

**\*TC 3-04.52** (TC 1-219)

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**Aircrew Training Manual, Reconnaissance Airplane,  
RC-12 Series**

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**JULY 2013**

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**Headquarters Department of the Army**

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# **AIRCREW TRAINING MANUAL, RECONNAISSANCE AIRPLANE, RC-12 SERIES**

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# Preface

Training Circular (TC) 3-04.52 consolidates Guardrail and Guardrail/common sensor (GRCS) aircraft into one aircrew training manual (ATM) and standardizes aircrew training programs (ATPs) and flight evaluation procedures. This manual provides specific guidelines for executing RC-12 series aircrew training. It is based on the training principles outlined at the Army Training Network, located on the web at: <https://atn.army.mil/index.aspx>, under the Training Management tab. The RC-12 ATM establishes crewmember qualification training, refresher training, mission training, continuation training, and evaluation requirements. This manual applies to all Active Army, the United States (U.S.) Army National Guard (ARNG) and U.S. Army Reserve (USAR) RC-12 series crewmembers and their commanders.

This manual is not a stand-alone document. All of the requirements contained in Army regulation (AR) 600-105, AR 600-106, National Guard regulation (NGR), NGR 95-210, and TC 3-04.11 must be met. 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. 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. 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.

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.

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

The TRADOC proponent for this publication is: Commander, U.S. Army Aviation Center of Excellence (USAACE), Fort Rucker, ATTN: ATZQ-TDT-F, Building 4507 Andrews Ave., Fort Rucker, Alabama 36362-5000. The TRADOC proponent for Guardrail training is: Commander, U.S. Army Intelligence Center (USAIC) and Fort Huachuca, ATTN: ATZS-TPM, Fort Huachuca, Arizona 85613-6000.

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This publication has been reviewed for operational security considerations.



# Chapter 1

## Introduction

This ATM describes training requirements for crewmembers. It will be used with AR 95-1, AR 600-105, NGR 95-210, TC 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 supports 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 be trained and must maintain proficiency in each crew station they are designated to occupy. Instructor pilots (IPs), standardization instructor pilots (SPs), instrument examiners (IEs) and maintenance test pilots (MPs) must maintain proficiency in both seats. Commanders may also designate other aviators in both seats. Aviators designated to fly from both pilots' 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 (/) means one or the other or both. For example, IP/SP may mean IP and SP or may mean IP or SP. When a difference in the task description between series of aircraft, this will be indicated by the use of reverse lettering to indicate the difference; for example, **D/H**.

b. **Word distinctions.**

- (1) Warnings, cautions and notes. These words emphasize important and critical instructions.
  - (a) A warning is an operating procedure or a practice that, if not followed correctly, could result in personal injury or loss of life.
  - (b) A caution is 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, shall, must, should, may. These words distinguish between mandatory, preferred and acceptable methods of accomplishment.
  - (a) Will, shall or must indicates a mandatory requirement.
  - (b) Should is used to indicate a preferred, but non-mandatory, method of accomplishment.
  - (c) May is used to indicate 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 complete 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 RCM, 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 RCM and supervises and maintains the standardization program.

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

1-3. **APPLICABILITY.** Operators RC-12D, H, K, N, P and X Guardrail series airplanes will use this manual. This manual does not apply to the C-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 aircraft qualification.** Initial qualification training for all Guardrail systems will be conducted at a DA-approved training site IAW a USAACE approved program of instruction (POI) after completion of the Fixed-Wing Multi-Engine Qualification course (FWMEQC). Aviators assigned to aerial exploitation battalions (AEBs) who have not been previously qualified in a RC-12 must attend the initial qualification course appropriate to their assignment.

(1) RC-12D Systems qualification course. Aviators, assigned to an AEB with either RC-12D or RC-12H aircraft must attend the RC-12D systems qualification course for initial qualification prior to integration into that unit's ATP.

(2) Guardrail/common sensor pilot qualification course (GR/CSPQC). Aviators assigned to a GR/CS AEB with either RC-12K, N, P, or X aircraft must attend the GR/CSPQC for initial qualification prior to integration into that unit's ATP.

**b. Assignment versus qualification course.** Attending the RC-12D systems qualification course does not meet the qualification requirements for assignment to a GR/CS AEB. Conversely, attending the GR/CSPQC does not meet the requirements for assignment to a unit with RC-12D or RC-12H aircraft. Each is a separate qualification course depending on the unit of assignment. Training will be accomplished IAW AR 95-1.

### 2-2. UNIT TRAINING.

**a. General.** Unit commanders are authorized to conduct refresher training. Unit commanders are also authorized to conduct aircraft series qualifications at the unit level for aircraft not supported by a USAACE POI.

**b. Training restrictions.**

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

(2) A crewmember may start the training without a current fixed-wing 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 a RC-12 aircraft an aviator must accomplish the following:

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*Note.* A series qualification in a RC-12X requires a previous qualification as an RC-12N aviator and a minimum of 10 hours flight training, demonstrating proficiency in all base tasks. All other aviators must attend the qualification course.

---

**a. Academic training.** Training must include sufficient academic instruction to ensure he or she has a thorough knowledge of the differences between the aircraft in which an aviator is qualified and the aircraft in which he or she is receiving the series qualification training. Table 2-1, page 2-2, provides minimum recommended academic subjects.

Table 2-1. Series qualification academic guide

<i>RC-12K/N/P</i>	<i>RC-12D/H</i>
<b>Base Tasks</b>	<b>Base Tasks</b>
Aircraft systems differences. Limitations. Performance planning. Operator's manual exam.	Aircraft systems differences. Limitations. Performance planning. Operator's manual exam.
<b>Mission Tasks</b>	<b>Mission Tasks</b>
Mission switches. <sup>1</sup> Global positioning system (GPS). <sup>1,3</sup> Inertial navigation system (INS). <sup>1,2</sup> Aircraft survivability equipment (ASE)/airspace control system (ACS) differences. <sup>2</sup>	*Mission switches. *GPS.
<sup>1</sup> May be conducted in the aircraft. <sup>2</sup> RC-12K only. <sup>3</sup> RC-12P mission functions.	May be conducted in the aircraft.

b. **Flight training.** At a minimum, an aviator will demonstrate proficiency in the tasks outlined in tables 2-2 and 2-3, page 2-3, to an IP or SP for a series qualification in the RC-12K, RC-12N, and the RC-12P. Refer to tables 2-4 and 2-5, page 2-3, for series qualification between the RC-12D and RC-12H. This is a proficiency-based training with **NO** minimum hour requirement.

Table 2-2. RC-12K/N/P series qualification base flight tasks

<i>RC-12K/N/P</i>	
<b>Tasks</b>	<b>Title</b>
1010	Prepare Department of the Army Form 7345-R
1029	Perform Preflight Inspection
1034	Perform Engine Start
1035	Perform Aircraft Taxi
1045	Perform Engine Run-Up
1104	Perform Normal Takeoff and Climb
1145	Perform Normal Landing
1212	Perform Enhanced Ground Proximity Warning System/Terrain Awareness and Warning System Operation
1264	Perform Global Positioning System Approach
1265	Perform Traffic Alert and Collision Avoidance System Operations
1310	Perform Emergency Procedures for Engine Failure During Flight
1315	Perform Single-Engine Landing
Notes: If a continual evaluation is conducted by an IP or SP, a separate additional evaluation is not required. These tasks are a minimum and do not prevent commanders from adding to the task list. Units performing GPS approaches will train and evaluate Task 1264.	

