12 percent or 120 feet/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 the simulated engine failure using the power lever or perform engine shutdown with the condition lever (above 4,000 feet AGL for complete engine stoppage), as appropriate.

      (2) After the P* confirms the propeller feathered, the IP will then set zero thrust, simulating a feathered propeller for a simulated engine failure. If the IP is simulating an engine failure with the

autofeather, the IP will simulate feathering the propeller when the P* advances the power lever sufficiently to activate the autofeather micro switches in the pedestal.

Note. In the event of an actual engine failure or emergency procedure training for an engine failure initiated with the use of the condition lever, the P* must advance both power levers sufficiently to activate the autofeather micro switches in the pedestal.

b. The P* will—

(1) Disconnect the AP with the yoke AP DISC button while increasing the power as required to keep the airspeed from decaying excessively and to activate the autofeather system.

(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 NO.1 ONE (OR NO.2) HAS FAILED**."

(4) Confirm with the P that the propeller did or did not feather, **"DID THE PROPELLER FEATHER?"** If the propeller did not feather, have the P manually feather the propeller after mutual identification and verification by directing the P to "**IDENTIFY THE NO.1** (or No.2 as appropriate) **PROP** lever." After visually confirming the correct prop lever has been identified, state: **"CONFIRMED, FEATHER THE PROP** or **NEGATIVE, RE-IDENTIFY THE NUMBER __ PROP."** In the event the autofeather system feathered the propeller, the **PROP** lever will be manually feathered when the engine malfunction during flight CL is performed.

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

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

c. The P will—

(1) Confirm for the P* that the engine failed and state: **"I CONFIRM NO.__ ENGINE HAS FAILED or NEGATIVE, THE NO.__ (opposite) ENGINE HAS FAILED."** Additionally state, **"I CONFIRM NO.1/NO.2 PROP HAS FEATHERED" or "NO, IT DID NOT FEATHER."** Place index finger on the appropriate prop lever when directed by P*and state, **"NO.1 (OR NO.2) PROP IDENTIFIED".**

(2) Manually feather the failed engine's 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 CL and perform designated P items.

(6) Notify ATC of the emergency with intentions.

d. Use power as required to cruise at the desired airspeed and altitude, if GWT permits. Use one-engine-inoperative MAX cruise power charts in the operator's manual to obtain this data. If altitude cannot be maintained without going below V_{YSE} after setting MAX cruise power, establish a controlled descent to an altitude at which 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 IAW 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 MAX controllable TQ to the operating engine. However, if the engine failure occurs at a speed below minimum control speed with the critical engine inoperative (V_{MCA}) 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. Underlined steps will be done promptly and from memory. The CL 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 IAW 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. Any reduction of power or moving a power lever to idle while the autofeather system is feathering the propeller will disarm the autofeather operation and allow the propeller to windmill. Consideration should always be given for a restart attempt dependent upon cause of the engine failure.

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.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and aircraft operator's manual.

TASK 1315

Perform Single-Engine Landing

Note. Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the 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 CL, when time and altitude permits.

CONDITIONS: In a C-12 series airplane, with an IP, VMC and a non-contaminated runway (Contaminated runway as defined by the Aeronautical Information Manual).

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

1. Maintain a minimum of best single-engine, rate-of climb speed (V_{YSE}) or above until landing is assured.
2. Attain landing approach speed plus one-half the wind gust spread ±5 KIAS.
3. Maintain at or above the approach angle on the FMS/ILS glide path, VASI or precision approach path indicator (PAPI) when available.
4. Cross the runway threshold at V_{REF} (indicated reference speed) plus one-half the wind gust spread ±5 KIAS.
5. Touchdown on the first 3,000 feet of the runway beginning at the threshold or the first third of the runway (on runways shorter than 9,000 feet) and roll out with desired runway track between the main landing gear.
6. Maintain positive directional control and crosswind correction during the after-landing roll.
7. Use beta, reverse, ground fine, and brakes (as appropriate) in such a manner to bring the aircraft to a safe stop.

DESCRIPTION:

1. Crew actions. The P*'s main focus will be outside the aircraft. 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 CL when the P* calls for it. The P will inform the P* when any designated or required checks are completed. When performing a simulated single engine landing, The IP will complete the required checks or procedures pertaining to the P's crew duties. The IP will also read the CL and perform all designated P actions, (such as monitoring flight and engine instruments), and those actions requested by the P*.
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 single-engine before-landing check at the same point as with both engines operating. The P will verify the single engine before landing check and announce, **"SINGLE ENGINE BEFORE LANDING 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 above 500 feet AGL. Maintain a minimum of V_{YSE} 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 V_{REF} plus one-half the wind gust spread at approximately 50 feet above the landing area. When it is certain that there is no possibility of a go-around, the P* should call for **"FLAPS FULL"** (A single engine go around should not be attempted after flaps are extended beyond approach).

   b. Reduce airspeed so as to be at V_{REF} plus one-half the wind gust spread at about 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 CL 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 wind-milling 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 thinking it is safer. V_{REF} is the same for single engine as it is for two engines. Excessive airspeed increases the sensitivity of control inputs and may result in over-controlling. In addition, the inertia will result in increased floating and longer landings.

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 glideslope or VASI/PAPI, 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 glideslope or VASI/PAPI 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, in the aircraft or in an approved FS.
2. Evaluation will be conducted academically, in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1320

Perform Single-Engine Go-Around

WARNING

A single-engine go-around should not be attempted once the flaps are extended beyond approach. This does not mean that flaps are limited to approach until short final. It does mean the P* has committed to landing.

Note. Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the 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 CL, when time and altitude permits.

CONDITIONS: In a C-12 series airplane, with an IP, VMC.

STANDARDS:

1. Perform single-engine go-around IAW the operator's manual.
2. Make the decision to go-around prior to placing flaps to full.
3. Maintain up to 5-degree bank angle into operating engine (ball one-half off center).
4. Maintain V_{YSE} until safe climb out is established (clear of obstacles).

DESCRIPTION:

1. Crew actions.
   a. The P*'s main focus will be flying the aircraft.
   b. The IP should assist the P* by completing all designated P checks, duties, and callouts, and read the CL when the P* calls for it.
2. Procedure.

   a. Discussion: An actual single-engine go-around is not a high-probability maneuver but it potentially can be a high-risk maneuver. Several events have occurred that keep the probability low. The airplane is probably already single engine, which means the crew has declared an emergency. 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 approach either VFR or IFR to avoid a pilot-induced reason for a single-engine go-around.

   (1) Do not initiate the go-around by increasing pitch without applying power. If pitch is raised without power and the gear and flaps are extended, airspeed will start decreasing rapidly. When power is applied with the nose up, some C-12's may not be able maintain V_{YSE} and climb at the same time with gear DOWN and flaps at APPROACH. The only way to maintain V_{YSE} with the gear DOWN and flaps at APPROACH is in a descent unless the aircraft is very light. Conversely, if the nose is pitched up to climb with the gear DOWN and flaps at APPROACH, airspeed will decay below V_{YSE} and continue to decrease as long as the nose is held in a climb attitude. The only way to transition from a descent to climb single engine and maintain V_{YSE} is to retract the gear and flaps at the beginning of the go-around.

   (2) During single-engine climb, maintain up to 5 degrees 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; you may actually start descending or lose directional control.

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

(a) At the DA/DH or missed approach point (MAP) if runway not in sight.

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

(c) When visual reference with the runway is lost during a circling approach.

b. Maneuver.

(1) The P* will—

(a) Initiate the maneuver by advancing the power lever toward MAX allowable power and direct the P to "**SET POWER**." The P will assist in setting MAX allowable power and respond, "**POWER SET**."

(b) Retract the gear (left seat crewmember)

(c) Direct the P to bring **"FLAPS UP**".

(d) Simultaneously adjust pitch to a V_{YSE} climb attitude (approximately 5 to 7 degrees normally).

(e) Establish a climb at V_{YSE}.

(f) Call for the single-engine go-around CL when time, altitude, and workload permit.

(2) The P will—

(a) Set MAX allowable power when directed and respond, "**POWER SET**."

(b) State "**FLAPS UP**" when directed by the P* and the flap switch has been moved to that position. Verify with the flap position indicator

(c) Read the go-around CL when P* directs.

(d) 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, unless their use is restricted by aircraft limitations. Monitor heading and altitude instruments closely and be prepared to convert to instrument flight if the visual horizon is lost or if experiencing vertigo.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted academically, in the aircraft or in an approved FS.
2. Evaluation will be conducted academically, in the aircraft or in an approved FS.

REFERENCES: Appropriate common references, operator's manual, and crewmember CL.