**Table 2-3. RC-12K/N/P series qualification mission flight tasks**

<b>RC-12 K/N/P Flight Instruction</b>	
<b>Tasks</b>	<b>Title</b>
2448	Perform Guardrail/Common Sensor Mission
2476	Operate Inertial Navigation System <sup>2</sup>
2482	Program Aircraft Survival Equipment/Avionics Control System Flight Plan <sup>1</sup>
2484	Operate the ARC-164 HaveQuick II Radio Using the Aircraft Survival Equipment/Avionics Control System <sup>1</sup>
2486	Interpret Aircraft Survival Equipment/Avionics Control System Threat Indications <sup>1</sup>
2488	Perform Track Synchronize Procedures
Notes: Unit trainers may be used for RL 2 training. If a UT is used for training, an IP or SP must conduct a final evaluation to complete qualification. If a continual evaluation is conducted by an IP or SP, a separate additional evaluation is not required. These tasks are a minimum and do not prevent commanders from adding to the list. <sup>1</sup> RC-12N/P only. <sup>2</sup> RC-12K only.	

**Table 2-4. RC-12D/H series qualification base flight tasks**

<b>RC-12 K/N/P Flight Instruction</b>	
<b>Tasks</b>	<b>Title</b>
1011	Prepare Department of the Army Form 7444-R
1029	Perform Preflight Inspection
1034	Perform Engine Start
1035	Perform Aircraft Taxi
1045	Perform Engine Run-Up
1104	Perform Normal Takeoff and Climb
1145	Perform Normal Landing
1212	Perform Enhanced Ground Proximity Warning System/Terrain Awareness and Warning System Operation
1265	Perform Traffic Alert and Collision Avoidance System Operations
1310	Perform Emergency Procedures for Engine Failure During Flight
1315	Perform Single-Engine Landing
Notes: If a continual evaluation is conducted by an IP or SP, a separate additional evaluation is not required. These tasks are a minimum and do not prevent commanders from adding to the task list.	

**Table 2-5. RC-12D/H series qualification mission flight tasks**

<b>RC-12 D/H Flight Instruction</b>	
<b>Tasks</b>	<b>Title</b>
2425	Operate Aircraft Survivability Equipment
2432	Perform Improved Guardrail and Guardrail/Common Sensor Minus Mission
2476	Operate Inertial Navigation System
2488	Perform Track Synchronize Procedures
Notes: Unit trainers may be used for RL2 training. If a UT is used for training, an IP or SP must conduct a final evaluation to complete qualification. If a continual evaluation is used, a separate additional evaluation is not required. These tasks are a minimum and do not prevent commanders from adding to the task list.	

2-4. **SIMILAR AIRCRAFT.**

a. Series aircraft that are similar are grouped below. Separate qualification is required in each aircraft. Currency in any one similar series aircraft will satisfy the requirement for all aircraft within the series group in which the aviator is qualified. 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 given in the aircraft by an IP or SP. The commander will designate the tasks for this evaluation.

- (1) RC-12D, H.
- (2) RC-12K, N, and P.
- (3) RC-12X.

b. All RC-12 series aircraft listed above may be listed on a single commander's task list (CTL) if the Commander requires multiple series of RC-12 aircraft to be flown IAW TC 3-04.11.

2-5. **INDIVIDUAL TRAINING.** Crewmembers are designated RL 3 during aircraft qualification, refresher training or when they are required to regain proficiency in 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. Crew members 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 crew members.** A crewmember that has not flown within the previous 180 days must be designated RL 3 for refresher training. The crewmember should attend a Directorate of Evaluation and Standardization (DES) approved C-12/RC-12 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, as a minimum, demonstrate proficiency in those tasks to an SP, IP, or IE, as appropriate for advancement to RL 2.

- (1) During RL 3 training, crewmembers do not have minimum hour, iteration, or 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 prior to 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. Crewmembers receive training and demonstrate a working knowledge of the applicable topics in table 2-6, page 2-5, and complete the operator's manual written examination.

**Table 2-6. 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, to include the DOD FLIP
Pneumatics system	Instrument departures, en route 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. Crewmembers receive training and demonstrate proficiency in each base task appropriate to the aircraft in table 2-12, page 2-9. Table 2-7 is a guide for developing a refresher flight training hour requirement. Actual hours are based on individual proficiency.

**Table 2-7. Refresher flight training guide**

<i>Flight Instruction</i>	<i>Hours</i>
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
<b>Total hours</b>	<b>25.0</b>

(3) Night training. The crewmember will complete a 1-hour flight (minimum) at night. The training must include all tasks marked with an "X" in the night column of table 2-12, page 2-9. 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 crew member's training plan. As 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 Guardrail missions. Upon completion of RL 3 qualification, series or refresher training, the aviator may perform PI duties while undergoing RL 2 training with an 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. Mission training guidelines shown in tables 2-8, 2-9, and 2-10, page 2-7, are the minimum requirements for qualification. The commander may require other mission tasks from table 2-13, page 2-11, and/or other additional tasks deemed appropriate to the unit's mission.

- a. **Academic mission training.** The topics in table 2-8 provide guidance in developing an academic mission-training program. The commander should tailor mission academic training to fit the specific 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 crew member's position.

**Table 2-8. Mission academic training guide**

Guardrail aviation mission planning station (GRAMPS). <sup>1</sup>	Mission equipment and mission panel operations.
Principles of direction finding.	Track geometry.
Communication high accuracy airborne location system.	Recall procedures.
Electronic intelligence.	Threat countermeasures.
Communications intelligence (COMINT).	Delco Carousel IV INS. <sup>2</sup>
Crew responsibilities.	Mission SOP.
Communications security (COMSEC).	Integrated processing facility (IPF) functions.
Air ground equipment (AGE) van. <sup>3</sup>	Ground processing facility (GRF).
<sup>1</sup> RC-12N/P/Q/X only. <sup>2</sup> RC-12D/H/K. <sup>3</sup> Except RC-12P.	

**Table 2-9. RC-12K/N/P/X mission flight training guide**

<b>RC-12K/N/P/X Mission Flight Instruction</b>	
<b>Task</b>	<b>Task Titles</b>
2425	Operate Aircraft Survivability Equipment <sup>2</sup>
2448	Perform Guardrail Common Sensor Mission
2472	Perform Data Transfer System Procedures <sup>1</sup>
2476	Perform Navigation with an Inertial Navigation System <sup>2</sup>
2478	Operate Guardrail Aviation Mission Planning Station <sup>1</sup>
2482	Program Aircraft Survivability Equipment-Avionics Control System Flight Plan <sup>1</sup>
2484	Operate the ARC-164 HAVEQUICK II Radio using Aircraft Survivability Equipment-Avionics Control System <sup>1</sup>
2486	Interpret Aircraft Survivability Equipment-Avionics Control System Threat Indications <sup>1</sup>
2488	Perform Track Synchronize Procedures
<sup>1</sup> RC-12N/P only. <sup>2</sup> RC-12K only.	
<b>Flight Instruction</b>	<b>Hours</b>
Mission tasks	20.0
Evaluation	5.0
<b>Total hours</b>	<b>25.0</b>
The above listed hours are recommendations only. However, a reasonable number of missions should be conducted from the left and the right seat to ensure proficiency.	



Table 2-10. RC-12D/H mission training guide

<b>RC-12D/H Mission Flight Instruction</b>	
<b>Task</b>	<b>Task Titles</b>
2425	Operate Aircraft Survivability Equipment
2432	Perform Improved Guardrail-Common Sensor Minus Mission
2476	Operate Inertial Navigation System
2488	Perform Track Synchronize Procedures
<b>Flight Instruction</b>	<b>Hours</b>
Mission tasks	20.0
Evaluation	5.0
<b>Total hours</b>	<b>25.0</b>
The above listed hours are recommendations only. However, a reasonable number of missions should be conducted from the left and the right seat to ensure proficiency.	

2-7. **CONTINUATION TRAINING.** 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 check 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) FAC 1– 55 Hours.
- (2) FAC 2 – 30 Hours.
- (3) FAC 3 – there is no provision to designate fixed-wing crewmembers as FAC 3.

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*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 requirement.

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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 the aviator is required to fly as indicated in table 2-11, page 2-9, as well as those mission and additional tasks on their 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 2-14, page 2-12, semi-annually.
- (2) FAC 3. There is no provision to designate fixed-wing crewmembers as FAC 3.
- (3) Additional Aircraft. The requirement to perform tasks iterations in additional aircraft will be at the discretion of the commander.

2-8. **ANNUAL CHEMICAL, 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 (F).

- a. Aviators who require CBRN training or evaluations will perform the tasks indicated by an “X” in the CBRN column in table 2-11, page 2-9, 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 or 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 gear.
  - (3) Close coordination is maintained with the local flight surgeon regarding CBRN training.

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. ACADEMIC CONTINUATION TRAINING.**

- a. 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).
- b. Academic training may be oral instruction, written instruction, computer-based instruction (CBI) or distance learning and may be conducted either individually or in groups. Topics listed in paragraph 3-4b should be considered in the development of the unit’s academic training program. Instructors should take advantage of commercial and FAA publications and web sites to find relevant topics to share during academic training sessions.

**2-11. TASK LISTS.**

- a. **Base tasks.** Table 2-11, page 2-9, lists the base tasks. An “X” under the mode of flight column denotes the task as a base task for that mode of flight.
- b. **Mission tasks.** Table 2-12, page 2-10 lists the mission tasks. The commander will select these tasks based on the unit METL.
- c. **Additional tasks.** The commander may develop additional tasks to support his METL. Additional tasks are 3000 series tasks.
- d. **Maintenance tasks.** Table 2-13, page 2-11, lists the maintenance tasks. These tasks are to be added to the CTL for aviators performing MP duties.
- e. **Evaluation guidelines.**
  - (1) **APART evaluation tasks** are those that are defined as a base task for that mode of flight. An “X” in the mode of flight column denotes that task as a base task. Tasks in the evaluation (EVAL) column identified with an "S", denotes mandatory tasks for the standardization flight evaluation. Tasks identified with an "I" indicates 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 for evaluation that support the unit’s METL.
  - (2) **MP evaluation requirements.** The MP will be evaluated annually on performance of selected MP tasks during the APART by a maintenance designated SP/IP. Those tasks in table 2-13, page 2-11, 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 2-11 are mandatory for annual night iteration performance and indicate the tasks that must be evaluated at night for progression to RL 2.

**Table 2-11. Aviator base task list**

<b>Task</b>	<b>Title</b>	<b>D</b>	<b>I</b>	<b>N</b>	<b>CBRN</b>	<b>EVAL</b>
1000	Participate in a Crew Mission Briefing	X	X	X		S,I
1004	Plan a Visual Flight Rules Flight <sup>1</sup>	X				S
1006	Plan an Instrument Flight Rules Flight <sup>1</sup>		X			I
1010	Prepare Department of the Army Form 7345-R (GR/CS Takeoff and Landing Data Card) <del>K/N/P/X</del>	X	X			S,I
1011	Prepare Department of the Army Form 7444-R(RC-12D/H Series Takeoff and Landing Data Card) <del>D/H</del>	X	X			S,I
1012	Verify Aircraft Weight and Balance	X				
1023	Perform Flight at Minimum Control Speed with Critical Engine Inoperative ( $V_{mca}$ ) (Simulator Only) <sup>2</sup>					
1029	Perform Preflight Inspection <sup>3</sup>	X	X	X	X	S or I
1034	Perform Engine Start <sup>3</sup>	X	X	X	X	S
1035	Perform Aircraft Taxi <sup>3</sup>	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 <sup>3</sup>	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 Landing <sup>7</sup>	X				S
1145	Perform Normal Landing <sup>3</sup>	X		X	X	S
1148	Perform Fuel Management Procedures	X	X	X		S,I
1177	Perform Go-Around	X		X		
1179	Perform Bailed Landing	X				
1182	Perform Radio Communications Procedures	X	X			
1200	Perform Instrument Takeoff		X			I
1210	Perform Holding Procedures		X			I
1212	Perform Enhanced Ground Proximity Warning System/Terrain Awareness and Warning System Operations	X	X			S or I
1215	Perform Precision Approach <sup>4</sup>		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			
1254	Perform Instrument Flight Rules Navigation		X			
1260	Operate Weather Avoidance Systems	X				S or I
1261	Perform Circling Approach		X			
1264	Perform Global Positioning System Approach <sup>5</sup>		X			I
1265	Perform Traffic Alert and Collision Avoidance System Operations	X				S or I
1303	Perform Approaches to Stall	X				S

Table 2-11. Aviator base task list

Task	Title	D	I	N	CBRN	EVAL
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 or I
1325	Perform Emergency Procedures for Engine Failure during Takeoff - <b>D/H</b>	X				S
1330	Perform Emergency Procedures for Engine Failure after V <sub>1</sub> <b>K/N/P/X</b>	X				S
1336	Perform Emergency Procedures for Engine Failure during Final Approach	X	X			S or I
1340	Perform Emergency Landing Gear Extension <sup>6</sup>	X				
1352	Perform Rejected Takeoff	X				
1800	Perform After-Landing Tasks <sup>3</sup>	X	X	X	X	S,I

<sup>1</sup> When tasks 1004 and 1006 are performed in the primary aircraft, they do not have to be performed in the additional aircraft.

<sup>2</sup> Task 1023 is a FS only task and has no annual task iteration or evaluation requirement.

<sup>3</sup> 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 TEMP limit for performing these tasks.

<sup>4</sup> Task 1215 must be evaluated at least annually while the aircraft is operating under single-engine. It should be evaluated on the standardization or instrument evaluation when possible.

<sup>5</sup> Units performing GPS approaches will train and evaluate Task 1264.

<sup>6</sup> Task 1340 is required only for qualification/refresher training, and has no other annual iteration requirements.

<sup>7</sup> (Required for IPs/SPs only)

Table 2-12. Aviator mission task list

Task	Title	RC-12D	RC-12H	RC-12K	RC-12N,P,X
2425	Operate Aircraft Survivability Equipment	X	X	X	
2432	Perform Improved Guardrail-Guardrail Common Sensor Minus Mission	X	X		
2440	Perform Flat Turns	X	X	X	X
2448	Perform Guardrail Common Sensor Mission			X	X
2472	Perform Data Transfer System Procedures				X
2476	Perform Navigation with an Inertial Navigation System	X	X	X	
2478	Operate the Guardrail Aviation Mission Planning Station				X
2482	Program Aircraft Survivability Equipment-Avionics Control System Flight Plan				X
2484	Program the ARC-164 HAVEQUICK II Radio using Aircraft Survivability Equipment-Avionics Control System				X
2486	Interpret Aircraft Survivability Equipment-Avionics Control System Threat Indications				X
2487	Perform Tactical Air Navigation Air-to-Air Operations			X	X
2488	Perform Track SYNC Procedures	X	X	X	X

## 2-12. FLIGHT SIMULATOR STANDARDS.

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

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

**2-13. SIMULATOR TRAINING.**

- a. All Regular Army, Reserve Component and Department of the Army Civilian (DAC) aviators flying a RC-12 as a primary, additional or alternate aircraft are required to conduct FS refresher/recurrent training as outlined below.
- b. Fixed-wing aviators serving in RC-12 assignments will complete an approved FS refresher/recurrent training within 12 to 18 months after completing the FWMEQC.
- 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 RC-12 as a primary, additional or alternate aircraft will receive an approved FS refresher/recurrent training biennially (once every 2 years).
- e. Fixed-wing aviators may apply 6 hours of approved FS flight time towards their semiannual flying-hour requirement.
- f. Aviators completing the fixed-wing IP course that includes time flown in a compatible or similar FS will receive credit for FS requirements listed in paragraph 2-13a through e.
- g. Aviators failing to meet the ATP requirements set forth in paragraph 2-12 and 2-13 will be processed IAW AR 95-1.