TASK 1325

Perform Emergency Procedures for Engine Failure During Take-Off

WARNING

Simulating an engine failure by retarding a power lever to idle during the takeoff run below V_{MCA} will result in loss of directional control. (See Task 1352.)

WARNING

V_1 engine cuts will not be performed in the C-12 aircraft and simulated engine failures will not be initiated below V_{SSE}.

Note. Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the 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 CL, when time and altitude permits.

CONDITIONS: In a C-12 series airplane, with an IP, VMC.

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

1. Maintain positive aircraft control.
2. Confirm the failed engine's propeller feathered.
3. Maintain up to a 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 or V_{YSE}] +5, -0 KIAS).
5. Complete and verify the procedure with the CL above 400 feet AGL.

DESCRIPTION:

1. Crew actions.

   a. The crew will discuss rejected takeoff criteria, emergency return plan, and crew responsibilities during the departure brief.

   b. The crew will review the TOLD card and determine the course of action if an engine fails at or after lift-off.

   c. The P*'s main focus will be to fly the aircraft.

   d. The IP should not simulate an inoperative autofeather until a safe altitude is reached. The IP will complete the required procedures pertaining to the P's crew duties. The IP will also read the CL and perform all designated P actions and those crew callouts and duties, IAW 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:

   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 which it occurs. Additionally, TEMP, PA and WT will affect the aircraft's ability to climb and accelerate. The most critical point to lose an engine is

at V_1. This is a decision point for the crew. Does the crew abort the takeoff and stop or continue the takeoff? One of the criteria to continue the takeoff has been met by reaching V_1. 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 WT, TEMP and PA.

Note. If an engine fails at or immediately after liftoff, climb to 35 feet may be critical. Positive pilot actions will be required to maintain aircraft control. The distance required to attain 35 feet AGL will be significant.

Note. Takeoff power is already applied and the P is responsible for maintaining the power at the appropriate setting.

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b. Engine failure immediately after lift-off–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, make pitch adjustment smoothly to avoid a TQ roll.

(b) At the **"POSITIVE RATE"** callout, retract the gear (left seat crewmember).

(c) Climb at V_2 for the aircraft configuration.

(d) Identify the failed engine and verify with the P. **"CONFIRM NUMBER ONE (OR TWO) ENGINE HAS FAILED."**

(e) Confirm with the P that the propeller did or did not feather, **"DID THE PROPELLER FEATHER?"** All C-12 series aircraft have an autofeather system installed it should feather the propeller. If an actual engine fails, the autofeather should feather the propeller in less than 10 seconds. Visual identification is easy if one propeller is stationary.

(f) If the aircraft is being flown with an inoperative autofeather, direct the P to manually feather the propeller after mutual identification and verification that the propeller did not feather by directing the P to **"IDENTIFY THE NO.1** (or No.2 as appropriate) **PROP LEVER."** The P will place the index finger on the appropriate prop lever. The P* visually confirms the correct propeller lever has been identified, state: **"CONFIRMED, FEATHER THE PROP" or NEGATIVE, RE-IDENTIFY THE NO. __ PROP."**

(g) When sufficient altitude that is clear of all obstacles can be obtained and the rate of climb allows, accelerate to V_{YSE}. It may be necessary to climb to single-engine maneuvering altitude (400 feet AGL) or to an altitude that will guarantee obstacle clearance and then level the aircraft to accelerate to V_{YSE}.

(h) Direct **"FLAPS UP"** at V_{YSE} (if flaps were used on takeoff).

(i) Transfer power control back from the P by stating **"MY POWER"** or P stating **"YOUR POWER"** at 400 feet AGL. Reduce power to MAX CONT.

(j) Call for the "**ENGINE MALFUNCTION AFTER V_1 CHECKLIST"** when time, altitude, and workload permits.

(k) Land at the nearest suitable airport.

(2) The P will—

(a) Set and maintain takeoff power from the beginning of the takeoff roll until the P* **"MY POWER"** callout is directed-normally at 400 feet AGL.

(b) Call **"POSITIVE RATE"** when two climb indications are observed.

(c) Confirm for the P*, **"I CONFIRM NO. __ HAS FAILED** or **NEGATIVE, THE __ (**opposite) **ENGINE HAS FAILED."** In addition state: **"YES, THE NO.1/NO.2 PROPELLER HAS FEATHERED'** or **NO, IT DID NOT FEATHER."**

(d) Manually feather the failed engine's propeller when the P* confirms the correct propeller lever has been identified and state, **"PROP FEATHERED."**

(e) State **"V_2 IS __"** (for the flap setting).

(f) Retract the flaps at V_{YSE} (if flaps were used on takeoff) when directed by the P* and state, **"FLAPS UP"** when the flap handle is moved to the up position and position is verified.

(g) Transfer power control to P* by stating **"YOUR POWER"** at 400 feet AGL.

(h) Read the CL when asked by the P*.

(i) Inform ATC of the emergency and intentions.

c. Engine failure after V_{YSE}. Any additional airspeed above V_{YSE} 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 fairly positive rate while it decelerates. The flying procedure is essentially the same. Takeoff power is already applied, the gear is retracted and airspeed is at or beyond V_{YSE}. 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 applicable duties remaining.

Note. To simulate engine failure with an armed autofeather, the IP will retard the affected power lever to IDLE while simultaneously moving the propeller lever to the feather detent position.

Note. For training in the airplane, the V_2 net climb gradient should be at least 2.0 percent.

Note. During single-engine climb, additional power will be available by retracting the ice vanes, if extended. Environmental consideration should be given prior to retraction.

NIGHT CONSIDERATIONS: Monitor heading and altitude instruments closely and be prepared to convert to instrument flight if the visual horizon is lost or if experiencing vertigo.

TRAINING AND EVALUATION REQUIREMENTS:

1. At V_1 or after lift-off below V_{SSE} flight continued, task must be trained and evaluated only in an approved FS.

2. Engine failure airborne after obtaining V_{SSE}, task may be trained and evaluated in the aircraft or in an approved FS.

REFERENCES: Appropriate common references and Title 14, CFR Part 23.

TASK 1336

Perform Emergency Procedures for Engine Failure during Final Approach

WARNING

Simulated engine failures will not be initiated below V_{SSE}. 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 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 CL, when time and altitude permits.

CONDITIONS: In a C-12 series airplane, with an IP, VMC or simulated IMC.

STANDARDS: Appropriate common standards and 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 CL, 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 V_{SSE}. The IP will complete the required checks or procedures pertaining to the P's crew station. If 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. Procedures. 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 and verifying by use of the checklist. 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 IAW chapter 6. Once the drag is removed, the aircraft will start accelerating. It will be necessary to reduce power to maintain approach airspeed. Complete the landing, crossing the threshold in normal descent and airspeed profile.

      (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 NO.1** (or No.2) **HAS FAILED**."

(c) Confirm with the P that the propeller did or did not feather, **"DID THE PROPELLER FEATHER?"** 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 NUMBER ONE** (or two as appropriate) **PROP LEVER."** After visually confirming the correct propeller lever has been identified, state: **"CONFIRMED, FEATHER THE PROP"** or **"NEGATIVE, RE-IDENTIFY THE NUMBER __ PROP."**

(d) Continue with a normal descent.

(2) The P will—

(a) Verify for the P*, **"I CONFIRM NO.1 (or No.2) HAS FAILED"** and **"I CONFIRM ENGINE NO.1 (or No.2) PROPELLER HAS (has not) FEATHERED."**

(b) Manually feather the failed engine's propeller, when the P* directs and state, **"PROP FEATHERED."**

(c) Advise ATC of the emergency.

b. Short final. Defined as Landing Check completed. 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 and to activate the autofeather system. 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 and prop feathering.

Note. A windmilling propeller in a four-bladed propeller system produces very high drag which will cause a rapid decay in airspeed. It is critical that, if time permits, that the propeller be feathered or the resulting drag may cause airspeed to decay excessively during a long final.

Note. During approaches with an armed autofeather, with the power below the autofeather arm position, the IP will not simulate autofeathering until the P* advances the operative engine power lever above the autofeather arm position. The P* must understand that this simulates advancing both power levers to activate the autofeather system as would be required in the event of an actual engine failure.

Note. When conducting this task, the IP should exercise extreme alertness to preclude the P* from inadvertently exceeding MAX allowable/controllable power.

Note. Maintain a minimum 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 V_{REF} plus one-half the wind gust spread at approximately 50 ft above the landing area.

NIGHT CONSIDERATIONS: Use normal approach and landing technique. Do not allow the aircraft to descend below a normal glide path. The VASI, PAPI or ILS 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, PAPI or ILS 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, in the aircraft, or in an approved FS.
2. Evaluation will be conducted academically, in the aircraft, or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1340

Perform Emergency Landing Gear Extension

CONDITIONS: In a C-12 series airplane with an IP, VMC or simulated IMC.