**2-14. 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. Instructor pilot qualification in category is highly desirable. Fixed-wing 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 accomplished by a MP qualified SP/IP designated by the commander in writing on the DA Form 7120-R (Commander’s Task List). The crewmember undergoing MP qualification training will receive academic training outlined in table 2-14, page 2-13, flight training and demonstrate proficiency in all MP tasks listed in table 2-13 before designation as MP. The commander must designate the MP in writing on the DA Form 7120-R.
- 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 2-13 indicated by an “X” in the evaluation 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.

**Table 2-13. Maintenance test pilot task list**

<b>Task</b>	<b>Title</b>	<b>Eval*</b>
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 <b>D/H**</b>	X

**Table 2-13. Maintenance test pilot task list**

<b>Task</b>	<b>Title</b>	<b>Eval*</b>
4936	Perform Speed Performance Check at Maximum Cruise Power <b>K/N/P/X</b>	X
4937	Perform Maximum Power-Lever Position Check-Maximum Turbine Gas Temperature-N <sup>1</sup> Availability <b>D/H**</b>	X
4938	Perform Engine Performance Check at Maximum Continuous Power <b>K/N/P/X</b>	
4939	Perform Engine-Acceptance Check-Engine Performance at Maximum Continuous-Cruise Power <b>D/H**</b>	X
4940	Perform Engine Performance Check at Maximum Cruise Power <b>K/N/P/X</b>	
4941	Perform Engine Ice Vanes Check	
4942	Perform Maximum Turbine Gas Temperature-N <sup>1</sup> Availability Check <b>K/N/P/X</b>	X
4943	Perform Trim and Rigging Check	
4945	Perform Auto-Pilot Check	
4947	Perform Stall Warning System Check	X
4949	Perform Flap Operation Check	X
4951	Perform Minimum Elevator Trim Check <b>D/H</b>	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 <b>D/H</b>	
4980	Perform Communications and Navigation Equipment Check	
* Tasks denoted with an "X" in the <b>EVAl</b> column will be evaluated during the annual MP flight evaluation.		
**Tasks 4935, 4937 and 4939 may be evaluated orally or at an altitude less than 25,000 feet.		

- (1) Flight training. The MP will receive training and demonstrate proficiency in all table 2-13 tasks.
- (2) Academic training. The following topics in table 2-14 may be used as a guide for developing a mission academic training program for MPs.

**Table 2-14. Maintenance test pilot academic training guide**

<b>TM 1-1500-328-23</b>	<b>DA PAM 738-751</b>
MTFs and Maintenance Operational Checks – Section III	Chapter 1 – Introduction
MTF Manuals	Chapter 2 – Aircraft Logbook Forms and Records
MTF Check Sheets	Chapter 3 – Maintenance Forms and Records

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

- a. **Selection for evaluators.** The evaluators must be selected not only for their technical qualifications but also for their demonstrated performance, objectivity, and ability to observe and to provide constructive comments. These evaluators are the SPs, IPs, 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 during the evaluation.
- 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.** The evaluation will determine the examinee's ability to perform essential hands-on and academic tasks to prescribed standards. Flight evaluations also will determine the examinee's ability to exercise crew coordination in completing these tasks.
- g. **Crew coordination.** The guidelines for evaluating crew coordination are based on a subjective analysis of how effectively a crew performs together to accomplish a series of tasks. The evaluator must determine how effectively the examinee employs the aircrew coordination basic qualities as outlined in chapter 6.
- h. **Evaluators role as crewmember.** In all phases of evaluation, the evaluator is expected to perform as an effective crew member. 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) Pilot. 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 a(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 fixed-wing IPs/SPs may only perform simulated engine failures and unusual attitude recoveries in cruise flight (may not be performed while on an instrument approach procedure [IAP] or in the traffic pattern).

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**Note.** Crewmembers must be evaluated in all crew positions authorized on their CTLs. 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 IAW 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 paragraphs 3-4b. If the evaluated crewmember is an IP/SP, the SP will evaluate the IP/SP's ability to instruct tasks.
- (3) APART instrument. The IE will evaluate a minimum of four topics from the subject areas in paragraphs 3-4b(3) relative to instrument flight rules (IFRs) flight and flight planning. If the evaluated crew member 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 paragraphs 3-4b(9). The IP/SP may choose topics in other subject areas if they apply to MTFs or are appropriate for the type evaluation.
- c. **Flight simulator.** 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, AL 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, Department of Defense Flight Information Publication (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 instrument meteorological conditions (IIMC) procedures.
    - Forms, records, and publications required in the aircraft.
    - Unit SOP and local requirements.
    - DOD flight information publications and maps.
    - Visual flight rules (VFRs)/IFR minimums and procedures.
    - Risk management.
    - Fuel requirements.
    - Crew endurance.
    - Weight and balance requirements.
    - Aviation life support equipment (ALSE).
  - (2) Aircraft systems, avionics, and mission equipment description and operation (operator's manual). Topics in this subject area—

- 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, aeronautical information manual [AIM], DOD FLIP, operator's manual, and FM 3-04.240). Topics in this subject are—
- Departure procedures.
  - Required weather (WX) for takeoff, en route, destination and alternate.
  - NOTAM.
  - Terminal aerodrome forecasts.
  - Aviation routine WX reports, Meteorological Aerodrome reports (METARs).
  - DOD FLIP symbology.
  - Fuel requirements.
  - WX 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 WX services.
  - Transponder requirements.
  - Arrival procedures.
- (4) Operating limitations and restrictions (operator's manual). Topics in this subject area are—
- Propeller limitations.
  - WX/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).
  - Computing equal time points (engine or pressurization failure).
- (5) Aircraft emergency procedures and malfunction analysis (appropriate operator's manual, chapter 9). Topics in this subject area are—
- Emergency terms and their definitions.
  - Engine malfunctions.
  - Drift down altitudes and speeds.
  - 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.
  - Wet footprint avoidance (engine or pressurization failure).
  - Low oil pressure.
  - Auto-pilot malfunctions.
- (6) Aeromedical factors (AR 40-8, TC 3-04.93, 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.
- (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, FM 3-04.203, FM 3-52, the commander's ATP, and unit SOP). Topics in this subject area are—
- CBRN operations.
  - ASE employment.
  - Downed aircraft procedures.
  - COMSEC.
  - Mission equipment.
  - Aviation mission planning.
  - Fratricide prevention.
  - Evasive maneuvers.
  - 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). Topics in this subject area are (for MPs only)—
- Local airspace usage.
  - Test flight WX 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.
- WX.
- Flight route.
- Performance data.
- Transfer of flight controls.
- Simulated-Engine-failure procedures.
- Crew duties, to include emergency duties.

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

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

switches.

(3) Flight tasks. At a minimum, the evaluator will evaluate those tasks designated in chapter 2 of this ATM, tasks listed on the CTL as mandatory for the designated crew station(s) and those mission 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 2-14, page 2-13, 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, WX 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 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.

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*Note.* A training plan will be approved by the commander for the crewmember to allow him to regain proficiency in tasks that were evaluated as unsatisfactory.

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### 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 evaluations (PMFE) and medical flight evaluations.** 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 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 IAW 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 Commander, USAACE, ATTN: MCXY-AER, Fort Rucker, AL 36362-5333, for board action. Commanders will coordinate with the local flight surgeons to obtain board results to ensure actions are completed in a timely manner.

d. **No-notice evaluation.** This evaluation is conducted IAW TC 3-04.11 and the unit's SOP. The commander will select the evaluation method, written, oral and/or 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 describes the essential tasks for maintaining crewmember skills. Each task includes 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 crew members to successfully perform the tasks to standard.

### 4-1. TASK CONTENTS.

a. **Task number.** Each ATM task is identified by a 10-digit systems approach to training number that corresponds to the tasks listed in the table of contents and chapter 2. The first three digits of each task in this ATM begin with 011, which is the U.S. Army Aviation Center and School designator or with 301 which were developed and approved by the U.S. Army Intelligence Center and Fort Huachuca. The center three digits are the same as the operator's manual and change from airframe to airframe (219 RC-12 series airplane). The last four digits of base tasks are assigned 1,000-series numbers, and the last four digits of mission tasks are assigned 2,000-series numbers. As an example, the full task number for Task 1004 is 011-219-1004. For convenience, only the last four digits are referenced 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.

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*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.

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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 IP in the task conditions includes the SP.
- (2) When a UT, IP, SP or IE is cited in the condition, that individual will be at one set of the flight controls unless the tasks are being performed in a FS.
- (3) Unless otherwise specified in the conditions, all in-flight training and evaluations will be conducted under visual meteorological conditions (VMC). Simulated instrument meteorological conditions (IMC) denote flight solely by reference to flight instruments while the aviator is wearing a hood or other similar device that restricts outside visual references. Tasks that are unique to a particular group of RC-12 series airframe are indicated in the condition. (The abbreviation **GR/CS** refers to the group that includes the RC-12K/N/P/X aircraft.)
- (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. Crew 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\* (pilot on the controls) 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 (pilot not on the controls) now also provides the response. The P should only accomplish noncritical functions without acknowledgment. The operation of systems such as landing gear, flaps, AP, flight management systems (FMS), and flight director (FD) mode selections require P\* participation, mandating a response such as “**CONFIRMED**” (for example, before landing check—“**GEAR, DOWN/CONFIRM,**” P\* responds—“**CONFIRMED**”).

(7) Aviators are expected to maintain operation within aircraft and engine limitations at all times. An operation outside these limits is considered unsatisfactory.

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 not 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 of this 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.

(3) Inflight.

(a) Maintain heading  $\pm 10$  degrees.

(b) Maintain altitude  $\pm 100$  feet.

(c) Maintain airspeed  $\pm 10$  knots indicated airspeed (KIAS).

(d) Maintain rate of climb or descent  $\pm 100$  feet per minute (FPM).

(e) Maintain the aircraft in trim  $\pm 1/4$  ball width.

(f) Maintain  $\pm 1$  nautical mile (NM) when tracking distance measuring equipment (DME) arcs.

(4) 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 may be required. Tasks may be accomplished using other techniques as long as the task is done safely and the standards are met. These actions apply in all modes of flight during day, night, IMC, or CBRN operations. When specific crew actions are required, the task will be broken down into crew actions and procedures as follows:

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

- (a) Crew members. 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 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 as a means to meet the standard. Procedures are flexible to allow the P\* to use judgment for minor deviations providing the standards are met; (for example, advancing the propellers to high revolutions per minute [RPM] on base to control high airspeed instead of short final is acceptable). 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. (example, **FLAPS – UP**). Chapter 6 contains a consolidated list of callouts.

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 2-12, page 2-10, 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 a particular task. Certain references apply to many tasks. Besides the references lists 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. **Standards versus descriptions.** 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 the 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 does not apply to aircraft without TCAS.)

**TASK 1000****Participate in a Crew Mission Briefing**

**CONDITIONS:** Prior to flight in a RC-12 series airplane and given DA Form 5484 (Mission Schedule/Brief) information and a unit-approved crew briefing CL.

**STANDARDS:**

1. The air mission commander (AMC) or PC will actively participate in and acknowledge an understanding of DA Form 5484 mission briefing.
2. For Guardrail missions, the AMC will conduct or supervise an aircrew mission briefing using mission information from DA Form 5484 and unit-approved crew briefing CL for, as a minimum, the mission PCs.
3. The PC will conduct or supervise an aircrew mission briefing using a unit-approved crew briefing CL.
4. 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 IAW AR 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 mission briefing. The PC may direct the other crewmember to perform all or part of the crew briefing.
  - c. Crewmembers will direct their attention to the crew member 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.

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

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2. Procedures.
  - a. Brief the mission using a unit approved crew mission briefing CL. Figure 4-1, page 4-6, provides a suggested format for a briefing CL.
  - b. Identify mission and flight requirements that will demand effective communication and proper sequencing and timing of crewmembers.

1. Mission overview.
  2. WX. Departure, en route, destination and alternate, if required.
  3. NOTAMs.
  4. Flight route.
  5. Fuel/Refueling requirements.
  6. Mission tracks (Guardrail).
  7. Required equipment.
    - a. Personal.
    - b. Survival.
    - c. Mission.
    - d. Publications.
  8. Crew callouts, duties, and responsibilities – Standard.<sup>1</sup>
    - a. Two-Challenge Rule.
    - b. Most Conservative Response.
    - c. Sterile Cockpit Procedures.
  9. Analysis of the aircraft.
    - a. Logbook and preflight deficiencies.
    - b. Performance planning.
      - (1) GRAMPS<sup>2</sup>, TOLD.
      - (2) Mission deviations required based on aircraft performance, WX, or threat.
      - (3) Single-engine capability.
    - c. Mission deviations required based on aircraft analysis.
  10. Risk assessment considerations.
  11. Crewmembers' questions, comments, and acknowledgment of the mission briefing.
- <sup>1</sup>. Use the word "Standard" when the crew has been trained on crew callouts, duties, and responsibilities IAW chapter 6 and the unit SOP.
- <sup>2</sup>. Guardrail Aviation Mission Planning Station (N/P/X).

**Figure 4-1. Sample crew mission briefing checklist**

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references and unit sop.

**TASK 1004****Plan a Visual Flight Rules Flight**

**CONDITIONS:** Prior to flight in a RC-12 series airplane or in an approved FS and given access to WX information; NOTAMS; flight planning aids; necessary charts, forms, publications, local flying rules and weight and balance information.

**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 WX for departure, en route, destination, and alternate (if used) and ensure WX 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 WX, to ensure mission completion. If appropriate e, select altitudes that conform to VFR cruising altitudes.
7. Complete and file a FPLN IAW AR 95-1, DOD FLIP and local or host country procedures.
8. Compute the following for the mission:
  - a. Distance within  $\pm 5$  miles, true airspeed within 10 knots (KTS) and estimated time en route (ETE) within  $\pm 3$  minutes for each leg of the flight.
  - b. Ensure the VFR fuel reserve requirement will be met IAW AR 95-1.
9. 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 WX facilities, obtain required flight WX 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 WX, 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. 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.

**REFERENCES:** Appropriate common references DD Form 365-4, local flying rules, AR 95-1, Title 14 Part 91 CFR, ICAO host nation regulations and unit SOP.

## TASK 1006

### Plan an Instrument Flight Rules Flight

**CONDITIONS:** Prior to IFR flight in a RC-12 series airplane or an approved FS and given access to weather information, NOTAMS, flight planning aids, necessary charts, forms/publications; and weight and balance information.

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

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#### 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 (Weight and Balance Clearance Form F-Transport/Tactical).
3. Obtain weather for departure, en route, destination and alternate (if used) and ensure weather will be at or above IFR weather planning minimums required by AR 95-1.
4. Plan the mission to meet all requirements for 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. Determine refueling arrangements, if required.
7. Compute for the mission.
  - a. Distance within  $\pm 5$  miles, true airspeed within 10 KIAS, and estimated time en route (ETE) within  $\pm 3$  minutes for each leg of the flight.
  - b. Ensure IFR fuel and reserve requirements are met IAW AR 95-1.
8. Perform mission risk assessment and crewmember briefing IAW unit SOP and AR 95-1.
9. 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. 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.

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

## TASK 1010

### Prepare a Department of the Army Form 7345-R (GR/CS Takeoff and Landing Data Card)

#### WARNING

**If the takeoff WT cannot be reduced because of mission requirements to meet single-engine performance during takeoff, then selecting a runway that meets Accelerate-Stop is recommended. Commanders must evaluate the mission requirements versus single-engine takeoff performance capabilities and address the associated risks of not meeting Accelerate-Stop distances and single-engine climb capabilities in the mission briefing/risk assessment process.**

**CONDITIONS:** Given a completed DD Form 365-4, the RC-12K/N/P/X series airplane operator's manual, airport information, environmental conditions at takeoff, and a blank DA Form 7345-R.