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

1. Extend the landing gear IAW the aircraft operator's manual.
2. Complete and verify the procedure with the CL.

DESCRIPTION:

1. Crew actions.

   a. The left seat pilot’s main focus will be inside the aircraft since the extension handle is located on the left side.

   b. The P will assist by keeping the area clear, read the CL, and perform 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 AP.

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 has not caused normal gear extension, perform emergency gear extension IAW the aircraft operator's manual.

   b. The P, when directed, will assist the P* by reading the CL. 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/SP.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted academically, in the aircraft or in an approved FS.
2. Evaluation will be conducted academically, in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1352

Perform Rejected Takeoff

> **WARNING**
>
> **Initiating a rejected takeoff by reducing a power lever or placing a condition lever to fuel cutoff is prohibited. Velocity minimum control ground (V_{MCA}) limits may be exceeded causing loss of control.**

CONDITIONS: In a C-12 series airplane with an IP, VMC and a non-contaminated runway (contaminated runway as defined by the AIM).

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

1. Review malfunctions that would be reason for a rejected takeoff prior to decision speed/rotation speed V_1.
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 P*'s main focus will be outside the aircraft. The IP will perform normal 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, reject the takeoff. If it occurs at or above V_1, continue the takeoff. Any crewmember may announce the Abort. Several common reasons to reject a takeoff are—

(1) Engine malfunction.
(2) Flat tire.
(3) Chip detector.
(4) Fire light illuminates.
(5) Oil pressure light illuminates (if equipped).
(6) Smoke/Smell in the cockpit.
(7) Abnormal flight control inputs required or feedback in controls.
(8) Loss of directional control.

Note. During the departure briefing the PC will review the TOLD card data to determine, if an engine failure occurs at V_1, that the aircraft has the performance to continue the takeoff. If it does not, the crew will discuss a rejected takeoff plan.

Note. There may be other reasons that units may deem critical enough for a rejected take-off. These reasons should be addressed as a SOP item. The PC may state "**STANDARD ABORT CRITERIA"** in the departure briefing if all items are included in the SOP and understood by both crewmembers.

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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, ABORT**."

(2) The P* will—

(a) Bring both power levers to idle.

(b) Safely stop the airplane using a combination of braking, and beta/ground fine (as required), and propeller reversing as required.

c. IP's should discuss actions for a rejected takeoff if insufficient runway remains.

d. If a malfunction occurs at V_1, the decision to continue the takeoff depends on several factors that should be discussed in the departure briefing.

(1) The performance data on the TOLD card should support continuing the takeoff; (for example, you have a positive climb at liftoff and accelerate-go distance is acceptable or first or second segment climb capabilities are sufficient).

(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 academically, in the aircraft, or in an approved FS.
2. Evaluation will be conducted academically, in the aircraft, or in an approved FS.

REFERENCES: Appropriate common references.

TASK 1800

Perform After-Landing Tasks

CONDITIONS: In a C-12 series airplane and given the operator's manual/CL.

STANDARDS: Appropriate common standards and the following additions/modifications (Without error, perform after-landing tasks IAW the CL.)

DESCRIPTION:

1. Crew actions. The P* will focus his 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 their crew duties IAW the CL and the preflight briefing.
2. Procedure. The P*, assisted by the 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 CL.

   b. The P should assist the P* by reading the CL and assisting in clearing the area. The P should complete all designated P checks and assist the P* as required.

Note. The PC will ensure that the aircraft is secured and that the FPLN is closed.

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

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the aircraft or in an approved FS.
2. Evaluation will be conducted in the aircraft or in an approved FS.

REFERENCES: Appropriate common references.

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Chapter 5
Maintenance Test Pilot Tasks

This chapter describes tasks essential in 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 provided. Tasks described in this chapter are to be performed by qualified C-12 MPs IAW AR 95-1 and chapter 2. This chapter contains tasks and procedures used by contractor MPs according to AR 95-20, *Contractor's Flight and Ground Operations*, and Defense Logistics Agency Manual (DLAM). 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.

5-1. TASK CONTENTS.

a. **Task number and title.** Each ATM task is identified by a number and title that corresponds to the MP tasks listed in table 2-5, page 2-8. 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 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. MTFs 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 addition to the common standards in chapter 4, the following common standards apply to all MP tasks.

(1) Prior to flight, brief the P on procedures to be performed during the MTF. 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 works in conjunction with the maintenance contractor 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 tasks incorporate more than one check from the MTF manual. This section defines the checks in each task that, at a minimum are required for MP training. Refer to table 2-5, page 2-8, 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 trouble-shooting 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.** References are sources of information relating to a 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 95-1

(2) AR 700-138, *Army Logistics Readiness and Sustainability*

(3) DA Pam 738-751.

(4) TM 1-1500-328-23.

(5) Operator's manual, checklist, and MTF manual.

(6) Aircraft logbook and historical records.

(7) Applicable airworthiness directives or messages from PEO-AV.

(8) Applicable commercial maintenance manuals.

h. **Crew stations.** Aviators designated as MPs will occupy the pilot's station (left seat) during MTFs. SPs/IPs designated as MPs may occupy either pilot station (left or right seat) during MTFs 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 with access to the MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew actions. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 in an approved FS.
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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 Check

CONDITIONS: In a C-12 airplane or simulator with access to the MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP)will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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.

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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 Check

CONDITIONS: In a C-12 airplane or simulator with access to the MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 Check

CONDITIONS: In a C-12 airplane, visual meteorological conditions (VMC), or simulator with access to the MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5 and the following 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 KIAS at an altitude that will allow recovery to be safely completed no lower than 7,500 feet 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 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 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 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. 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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.

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 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. 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 Check

CONDITIONS: In a C-12 airplane or simulator with access to the 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 P* must be diligent in maintaining altitude, heading, and airspeed throughout this task. Allowing airspeed to decay below Vs or V_{MCA} during this maneuver will cause loss of airplane control.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 Auto-feathering System Check

CONDITIONS: In a C-12 airplane or simulator with access to the 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 P* must be diligent in maintaining altitude, heading, and airspeed throughout this task. Allowing airspeed to decay below V_S or V_{MCA} during this maneuver will cause loss of airplane control.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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 Communications and Navigation Equipment Check

CONDITIONS: In a C-12 airplane or simulator with access to the MTF manual.

STANDARDS: Appropriate common standards outlined in chapter 4 and chapter 5.

DESCRIPTION:

1. Crew action. The MP will ensure the checks are conducted according to the appropriate aircraft MTF manual. The MP may direct the 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
Aircrew Coordination

This chapter describes the background of aircrew coordination development. It also describes the aircrew coordination principles 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 enhanced ability for either PI to perform most aircraft/system functions from his or her crew station breaks down the standard delineation of duties and has added capabilities, and potential distractions, in training and in combat. This could mean that during an unforeseen event, one pilot may attempt to resolve the situation rather than seeking assistance from or even communicating that action with the other crewmember. It is essential for the 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. **AIRCREW COORDINATION BACKGROUND AND PLANNING STRATEGY.** An analysis of United States Army aviation accidents revealed that a significant percentage of aircraft accidents resulted from one or more aircrew coordination errors committed during and even before the flight mission. 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 crews actually avoided potential accidents, these same errors could result in degraded *performance that jeopardized mission success.* A systematic analysis of these error patterns identified specific areas where crew-level training could reduce the occurrence of such faults and break the *chain of errors* leading to accidents and poor mission performance.

a. Aircrew coordination patterns begin with the accomplishment of crew-level pre-mission planning, rehearsal and after action reviews. Pre-mission planning includes all preparatory tasks associated with accomplishing the mission. This will include assigning crewmember responsibilities and conducting all required briefings and brief-backs. Pre-mission rehearsal involves the crew collectively visualizing and discussing expected and potential unexpected events for the entire mission. Through this process, all crewmembers discuss and think through contingencies and actions for difficult segments, equipment limitations and failures, or unusual events associated with the mission, and develop strategies to cope with possible contingencies (METT-TC).

b. Each crewmember must actively participate in the mission planning process to ensure a common understanding of mission intent and operational sequence. The PC prioritizes planning activities so that critical items are addressed within the available planning time. Crewmembers must then mentally rehearse the entire mission by visualizing and discussing potential problems, contingencies, and assigned responsibilities. The PC ensures that crewmembers take advantage of periods of low workload to review or rehearse upcoming flight segments. Crewmembers should continuously review remaining flight segments to identify required adjustments, making certain their planning is consistently ahead of critical lead times.

c. After a mission or mission segment, the crew should debrief, review, and critique major decisions, their actions, and task performance. This should include identifying options and factors that were omitted from earlier discussion and outline ways to improve crew performance in future missions. The discussion and critique of crew decisions and actions must remain professional. "Finger pointing" is not the intent and should be avoided; the emphasis should remain on education with the singular purpose of improving crew and mission performance.