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

1. Correctly compute performance data IAW procedures given in the aircraft operator's manual and the description below.
2. Re-compute GR/CS TOLD card data if conditions increase by 1,000 feet pressure altitude (PA), 10 degrees Celsius or 500 pounds gross weight (GWT).

---

*Note.* Performance planning software may be used to compute GR/CS TOLD card data. The software must be approved for use by the Program Executive Office (PEO)-AVN. DA Form 7345-R must be used during ATP evaluations.

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#### DESCRIPTION:

1. Crew actions.
  - a. The PC will compute or direct the other crew member 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 crew member.
  - c. The PC will ensure that aircraft limitations and capabilities are not exceeded.
2. Procedures.
  - a. DA Form 7345-R (figure 4-2, page 4-11, and figure 4-3, page 4-12) is an aid for organizing takeoff and landing planning data. This form provides an easy reference for aircraft performance during takeoff, takeoff emergencies and landing at the destination. The GR/CS TOLD card will be computed prior to takeoff and should be updated prior to landing. It is a primary risk management tool for both 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 TEMP forecast for the departure time. Instructions for completing the items 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.

GR/CS TAKEOFF AND LANDING DATA CARD		
For use of this form, see TC 3-04.52; the proponent agency is TRADOC.		
TAKEOFF CONDITIONS		
TEMP C° (1)	PA (2)	
TAKEOFF WEIGHT (3)	RUNWAY AVAIL (4)	
STATIC POWER	(5)	(6)
FLAPS	0%	40%
Tire Speed Limit	(7)	(13)
V <sub>1</sub>	(8)	(14)
V <sub>R</sub>	(9)	(15)
V <sub>2</sub>	(10)	(16)
Takeoff Distance	(11)	(17)
Accelerate-Stop	(12)	(18)
LANDING DATA		
V <sub>ref</sub> (19)	LAND DISTANCE (20)	
OPTIONAL (21)		

DA FORM 7345-R, JUL 2013 APD Lf v1.00  
 PREVIOUS EDITIONS ARE OBSOLETE

Figure 4-2. DA Form 7345-R (Front)

ONE ENGINE INOPERATIVE TAKEOFF CONDITIONS		
FLAPS	0%	40%
Max Takeoff Weight for One Engine Climb at Lift-off	(6)	(12)
Accelerate - Go ( _____ (2) _____ )	(7)	(13)
Net Takeoff Flight Path First Segment _____ (3) %	(8)	(14)
Net Takeoff Flight Path Second Segment ( $V^2$ ) _____ (4) %	(9)	(15)
Net Takeoff Flight Path Third Segment ( $V_{enr}$ ) _____ (5) %	(10)	
Adjusted Takeoff Weight	(11)	(16)
REMARKS Sample data input here.		

PAGE 2, DA FORM 7345-R, JUL 2013 APD LF v1.00

Figure 4-3. DA Form 7345-R (Back)

## 3. Supplemental instructions.

*Note.* Speeds that are listed as “All WTs” or are published as a single number and do not have a chart that varies the speed with WT are required memory items. The GR/CS TOLD card eliminates the requirement to list speeds that do not change; for example,  $V_{ENR}$  or  $V_{YSE}$ .

## a. Front (figure 4-2, page 4-11).

**Item (1)** – TEMP °C. Record the TEMP in degrees Celsius forecast for the time of departure.

**Item (2)** – PA. Record the PA forecast for the time of departure.

**Item (3)** – Takeoff WT. 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. If the takeoff WT is adjusted, verify the WT and balance of the adjusted WT.

**Item (4)** – Runway Avail. Record runway length (including overrun distance if applicable) for the planned departure runway.

**Item (5)** – Static Power.

- **K** Record the engine TQ in percent, from the *Minimum Static Takeoff Power at 1,700 RPM – Flaps Up* chart.
- **N/P/X** Record the engine TQ from the *Static Takeoff Power at 1,700 RPM with Ice Vanes Retracted* chart.

**Item (6) – Static Power.**

- **K** If required, record the engine TQ in percent from the *Minimum Static Takeoff Power at 1,700 RPM – Flaps Approach* chart.
- **N/P/X** If required, record the engine TQ in percent from the *Static Takeoff Power at 1,700 RPM with Ice Vanes extended*.

**Item (7) – Tire Speed Limit – Flaps 0%.** **N/P/X** Compute the tire speed limit using zero wind component from the *MAX Takeoff WT – Flaps Up as limited by the Tire Speed* chart.

**Item (8) –  $V_1$  - Flaps 0%.** Record the Flaps-Up  $V_1$  for the takeoff GWT using the *Takeoff Speed – Flaps Up* chart.

**Item (9) –  $V_R$  - Flaps 0%.** Record the Flaps Up  $V_R$  for the takeoff WT using the *Takeoff Speed – Flaps Up* Chart.

**Item (10) –  $V_2$  – Flaps 0%.** Record the Flaps Up  $V_2$  for the takeoff WT using the *Takeoff Speed – Flaps Up* chart.

**Item (11) – Takeoff distance - Flaps 0%.** Do not consider head wind during takeoff computations unless mission criticality demands it. However, if takeoff must be made downwind, include the tail wind in takeoff computations. Adjust the distance for takeoff with the ice vanes extended, runway slope or winds as appropriate.

- **N** Record the distance required for takeoff using the *Takeoff Distance – Flaps Up* chart. The distance is from brake release to 50 feet AGL.
- **K/P/X** Record the distance required for takeoff using the *Takeoff Distance – Flaps Up* chart. The distance can be computed from brake release to an altitude between 0 to 50 feet AGL.

**Item (12) – Accelerate – Stop - Flaps 0%.** Record the accelerate – stop distance from the *Accelerate – Stop – Flaps Up* chart. Adjust the distance for takeoff with the ice vanes extended, runway slope, or winds as appropriate. This is the total distance from brake release, accelerating to  $V_1$ , reject the takeoff and then stopping using ground fine and MAX braking.

**Item (13) – Tire speed limit – Flaps 40%.** **N/P/X** Compute the tire speed limit using zero wind component from the *MAX Takeoff WT – Flaps Approach as limited by the Tire Speed* chart.

**Item (14) –  $V_1$  - Flaps 40%.** Record the Flaps-Approach  $V_1$  for the takeoff GWT using the *Takeoff Speed – Flaps Approach* chart.

**Item (15) –  $V_R$  - Flaps 40%.** Record the Flaps Approach  $V_R$  for the takeoff WT using the *Takeoff Speed – Flaps Approach* chart.

**Item (16) –  $V_2$  – Flaps 40%.** Record the Flaps Approach  $V_2$  for the takeoff WT using the *Takeoff Speed – Flaps Approach* chart.

**Item (17) – Takeoff Distance - Flaps 40%.** Record the runway distance required for takeoff. Do not consider head wind during takeoff computations unless mission criticality demands it. However, if takeoff must be made downwind, include the tail wind in takeoff computations. Adjust the distance for takeoff with the ice vanes extended, runway slope or winds.

- **N** Record the distance required for takeoff using the *Takeoff Distance – Flaps Approach* chart. The distance is from brake release to 50 feet AGL.
- **K/P/X** Record the distance required for takeoff using the *Takeoff Distance – Flaps Approach* chart. The distance can be computed from brake release to an altitude between 0 to 50 feet AGL.

**Item (18) – Accelerate – Stop - Flaps 40%.** Record the accelerate-stop distance from the *Accelerate – Stop – Flaps Approach* chart. Adjust the distance for takeoff with the ice vanes extended, runway slope, or winds as appropriate. This is the total distance from brake release, accelerating to  $V_1$ , reject the take off, and then stopping using ground fine and MAX braking.

**Item (19)** –  $V_{REF}$ . Guardrail Common Sensor Aircraft have a single  $V_{REF}$  for all WTs. This block may be used for that  $V_{REF}$ , for a no flap  $V_{REF}$  or left blank.

**Item (20)** – Land Distance. Record the runway distance required for landing at the destination. 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 the event of an emergency. This does not imply that the aircraft should be landed above its certified MAX landing WT unless an emergency warrants it.

- **K** *Normal Landing Distance Without Propeller Reversing – Flaps Down.*
- **N/P/X** *Normal Landing Distance – Flaps Down.*

**Item (21)** – Optional. Use this area as desired.

- b. **Back (figure 4-3, page 4-12)**. 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% meets the desired performance, it is not required to compute both. The back of the card should be completed first.

**Item (1)** – General instructions. Using the planned departure WT, TEMP and PA, obtain the data from the charts listed below for the planned flap setting. If the single-engine climb criteria are met, enter the departure WT on the front side of the TOLD card and obtain the takeoff data. If a segment(s) does not meet single ENG performance criteria, using the worst condition, back plan on that chart to determine the takeoff WT that would satisfy climb performance. Re-compute the back side of the TOLD card, using this adjusted takeoff WT to verify the WT reduction meets all performance criteria. Enter the adjusted WT on the front of the TOLD card in takeoff WT block. The commander will determine the minimum criteria for items 2n through 5 as part of risk management. The values given are for information only, based on the airplane certification under Title 14 CFR Part 25.

**Item (2)** – Accelerate – Go. Use this area to enter the MAX distance of accelerate-go allowed if required 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  $V_2$ .

**Item (3)** – Net Takeoff Flight Path – First Segment (%). This segment begins at  $V_R$  and ends after obtaining  $V_2$  and the gear is fully retracted. It is a high drag segment and a positive rate of climb is highly recommended.

**Item (4)** – Net Takeoff Flight Path – Second Segment (%). The second segment begins from the point the gear is fully retracted, ends at 400 feet above ground level (AGL), and is flown at  $V_2$ . Recommended minimum gradient of climb is 2.4% for VMC. A climb gradient of 3.3% is required for IMC departures. A climb gradient of greater than 3.3% may be required for departures with other than standard takeoff/departure procedures.

**Item (5)** – Net Takeoff Flight Path - Third Segment (%). The third segment begins after the Acceleration and Flaps retraction segment ends by obtaining  $V_{ENR}$ , while maintaining takeoff power until reaching  $V_{ENR}$  or 5 minutes and then reduce power to MAX continuous. The takeoff path ends at 1,500 feet AGL and clear of obstacles. Recommend a minimum of 1.2 percent climb gradient for VMC operations.

**Item (6)** – Max Takeoff WT for One Engine Climb at Lift-off – Flaps 0%. Determine if the planned takeoff WT is equal to or less than the charted limit. If the planned departure WT is more than the MAX chart WT for the conditions, continuing the takeoff is not an option unless the takeoff WT is reduced.

**Item (7)**– Accelerate – Go – Flaps 0%. Determine the total takeoff distance from brake release to clear a 50-foot obstacle if an engine failure occurs at  $V_1$ . *Accelerate – Go Distance Over a 50-Foot Obstacle – Flaps Up.*

**Item (8)** – Net Takeoff Flight Path – First Segment – Flaps 0%. Use the *Net Takeoff Flight Path – First Segment – Flaps Up - One Engine Inoperative* chart to determine the gradient of climb.

**Item (9)** – Net Takeoff Flight Path – Second Segment Flaps 0%. Use the *Net Takeoff Flight Path – Second Segment – Flaps Up – One Engine Inoperative* chart to determine the gradient of climb.

**Item (10)** – Net Takeoff Flight Path - Third Segment – One Engine Inoperative – Flaps 0%. Use the *Net Takeoff Flight Path – Third Segment – One Engine Inoperative* chart to determine the gradient of climb.

**Item (11)** – Adjusted Takeoff WT – Flaps 0%. Enter the adjusted takeoff WT, if WT had to be reduced to meet one engine inoperative criteria. Enter this WT on the front of the TOLD card as the takeoff WT.

**Item (12)** – Max Takeoff WT to Achieve a Positive Climb at Lift-off – Flaps 40%. Determine if the planned takeoff WT is equal to or less than the charted limit, using the *MAX Takeoff WT – Flaps Approach To Achieve Positive One Engine Inoperative Climb at Lift-off* chart.

**Item (13)** – Accelerate – Go – Flaps 40%. Determine the distance from the *Accelerate – Go Distance Over a 50-Foot Obstacle – Flaps Approach*.

**Item (14)** – Net Takeoff Flight Path – First Segment – Flaps 40%. Use the *Net Takeoff Flight Path – First Segment – Flaps Approach - One Engine Inoperative* chart to determine the gradient of climb.

**Item (15)** – Net Takeoff Flight Path – Second Segment – Flaps 40%. Use the *Net Takeoff Flight Path – Second Segment – Flaps Approach – One Engine Inoperative* chart to determine the gradient of climb.

**Item (16)** – Adjusted Takeoff WT – Flaps 40%. Enter the adjusted takeoff WT, if WT had to be reduced to meet one engine inoperative criteria. Enter this WT on the front of the TOLD card as the takeoff WT.

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**Note.** The same TOLD may suffice for consecutive takeoffs and landings if the crew verifies that the existing TEMP, PA and WT do not degrade performance.

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- 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 (figure 4-4, page 4-16, and figure 4-7, page 4-24) 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; abort the takeoff and stop; or reduce his planned takeoff WT to increase the aircraft's performance.
- d. **Takeoff WT considerations.** The takeoff WT may be limited by the most restrictive of the following:
- (1) MAX certified takeoff WT (structural).
  - (2) MAX takeoff WT permitted by takeoff field length.
  - (3) MAX takeoff WT to achieve a positive climb at lift-off.
  - (4) Accelerate – Go distance over 50-foot obstacle.
  - (5) Net takeoff flight path – Second segment.

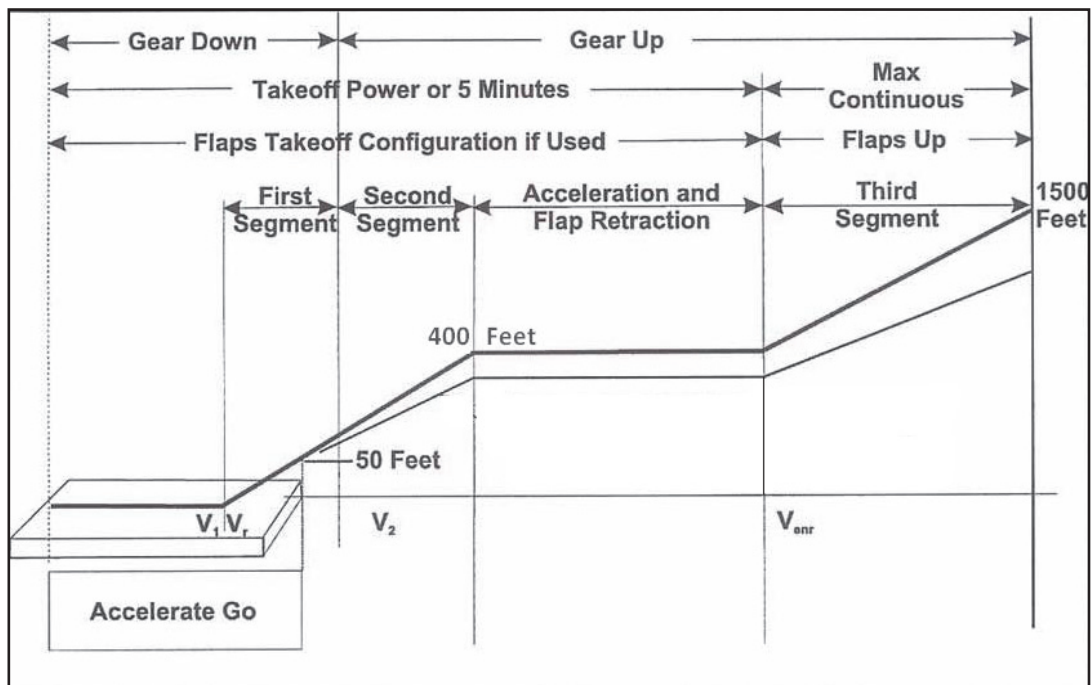


Figure 4-4. RC-12 K/N/P/X one engine inoperative takeoff

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common reference, TM 55-1510-222-10 **K**, TM 1-1510-223-10 **N**, and TM 1-1510-224-10 **P** **X**.