6-2. **AIRCREW COORDINATION PRINCIPLES.** Aircrew coordination is the cooperative interaction between crewmembers necessary for the safe, efficient, and effective performance of flight tasks. The essential principles and qualities of aircrew coordination are described in figure 6-1, page 6-2.

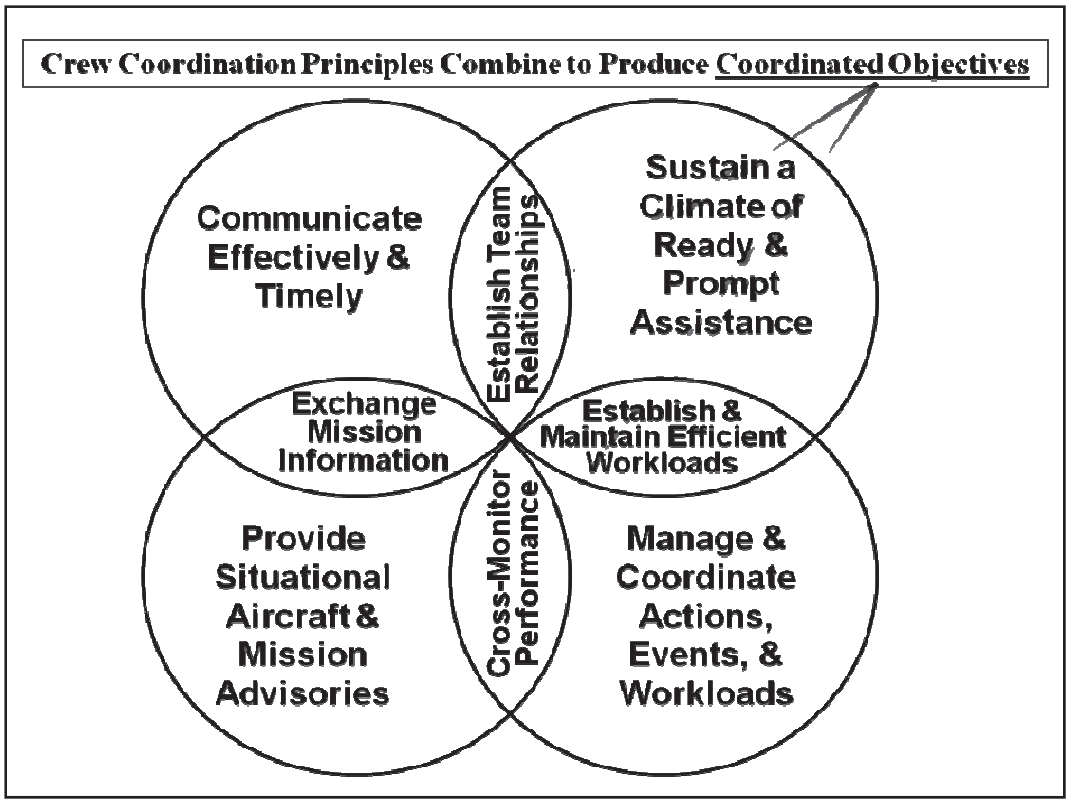

Figure 6-1. Crew coordination principles

a. **Communicate effectively and timely.** Good team relationships begin with effective communication among crewmembers. Communication is effective when the sender directs, announces, requests, or offers information; the receiver acknowledges the information; and the sender confirms the receipt of information, based on the receiver's acknowledgment or action. This enables the efficient flow and exchange of important mission information that keeps a crew on top of any situation that arises.

(1) **Announce and acknowledge decisions and actions.** To ensure effective and well-coordinated actions in the aircraft, all crewmembers must be kept informed and made aware of decisions, expected movements of crew and aircraft, and the unexpected individual actions of others. Each crewmember will announce any actions that may affect the actions of other crewmembers. In turn, communications in the aircraft must include supportive feedback that clearly indicates that crewmembers acknowledge and correctly understand announcements, decisions, or directives of other crewmembers.

(2) **Ensure that statements and directives are clear, timely, relevant, complete, and verified.** These are qualities that must describe the kind of communication that is effective. Considering the fleeting moments of time in a busy aviation environment, only one opportunity may exist to convey critical and supporting information before tragedy strikes. That information must be clearly understood, not confusing, and said at the earliest opportunity possible. It must be applicable to the events at hand to support the needs and security of the mission. The information must include all elements needed to make the best decision based on its urgency; and the communication must come with ability of proven confirmation and without redundancy. It must also include the crew's use of standard terminology and feedback techniques that accurately validate information transfer. Emphasis is on the quality of statements associated with navigation, obstacle clearance, instrument readouts, and emergencies. Specific goals include the following:

(a) Crewmembers consistently make the required callouts. Their statements and directives are always timely. Their response to unexpected events is made in a composed, professional manner.

(b) Crewmembers actively seek feedback when they do not receive acknowledgment from another crewmember. They always acknowledge the understanding of intent and request clarification when necessary.

(3) **Be explicit.** Crewmembers should use clear, concise terms, standard terminology, and phrases that accurately convey 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, "You are coming in a little fast."

b. **Sustain a climate of ready and prompt assistance.** The requirement to maintain a professional atmosphere by all members of the team begins with the team leadership of the PC. However, all crewmembers must equally respect the value of other crewmember's expertise and judgment regardless of rank, duty, or seniority. Every member has a responsibility to maintain situational awareness for mission requirements, flight regulations, operating procedures, and safety. Each crewmember must be willing to practice advocacy and assertiveness should the situation demand a different course of action, as time permits. It is critical to maintain a crew climate that enables the opportunity to apply appropriate decision-making techniques for defining the best course of action when problems arise. Courses of action may demand that assistance be directed to other crewmembers or could be voluntary assistance that is offered in a timely manner, depending on time constraints and information available. All crewmembers must remain approachable, especially in critical phases of flight when reaction time is at a premium.

c. **Effectively manage, coordinate, and prioritize planned actions, unexpected events, and workload distribution**. The crew performing as a team should avoid distractions from essential activities while distributing and managing the workloads equally. Both the technical and managerial aspects of coping with normal and unusual situations are important. Proper sequencing and timing guarantees that the actions of one crewmember support and mesh with the actions of the other crewmembers. Responsible effort must be used to ensure that actions and directives are clear, timely, relevant, complete, verified, and coordinated with minimal direction from the PC.

(1) Direct assistance. A crewmember will direct or request assistance when he or she cannot maintain aircraft control, position, or clearance. A crewmember will also direct assistance when being overloaded with tasks or unable to properly operate or troubleshoot aircraft systems without help from the other crewmembers. The PC ensures that all crew duties and mission responsibilities are clearly assigned and efficiently distributed to prevent the overloading of any crewmember, especially during critical phases of flight. Crewmembers should also watch for workload buildup on others and react quickly to adjust the distribution of task responsibilities.

(2) Prioritize actions and equitably distribute workload. 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 tasks that are more critical. Crewmembers consistently avoid nonessential distractions so that these distractions do not affect task performance (for example sterile cockpit) or ability to help another crewmember. Crew actions should reflect extensive review of procedures in prior training and pre-mission planning and rehearsal.

d. **Provide situational aircraft control, obstacle avoidance, and mission advisories**. Although the P* is responsible for aircraft control, the other crewmembers may need to provide aircraft control information regarding aircraft position (airspeed, altitude), orientation, obstacle avoidance, equipment and personnel status, environmental and battlefield conditions, and changes to mission objectives or evolving situations of the mission (situational awareness). Crewmembers must anticipate and offer supporting information and actions to the decision maker, which is usually the PC or may be the AMC in a mission-related situation. Specific goals include the following:

(1) Situational awareness. Crewmembers must anticipate the need to provide information or warnings to the PC or P* during critical phases of the flight or mission. The PC must encourage crewmembers to exercise the freedom to raise issues or offer information about safety or mission-related matters. In turn, the crewmembers will provide the required information and warnings in a timely and professional manner. None of this could be accomplished without cross-monitoring performance and crew tasks.

(2) Mission changes and updates. Crewmembers should routinely update each other while highlighting and acknowledging mission changes. They must take personal responsibility for scanning the entire flight environment, considering their assigned workload and areas of scanning. Each crewmember needs to appropriately adjust individual workload and task priorities with minimal verbal direction from the PC when responding to emergencies and unplanned changes of the mission.

(3) Offer assistance. A crewmember will provide assistance, information, or feedback in response to another crewmember. A crewmember will also offer assistance when he or she detects errors or sees that another crewmember needs help. If safety or mission performance is at risk, immediate challenge and control measures must be assertively exercised. A crewmember should quickly and professionally inform and assist the other crewmember committing the error. When required, they must effectively implement the two-challenge rule with minimal compromise to flight safety. Crewmembers must continually cross-monitor other crewmember's actions and remain 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. Crewmembers must discuss conditions and situations that can compromise situational awareness. These include, but are not limited to, stress, boredom, fatigue and anger.

6-3. **AIRCREW COORDINATION OBJECTIVES.** Aircrew coordination principles and objectives originate from and are fundamentally supported by a set of individual, professional skills. Each crewmember is responsible for attaining the leadership skills of effective communication, resource management, decision-making, situational awareness, team building, and conflict resolution. When crewmembers are actively using these skills and practicing aircrew coordination principles, results can be seen and measured to determine if the objectives of the aircrew coordination program are being met. The goals of the program have been defined by four aircrew coordination objectives. The four objectives are as follows:

a. **Establish and maintain team relationship**s. Establish a positive working relationship that allows the crew to communicate openly, freely, and effectively in order to operate in a concerted manner where a climate of professional assistance is easily found and promptly provided.

b. **Establish and maintain efficient workloads.** Manage and coordinate priorities and execute the mission workload in an effective and efficient manner with the redistribution of task responsibilities as the mission situation changes. Flight duty responsibilities are performed in a timely manner where mission needs are always anticipated.

c. **Exchange mission information.** Establish all levels of crew and mission communications using effective patterns and techniques that allow for the flow of essential data and mission advisories among all crewmembers in a timely and accurate manner.

d. **Cross-monitor performance.** Cross-monitor each other's actions and decisions to ensure workloads and crew actions are performed in a coordinated manner and to standard. Cross-monitoring crewmember performance keeps a crew ready to provide aircraft and mission advisories to each other and helps to reduce the likelihood of errors affecting mission performance and safety.

6-4. **STANDARDIZED COCKPIT PROCEDURES.**

a. General. The intent of clearly defining a division of cockpit responsibilities is to ensure that duties that may distract the P* are transferred to the P. Clear division of cockpit responsibilities is of particular importance during the arrival and departure phases of flight. The individual operator's manual designates C-12s as two-pilot aircraft. Besides the circled items in the operator's manual and the CL that delineates P duties, the crew callouts and responsibilities outlined in this chapter should serve to fully integrate the P* and P as a flight crew.

b. P* responsibilities. The P* is responsible for flying the aircraft. If the AP is coupled, the P* is responsible for ensuring that the AP 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 by tasking 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 his or her duties. The primary duty of the P is to keep the P* free to simply fly the airplane. Basic P duties include the following:

(1) Radio communications.

(2) Change NAVAID and communications radio frequencies.

(3) Change transponder codes.

(4) Prepare and review copy clearances, local weather broadcast, automated terminal information services, and other flight information.

(5) Read and complete CL 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 the aircraft configuration at the direction of the P*, such as—

(a) Power and propeller settings.

(b) Flap selection.

(9) Operate the weather avoidance equipment.

(10) Set and arm the altitude on the altitude pre-selector (if installed) and cabin controller.

(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 FD panel.

(1) The P may make changes to the altitude controls as required by newly assigned altitudes without the direction of the P*.

(2) The P shall not make other changes to the P*'s FD system without the direction of the P*.

(3) When the AP is not engaged, the P* will direct the P to make changes to the P* FD system. If the P is unable to assist, the P* may make minor changes to his FD system. Examples of minor changes include the following:

(a) Arming the approach mode.

(b) Selecting indicated airspeed or vertical speed (VS).

(c) Selecting heading (HDG) or navigation.

(d) Selecting standby (STBY).

(4) Changes to the status of the FD system coupled to the AP should be announced and mutually verified (such as "Heading mode is selected, NAV is armed for the localizer, and altitude is captured at 3,000 feet"). In general, when something is selected, it should be announced to the other pilot. An announcement should also be made when the FD 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 take-off power as briefed until V_1 is announced. During take-off roll, if there is a need to abort the takeoff, the P* will retard the power levers.

f. Operation of landing gear. The left seat pilot will operate the landing gear unless otherwise briefed such as for IP demonstration purposes. Under high workload conditions the P may be directed to retract the gear by the P*.

g. Standardized calls. Standardized calls enhance communication and crew coordination while minimizing confusion and reducing cockpit workload. The standardized calls listed in this manual are concise effective callouts that should be used as standard terminology whenever possible.

h. Deviations. Certain circumstances may require deviation from the guidelines published in this chapter. Such deviations, when clearly communicated between the crew, reflect good resource management and coordinated crew actions.

i. CLs. The P and 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 (taxiing, departure or take-off, 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 non-critical functions with command or acknowledgment. The operation of systems such as landing gear, flaps, AP, FMS, and FD mode selections require P* participation, mandating a response of "**CONFIRMED**." (For example, before landing, the P announces "**GEAR DOWN/CONFIRM;**" the P* responds with "**CONFIRMED**.")

6-5. **STERILE COCKPIT.** The definition of a sterile cockpit is, only that conversation required for safe aircraft operation is allowed. A sterile cockpit shall exist—

a. From the start of the take-off run through the climb to 10,000 feet or the en route phase of flight when cruise altitude is less than 10,000 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.

6-6. **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 or she 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.

6-7. **AUTOMATION MANAGEMENT.**

a. **General**. The high level of automation in modernized C-12 aircraft affords a variety of ways to obtain flight information and execute mission tasks. It also presents challenges for managing information, monitoring systems operations, and verifying task accuracy and completion. Inefficient automation management can lead to confusion, conflict, and increased workload. The following techniques are not mandatory but will provide a common expectation for crewmembers and prioritize actions during periods of high workload.

b. **Automation philosophy**. The hierarchy of automation can range from manual manipulation of flight controls without FD guidance to the AP coupled to FD and NAV system guidance. Understanding the automation capabilities of the aircraft allows for the highest level of automation possible without conscious effort. This generally creates an environment for aircrew to have the lowest workload and the highest level of situational awareness.

c. **Aircrew coordination and automation**. Crew discipline is necessary to prioritize duties, effectively manage workload, and inhibit complacency. P* and P duties and responsibilities must be clearly understood. The use of standard terminology and effective communication skills, especially those used in cross-checking/verifying FD and NAV system inputs and reviewing flight status, are particularly important in order to keep the crew advised of the current automation status and any change to automation status. To enhance situational awareness, complete the following:

(1) **Heads-up/heads-down operations**. The design and placement of cockpit displays and navigation units allows both pilots to maintain heads-up to lookout as often as possible. Full advantage of mission planning and preflight time should be taken to complete tasks that would otherwise require heads-down time during flight.

(2) **Data Entry.** Data entry should not be allowed to consume the attention of both pilots and/or detract from the primary task of flying the aircraft. Any data entry which alters the aircraft current or future flight profile should be verified by the P* prior to execution. All data entries affecting the current navigation/FMS mode should be visually verified by the other pilot (time permitting). Data

entry is discouraged while the aircraft is taxiing, but if necessary should be made by the P. Data entry in flight should be made by the P. Either pilot may make entries if the aircraft is stopped with the parking brake set.

(3) **Manual or AP flight**.

(a) The P* makes or directs all actions that cause the aircraft to change pitch/roll/heading/speed. The P verifies all settings and callouts made by the P*.

(b) When flight is conducted with the AP engaged, the P* may select or direct the P to select FD modes and navigation sources. When manually flying the aircraft the P* should direct the P to select FD modes and navigation sources whenever possible. In normal flight situations, only the P* should disengage the AP and announce "**AUTOPILOT DISENGAGED**".

d. **Emergency/abnormal procedures.**

(1) Immediate actions.

(a) The P* is responsible for aircraft control and must continue to fly the aircraft. Underlined emergency items in the operator's manual will be committed to memory. This should not be construed to mean the 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 CL, when time and altitude permits.

(b) The P announces the nature of the malfunction (such as "**ENGINE FAILURE NUMBER 1**"), verbalizes the displayed indications, if applicable, and accomplishes immediate action items as directed by the P*. The P will read and accomplish applicable emergency CL items.

(2) Follow up/decision making. Complete all required CL action items and determine a course of action (for example continue mission, modify/abort mission, or return to base/divert field) based on the nature of the emergency.

(3) Critical action coordination. Flight critical/irreversible actions should always be confirmed by two crewmembers. These actions include, but are not limited to, pulling the engine fire pull handle or moving a propeller or condition lever. The crewmember performing the action points to the affected switch/handle and verbally seeks confirmation from an opposite crewmember (for example "**CONFIRM NUMBER ONE PROP LEVER**"). The crewmember confirming the action looks at the affected switch/handle and acknowledges "**NUMBER ONE PROP LEVER CONFIRMED**".

6-8. STANDARD CREW TERMINOLOGY.

a. Standard words and phrases. 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. DOD FLIP contains standard terminology for radio communications. Operator's manuals contain standard terminology for items of equipment. Table 6-1, page 6-8, is a list of other standard words and phrases that crewmembers may use.

b. Crew callouts. Crew callouts are a standard means to effectively communicate actions between the P* and the P in a terminal area during critical phases of flight. By reducing unnecessary cockpit communications, crew callouts increase the situational awareness of both crewmembers and allow them to focus on flying the aircraft efficiently, staying abreast of traffic and ATC communications. Crews should not interpret making crew callouts as a means to vocalize every action.

c. Standard brief. The term "**STANDARD BRIEF**" may be used during the departure briefing to indicate crew duties and callouts remain the same IAW the unit SOP.

Table 6-1. Standard crew terminology

Term	*Definition*
Abort	To terminate a preplanned maneuver; for example, an aborted takeoff.
Affirmative	Yes.
Bandit	An identified enemy aircraft.
Bogey	An unidentified aircraft assumed to be enemy.
Braking	Announcement made by the rated crewmember (RCM) who intends to apply brake pressure.
Break	Immediate action command to perform a maneuver to deviate from the present ground track; will be followed by “right,” “left.”
Callout	Command by the P* for a specified procedure to be read from the CL by another crewmember.
Clear	No obstacles present to impede aircraft movement along the intended direction of flight or while taxiing on the ground. Will be followed by direction of movement. Example: Clear right or left. Also when preceded by #1 or #2 to indicate that engine area has been visually checked for personnel or other hazards before engine start.
Contact	Establish communication with….
Correct	Confirms a statement as being accurate or right. 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, altitude, etc.
Drifting	An alert of the unannounced movement of the aircraft on final approach or take-off will be followed by direction. 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 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	Sixty-five-knot check on the take-off roll indicating the airspeed indicators are alive, autofeather lights are illuminated, and instrument indications are within limits.
Outside	The primary focus is outside the aircraft.
Put me up	Command to place the P*’s radio transmit selector switch to a designated position or to place a frequency in a specified 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 V_R.
Set power	Command by the P* for the P to set takeoff power or MAX available power

Table 6-1. Standard crew terminology

Term	*Definition*
	during a go-around or missed approach.
Stop	Command to go no further; halt present action.
Traffic	Any friendly aircraft that presents a collision hazard; an announcement of traffic will be followed by a clock position, distance, and reference to altitude.
Turn	Command to deviate from the current heading; the command will be followed by the word "right" or "left" and a specific heading.
Up on	Indicates the radio selected; “Up on” will be followed by the position number on the intercommunication system panel; for example, “Up on 3.”
Verify	Request confirmation of information.
You have the controls	Used as a command or announcement by the RCM relinquishing the flight controls.
Your power	P returning control of the power levers to the P*.
You’re up	Announces a specific radio frequency is selected on a selected radio. “You’re up 121.7 on number 1”.

6-9. **CREW COORDINATION CALLOUT.** Bold type identifies the crewmember who should initiate the call.

a. Takeoff (table 6-2) applies to a normal takeoff and an instrument takeoff.

Table 6-2. Takeoff

ACTION	*P* CALL/RESPONSE*	*P CALL/RESPONSE*
POWER LEVERS ADVANCE	**“SET POWER**	“POWER SET”
65 KTS INDICATED (AIRSPEED INDICATORS CHECKED, AND SYSTEMS NORMAL)		**“NORMAL”**
AIRSPEED AT V_1	REMOVES HAND FROM POWER LEVERS AND PLACES HAND ON THE YOKE AND ROTATES.	**“V_1, ROTATE”**
ABNORMAL OR EMERGENCY CONDITION BEFORE V_1 (IDENTIFIED BY P)	“ABORTING”	**“ABORT, ABORT, ABORT”**
P* ELECTS TO ABORT BEFORE V_1	**“ABORTING”**	“ROGER”
POSITVE RATE OF CLIMB (TWO INDICATIONS)	AFTER P “POSITIVE RATE,” LEFT SEAT RAISES THE GEAR HANDLE	**“POSITIVE RATE”** “**GEAR IS UP** or **GEAR DID NOT RETRACT**”
FLAPS UP AT V_{YSE}	**FLAPS UP”**	“FLAPS UP”

b. Climb, cruise, and descent (table 6-3, page 6-10). If passing the 1,000-foot prior point and ATC communications are 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.

Table 6-3. Climb, cruise, and descent

ACTION	*P* CALL/RESPONSE*	*P CALL/RESPONSE*
1,000 FEET BEFORE LEVEL OFF	EXAMPLE "**5000 FOR 6000**"	**1,000 TO GO"**
DESCENDING THROUGH TRANSITION LEVEL	"**30.XX SET LEFT**	**"30.XX SET RIGHT AND CENTER""**
CLIMBING THROUGH TRANSITION ALTITUDE	"**29.92 SET LEFT**"	**"29.92 SET RIGHT AND CENTER"**

c. All phases of flight (table 6-4).

Table 6-4. All phases of flight

ACTION	*P* CALL/RESPONSE*	*P CALL/RESPONSE*
BANK ANGLE EXCEEDS 30°	"CORRECTING"	**"BANK ANGLE"**
AIRSPEED DEVIATES ±10 KIAS	"CORRECTING"	**"AIRSPEED"**
ALTITUDE DEVIATES ±100 FEET	"CORRECTING"	**"ALTITUDE**
HEADING DEVIATES ±10°	"CORRECTING**"**	**"HEADING**

d. Instrument approach (table 6-5). Applies to all instrument approaches, except ground-controlled approach.

Table 6-5. 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 GLIDESLOPE MOVEMENT (PRECISION APPROACH)	"ROGER"	**"GLIDESLOPE ALIVE"**
GLIDESLOPE CAPTURE (PRECISION APPROACH)	"ROGER"	**"GLIDESLOPE CAPTURED"**
FAF	**"TIME" (IF APPLICABLE)**	"TIME STARTED"
1,000 FEET BEFORE DA/DH/MDA	"ROGER"	**"1,000 TO GO"**
500 FEET BEFORE DA/DH/MDA	"ROGER"	**"500 TO GO"**
100 FEET BEFORE DA/DH/MDA	"ROGER"	**"100 TO GO"**

e. Missed approach (table 6-6, page 6-11). These callouts apply when—

(1) The aircraft has reached the MAP at the published minimum decision 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 LOC, VOR, or GPS deviation indicator, or glideslope reaches full-scale deflection.

(4) If, upon reaching the DA/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 the runway to land, visual contact with the runway environment is lost.

Table 6-6. 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)	**"(DA/DH"/"TIMES UP)" "MISSED APPROACH"**
CIRCLING APPROACH – VISUAL CONTACT WITH THE RUNWAY LOST (THE CREWMEMBER MONITORING OUTSIDE WHILE CIRCLING WILL INITIATE THE CALLOUT.)	**"VISUAL LOST, MISSED APPROACH"** (FOLLOWED BY MISSED APPROACH ACTIONS)	"ROGER"
	"ROGER, MISSED APPROACH" (FOLLOWED BY MISSED APPROACH ACTIONS)	**"VISUAL LOST, MISSED APPROACH"**
GO AROUND SEGMENT AFTER P* INITIATES THE POWER APPLICATION	***"SET POWER"***	"POWER SET"
FLAPS BEYOND APPROACH	***"FLAPS APPROACH"***	"FLAPS APPROACH"
AFTER VERIFYING TWO POSITIVE CLIMB INDICATIONS	**"***GEAR UP***"** *(LEFT SEAT PILOT RAISES GEAR HANDLE)*	"**POSITIVE RATE**"
AIRSPEED REACHES V_{YSE}	***"FLAPS UP"***	"FLAPS UP"
WHEN TIME AND ALTITUDE PERMITS	***"MY POWER"***	"YOUR POWER"

f. Visual transition from instruments (table 6-7, page 6-12).

(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 LOST**." If the aircraft has not yet reached the missed approach point, the approach may be continued to DA/DH/MDA.

(2) If your position has passed the missed approach point, the call "**MISSED APPROACH**," is to be followed by the missed approach actions by the P*.

(3) 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 to the P* that he 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 DA/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.

(4) While at MDA on a 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."**

(5) 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.

Table 6-7. Instrument reference to visual

ACTION	*P* CALL/RESPONSE*	*P CALL/RESPONSE*
APPROPRIATE VISUAL REFERENCES IN SIGHT	"ROGER" (OR OTHER INTENTIONS)	**"APPROACH LIGHTS** (OR OTHER FEATURES IDENTIFIABLE WITH RUNWAY ENVIRONMENT**) IN SIGHT ; CONTINUE** (OR OTHER RECOMMENDED ACTION**)"**
RUNWAY IN SIGHT	(AFTER RUNWAY IS IN SIGHT)" VISUAL"	**"RUNWAY IN SIGHT (CLOCK POSITION), GO VISUAL**"
P* DEPARTS MDA TO LAND	***"LEAVING MDA"***	"ROGER"

g. Approach deviations (table 6-8). The two-challenge rule applies to these callouts.

Table 6-8. Approach deviations

OBSERVATION	*P* CALL/RESPONSE*	*P CALL/RESPONSE*
±ONE DOT OF GLIDESLOPE	"CORRECTING"	**"ONE DOT (HIGH/LOW)"**
±ONE DOT OF LOCALIZER/VOR/GPS	"CORRECTING"	**"ONE DOT(LEFT/RIGHT)"**
±5° ON NONDIRECTIONAL RADIO BEACON (NDB) APPROACH	"CORRECTING"	**" FIVE DEGREES (LEFT/RIGHT) "**
±10 KTS FROM APPROACH SPEED	"CORRECTING"	**"SPEED"**
RATE OF DESCENT EXCEEDS 1,000 FPM	"CORRECTING"	"**SINK RATE"**

h. Touch and go (table 6-9, page 6-13).

Table 6-9. Touch and go

OBSERVATION	*P* CALL/RESPONSE*	*P 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	REMOVES HAND FROM POWER LEVERS, PLACES HAND ON YOKE, AND ROTATES	**"V_1, ROTATE"**

i. Engine failures (table 6-10). The call-out sequence begins after power has been applied and the aircraft is stabilized.

Table 6-10. Engine failure

OBSERVATION	*P* CALL/RESPONSE*	*P CALL/RESPONSE*
LOSS OF AN ENGINE (ONE OR TWO) BY CONTROL PRESSURES AND/OR INSTRUMENT INDICATIONS	"**CONFIRM THE NUMBER (ONE OR TWO) ENGINE HAS FAILED**" "**DID THE PROPELLER FEATHER?"**	**"**I CONFIRM NUMBER (ONE OR TWO) ENGINE HAS FAILED OR NEGATIVE NUMBER __ (OPPOSITE) ENGINE HAS FAILED.**"** **"**YES, THE NUMBER ___ PROP FEATHERED" OR "NO, IT DID NOT FEATHER."
PROPELLER DID NOT FEATHER	"**IDENTIFY THE NUMBER (ONE OR TWO) PROP LEVER**" VISUALLY CONFIRMS THE CORRECT PROP LEVER HAS BEEN IDENTIFIED. "**CONFIRMED, FEATHER THE PROP**" **OR** **"NEGATIVE, RE-IDENTIFY THE NUMBER ___ PROP"**	PLACES INDEX FINGER ON THE APPROPRIATE PROP LEVER. "NUMBER __ PROP LEVER IDENTIFIED" WHEN DIRECTED BY THE P*, MOVE THE PROP TO FEATHER. "PROP FEATHERED."
Additionally for Engine Failure After Takeoff/Engine Failure after V_1		
UPON REACHING V_{YSE}	"**FLAPS UP**"	"FLAPS UP"

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Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

AC	advisory circular
AGL	above ground level
AIM	aeronautical information manual
AP	autopilot
AR	Army regulation
ARNG	Army National Guard
ATC	air traffic control
ATM	aircrew training manual
ATP	aircrew training program
ATTN	attention
CBRN	chemical, biological, radiological, and nuclear
CDI	course deviation indicator
CFR	Code of Federal Regulation
CG	center of gravity
COR	contracting officer's representative
CTL	commander's task list
DA	Department of the Army
DD	Department of Defense
DES	Directorate of Evaluation and Standardization
DH	decision height
DISC	disconnect
DLAM	Defense Logistics Agency manual
DME	distance measuring equipment
DOD FLIP	Department of Defense flight information publication
EGPWS	enhanced ground proximity warning system
ETE	estimated time en route
FAA	Federal Aviation Administration
FAC	flight activity category
FAF	final approach fix
FAWP	final approach waypoint
FD	flight director
FIH	flight information handbook
FM	field manual
FMS	flight management system
FPM	feet per minute
FSI	Flight Safety International
GCA	ground-controlled approach

GPS	global positioning system
GPWS	ground proximity warning system
GWT	gross weight
IATF	individual aircrew training folder
ICAO	International Civil Aviation Organization
IE	instrument flight examiner
IFR	instrument flight rules
ILS	instrument landing system
IMC	instrument meteorological conditions
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
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
NAS	National Airspace System
NAV	navigation
NAVAID	navigational aid
NDB	non-directional radio beacon
NGR	National Guard regulation
NM	nautical mile
NOTAM	notice to airmen
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	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
TM	technical manual
T/O	takeoff

TOD	top of descent
TOLD	takeoff landing data
TRADOC	United States Army Training and Doctrine Command
USAR	United States Army Reserve
USAACE	United States Army Aviation Center of Excellence
USAF	United States Air Force
UT	unit trainer
VASI	visual approach slope indicator
VDP	visual descent point
VFR	visual flight rules
VHF	very high frequency
VMC	visual meteorological conditions
VNAV	vertical navigation
VOR	very high frequency omnidirectional range
VORTAC	very high frequency omnidirectional range/tactical air navigation
VSI	vertical speed indicator
WT	weight

SECTION II – TERMS

N1
gas generator revolutions per minute

V_1
take-off decision speed (same as V_r)

V_2
take-off safety speed

V_A
maximum-design maneuvering speed

V_{APP}
approach speed (V_{ref} + xx)

V_B
turbulent penetration speed

V_C
design-cruising speed

V_F
design-flap speed

V_{FE}
maximum flap-extended speed

V_{MCG}
minimum control speed with critical engine inoperative, ground

V_R
rotation speed (same as V1 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.

V_{REF} +10 KIAS
final-approach speed for visual or instrument with landing environment in sight

V_{REF} +20 KIAS
base-leg speed or instrument approach speed

V_{REF} +30 KIAS
speed after landing gear has been lowered on downwind.

V_S
power-off stalling speed

V_{S1}
the power-off stalling speed (clean) with flaps and landing gear in a specified configuration

V_{SO}
power-off stalling speed in the landing configuration

V_{SSE}
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.

V_X
best angle-of-climb speed

V_{YSE}
best single-engine, rate-of-climb speed

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References

SOURCES USED

ARMY REGULATIONS

ADRP 7-0, *Training Units and Developing Leaders*, 23 August 2012.

AR 40-8, *Temporary Flying Restrictions Due to Exogenous Factors*, 16 May 2007.

AR 40-501, *Standards of Medical Fitness*, 14 December 2007.

AR 95-1, *Aviation: Flight Regulations*, 12 November 2008.

AR 95-2. *Aviation: Air Traffic Control, Airspace, Airfields, Flight Activities, and Navigational Aids*. 10 April 2007.

AR 95-10, *DOD Notice to Airmen (NOTAM) System*, 1 August 2004.

AR 95-20, *Contractor's Flight and Ground Operations*, 1 March 2007.

AR 600-105, *Aviation Service of Rated Army Officers*, 22 June 2010.

AR 600-106, *Flying Status for Nonrated Army Aviation Personnel*. 8 December 1998.

AR 700-138, *Army Logistics Readiness and Sustainability*, 26 February 2004.

DA Pam 385-90. *Army Aviation Accident Prevention Program*. 28 August 2007.

DA Pam 738-751. *Functional Users Manual for the Army Maintenance Management System-Aviation (TAMMS-A)*. 15 March 1999.

FM 1-230. *Meteorology for Army Aviators*. 30 September 1982.

FM 3-01.80. *Visual Aircraft Recognition*. 17 January 2006.

FM 3-04.111, *Aviation Brigades*, 7 December 2007.

FM 3-04.203, *Fundamentals of Flight*, 7 May 2007.

FM 3-04.240, *Instrument Flight for Army Aviators*, 30 April 2007.

FM 3-04.300. *Airfield and Flight Operations Procedures*. 12 August 2008.

FM 3-11. *Multiservice Doctrine for Chemical, Biological, Radiological, and Nuclear Operations*. 1 July 2011.

FM 3-11.3. *Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Avoidance {MCWP 3-37.2A, NTTP 3-11.25, AFTTP(I) 3-2.56}*. 2 February 2006.

FM 3-52, *Airspace Control*, 8 February 2013.

TC 3-04.11, *Commander's Aircrew Training Program for Individual, Crew, and Collective Training*, 19 November 2009.

TC 3-04.93, *Aero Medical Training for Flight Personnel*, 31 August 2009.

TC 3-25.26. *Map Reading and Land Navigation*. 15 November 2013.

TM 1-1500-204-23-1. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (General Maintenance and Practices) Volume 1*. 31 July 1992.

TM 1-1500-204-23-2. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Pneudraulics Maintenance and Practices) Volume 2*. 31 July 1992.

TM 1-1500-204-23-3. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Maintenance Practices for Fuel and Oil Systems) Volume 3*. 31 July 1992.

TM 1-1500-204-23-4. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Electrical and Instrument Maintenance Procedures and Practices) Volume 4*. 31 July 1992.

TM 1-1500-204-23-5. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Propeller, Rotor, and Powertrain Maintenance Practices) Volume 5*. 31 July 1992.

TM 1-1500-204-23-6. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Hardware and Consumable Materials) Volume 6*. 31 July 1992.

TM 1-1500-204-23-7. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Nondestructive Testing and Flaw Detection Procedures and Practices) Volume 7*. 31 July 1992.

TM 1-1500-204-23-8. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Machine and Welding Shop Practices) Volume 8*. 31 July 1992.

TM 1-1500-204-23-9. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Tools and Ground Support Equipment) Volume 9*. 31 July 1992.

TM 1-1500-328-23, *Aeronautical Equipment Maintenance Management Policies and Procedures*, 30 July 1999.

TM 1-1500-204-23-10. *Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual for General Aircraft Maintenance (Sheet Metal Shop Practices) Volume 10*. 31 July 1992.

TM 1-1510-218-10, *Operator`s Manual for Army C-12C Aircraft (NSN 1510-01-070-3661) Army C-12D Aircraft (1510-01-087-9129), Army C-12T Aircraft (1510-01-470-0220)*, 1 October 2009.

TM 1-1510-225-CL. *Operator's and Crewmember's Checklist for Army Model C-12R Aircraft (NSN 1510-01-425-1355), C-12T3 Aircraft (1510-01-470-0220), and C-12F3 Aircraft (1510-01-235-5840)*. 4 September 2001.

TM 1-1510-225-10, *Operator`s Manual for Army C-12R Aircraft (NSN 1510-01-425-1355), Army C-12T3 Aircraft (1510-01-470-0220), Army C-12F3 Aircraft*, 15 September 2009.

TM 1-1520-218-CL. *Operator's and Crewmember's Checklist for Army Model C-12C, D, T Aircraft*. 1 April 2003.

TM 9-1095-206-12&P. *Operator's and Aviation Unit Maintenance Manual (Including Repair Parts and Special Tools List) for Dispenser, General Purpose Aircraft: M130 PN 9311430 (NSN 1095-01-036-6886)*. 18 July 1995.

TM 9-1095-206-30&P. *Aviation Intermediate Maintenance Manual (Including Repair Parts and Special Tools List) for Dispenser, General Purpose Aircraft: M130 PN 9311430 (NSN 1095-01-036-6886)*. 18 July 1995.

TM 11-5810-262-10. *Operator's Manual for Speech Security Equipment KY-58 (NSN 5810-00-449-0154)*. 31 May 1990.

TM 11-5895-1199-12. *Operators and Organizational Maintenance for the Mark XII IFF System*. 1 July 1984.

TM 55-1500-342-23, *Joint Service Technical Manual for Aircraft Weight and Balance*, 30 September 2011.

TM 55-1510-218-MTF. *Maintenance Test Flight Manual for Army Model C-12C, C-12D, and C-12F Aircraft*. 19 June 1989.

DEPARTMENT OF ARMY FORMS

DA Form 2028. *Recommended Changes to Publications and Blank Forms*.

DA Form 2408-12. *Army Aviator's Flight Record*.

DA Form 2408-13. *Aircraft Status Information Record*.

DA Form 2408-13-1. *Aircraft Inspection and Maintenance Record*.

DA Form 4186, *Medical Recommendation for Flying Duty.*

DA Form 5484. *Mission Schedule/Brief*.

DA Form 7120-R, *Commander's Checklist.*

DA Form 7739-R. *C-12 Takeoff and Landing Data Card.*

DEPARTMENT OF DEFENSE PUBLICATIONS AND FORMS

DOD FLIPs are available from Director, United States Army Aeromedical Services Agency, ATTN: ATAS-AI, 9325 Gunston Road, Suite N319, Fort Belvoir, VA 22060-5582.

DD Form 175. *Military Flight Plan*.

DD Form 175-1. *Flight Weather Briefing.*

DD Form 365-4. *Weight and Balance Clearance Form F-Transport/Tactical*.

DEPARTMENT OF DEFENSE AIRMAN'S INFORMATION MANUAL

The following publication is available from Commanding Officer, ATTN: Code 2111, Naval Electronic Systems Engineering Activity, St. Inigoes, MD 20684-0010, or WR-ALC/MMAM-AIMS, ATTN: DOC AIMSPO, Robins AFB, GA 31098-5609.

DOD AIM 86-100. *Operation and Maintenance Overview General Triservice Mode 4 Handbook*. May 1987.

FEDERAL AVIATION ADMINISTRATION PUBLICATIONS

FAA publications are available from http://www.faa.gov. The following advisory circulars are available from http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm.

AC 00-24B. *Thunderstorms*. 20 January 1983.

AC 00-54. *Pilot Windshear Guide*. 25 November 1988.

AC 20-68B. *Recommended Radiation Safety Precautions for Ground Operation of Airborne Weather Radar*. 8 August 1980.

AC 20-131A. *Airworthiness Approval of Traffic Alert and Collision Avoidance Systems (TCAS II) and Mode S Transponders*. 29 March 1993.

AC 60-22. *Aeronautical Decision Making*. 13 December 1991.

AC 61-67B. *Stall and Spin Awareness*. 17 May 1991.

AC 61-12M. *Student Pilot Guide/Training Handbook*. 12 January 2000.

AC 120-55B. *Air Carrier Operational Approval and Use of TCAS II*. 22 October 2001.

Aeronautical Information Manual. *Official Guide to Basic Flight Information and ATC Procedures.*

FAA-P-8740-24. *Tips on Winter Flying*. 1999.

FAA-S-8081-5C. *Airline Transport Practical Test Standards for Airplane (including C1).* 26 October 1998.

FAA-S-8081-12A. *Commercial Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES) (including C1-C3)*. May 1997.

FAA Order 7110.65. *Air Traffic Control Handbook*. 26 February 1998.

Title 14, U.S. Code of Federal Regulations.

INTERNATIONAL STANDARDIZATION AGREEMENT

STANAG 3114 (Edition Eight). *Aeromedical Training of Flight Personnel*. 22 Nov 2006.

OTHER

The following publication is available at http://www.e-publishing.af.mil/.

Air Force Technical Order 1C-12J-1SS-9. *Flight Manual, USAF Series C-12J Aircraft*. 27 February 2001.

The following publication is available at http://www.beechcraft.com/customer_support/.

Beech 1900C, Airliner Pilot's Operating Handbook, P/N: 114-590021-3D.

The following publication is available at http://www.egpws.com/database/060-4267-000.pdf.

Allied Signal Document #060-4267-000. *EGPWS Terrain Database Airport Coverage List.*

Defense Logistics Agency Manual (DLAM) 8210.1. *Contractor's Flight and Ground Operations*. 13 November 2002.

Index

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20 February 2014

By order of the Secretary of the Army:

RAYMOND T. ODIERNO
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1405102

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C-12 TAKEOFF AND LANDING DATA CARD

For use of this form, see TC 3-04.51; the proponent agency is TRADOC.

TAKEOFF CONDITIONS		
STATION	RUNWAY AVAIL	
TEMP C°	PA	
TAKEOFF WEIGHT	TAKEOFF POWER	

FLAPS	0%	40%
V_1		
V_2		
V_{yse}		
Takeoff Distance		
Accelerate - Stop		

LANDING DATA	
Vref	LAND DISTANCE
OPTIONAL	

DA FORM 7739-R, FEB 2014 APD LC v1.00

ONE ENGINE INOPERATIVE TAKEOFF CONDITIONS		
FLAPS	**0%**	**40%**
Positive Climb at Lift-off		
Accelerate - Go (_____)		
Single Engine Gradient of Climb (V_2) _____ %		
Climb One Engine Inoperative (V_{yse}) _____ %		
Adjusted Takeoff Weight		
REMARKS		

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