**TASK 1011****Prepare a Department of the Army Form 7444-R (RC-12D/H Series Takeoff and Landing Data Card)****WARNING**

If the takeoff WT cannot be reduced because of mission requirements to meet single-engine performance during takeoff, then selecting a runway that meets Accelerate-Stop is recommended. Commanders must evaluate the mission requirements versus single-engine takeoff performance capabilities and address the associated risks of not meeting Accelerate-Stop distances and single-engine climb capabilities in the mission briefing/risk assessment process.

**WARNING**

If pre-mission planning indicates a negative first segment climb gradient, take-off distance + landing distance over a 50 foot obstacle + 2000 feet of runway distance is recommended for an aborted takeoff due to an ENG failure.

**WARNING**

If an attempt is made to continue flight prior to obtaining  $V_2$ , directional control may be lost if heavier than the positive climb at lift-off WT or the accelerate-go distance is excessive.

---

*Note.* Performance planning computer software may be used to complete RC 12D/H TOLD card data. The software must be approved for use by the PEO-AV. DA Form 7444-R must be used during ATP evaluations.

---

**CONDITIONS:** Given a completed DD Form 365-4 (Weight and Balance Clearance Form F-Transport/Tactical) the RC-12D or RC-12H series airplane, operator's manual; unit SOP; environmental conditions at takeoff; runway information and a blank DA Form 7444-R.

**STANDARDS:** Appropriate common standards and these additions/modifications:

1. Correctly compute performance data IAW 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 GWT.

**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 7444-R (figure 4-5, page 4-19, and figure 4-6, page 4-20) is an aid for organizing takeoff and landing planning data. The RC-12D/H TOLD card provides an easy reference for takeoff, takeoff emergencies, and landing at the destination. This form 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 both 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 TEMP forecast for departure time. Instructions for completing the items 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.

RC-12D/H TAKEOFF AND LANDING DATA CARD		
For use of this form, see TC 3-04.52; the proponent agency is TRADOC.		
TAKEOFF CONDITIONS		
STATION (1)	RUNWAY AVAIL (2)	
TEMP C° (3)	PA (4)	
TAKEOFF WEIGHT (5)	TAKEOFF POWER (6)	
<b>FLAPS</b>	<b>0%</b>	<b>40%</b>
V <sub>1</sub> (7)	(8)	(12)
V <sub>2</sub> (8)	(9)	(13)
V <sub>yse</sub> (9)		
Takeoff Distance	(10)	(14)
Accelerate - Stop	(11)	(15)
LANDING DATA		
V <sub>ref</sub> (16)	LAND DISTANCE (17)	
OPTIONAL (18)		

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 PREVIOUS EDITIONS ARE OBSOLETE

Figure 4-5. DA Form 7444-R (Front)

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)		

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Figure 4-6. DA Form 7444-R (Back)

## 3. Supplemental instructions.

**Note.** Speeds that are published as a single number and do not have a chart that varies the speed with WT are required memory items. The RC-12D/H TOLD card eliminates the requirement to list speeds that do not change; for example,  $V_{MC}$ .

## a. Front (figure 4-4 page 4-16).

**Item (1)**– STATION. Enter the three-letter or International Civil Aviation Organization (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 degrees Celsius forecast for the time of departure.

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

**Item (5)** – TAKEOFF WT. 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. Record the engine TQ in percent from the *Minimum Takeoff Power At 2,000 RPM* chart. For operation with the ice vanes extended, increase field PA 1,000 feet before entering the graph.

**Item (7)** – FLAPS UP  $V_1$ . Record the Flaps Up  $V_1$  for the takeoff GWT. Different operator's manuals may list  $V_R$  on one page, and then call it ROTATION SPEED or  $V_1$  on another page; yet when you compare speeds they are identical. They are the same because  $V_R$  equals  $V_1$  and is the rotation speed for the RC-12D/H series aircraft. For standardization, references to  $V_1$  are synonymous with  $V_R$  and ROTATION SPEED.

- D -  $V_1$  is the  $V_R$  speed on the *Takeoff Distance – Flaps 0%* chart.
- H -  $V_1$  is the 'ROTATION SPEED' on the *Takeoff Distance – Flaps 0%* chart.

---

**Note.**  $V_{LOF}$  will always be  $V_R + 3$  KTS or  $V_1 + 3$  KTS.

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**Item (8)** – FLAPS UP  $V_2$ . Record  $V_2$  with the flaps up. Figure 4-4 lists other charts  $V_2$  is found.

- D - Flaps up  $V_2$  is listed on the *Takeoff Distance – Flaps 0%* chart.
- H - Flaps up  $V_2$  is the 50-foot speed on the *Takeoff Distance – Flaps 0%* chart.

**Item (9)** –  $V_{YSE}$ . Record  $V_{YSE}$  from the CLIMB SPEED~KTS airspeed block listed on the *Climb-One Engine Inoperative* chart for the departure WT.

**Item (10)** – TAKOFF DISTANCE FLAPS 0%. Record the runway distance required for takeoff from the *Takeoff Distance – Flaps 0%* 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.

**Item (11)** – ACCELERATE–STOP FLAPS 0%. Record the accelerate-stop distance from the *Accelerate – Stop – Flaps 0%* chart.

**Item (12)** – FLAPS 40%  $V_1$ . Record  $V_1$  with the flaps at the takeoff position for the takeoff GWT.

- **D** –  $V_1$  is the  $V_R$  speed on the *Takeoff Distance – Flaps 40%* chart.
- **H** –  $V_1$  is the 'ROTATION SPEED' on the *Takeoff Distance – Flaps 40%* chart.

**Item (13)** – FLAPS 40%  $V_2$ . Record  $V_2$  with the flaps at the takeoff position for the takeoff GWT.

- **D** - Flaps 40%  $V_2$  is listed on the *Takeoff Distance – Flaps 40%* chart.
- **H** - Flaps 40 %  $V_2$  is the 50-foot speed on the *Takeoff Distance– Flaps 40%* chart.

**Item (14)** – 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 unless mission criticality demands it. However, if takeoff must be made downwind, include the tail wind in takeoff computations. Adjust the distance for takeoff with the ice vanes extended and runway slope.

**Item (15)** – ACCELERATE–STOP FLAPS 40%. Record the Accelerate – Stop distance from the *Accelerate – Stop – Flaps 40%* chart.

**Item (16)** –  $V_{REF}$ . Record  $V_{REF}$  for landing. Recording the no-flap  $V_{REF}$  airspeed is not mandatory. Units have the option of splitting the block (*l*) and recording the  $V_{REF}$  for landing at takeoff GWT or MAX landing WT on one side. On the other side, record the  $V_{REF}$  for the landing WT at destination. D/H - Obtain  $V_{REF}$  from the *Landing Distance Without Propeller Reversing – Flaps 100%* chart.

**Item (17)** – LAND DISTANCE. Record the runway distance required for a landing at the destination. For planning purposes, use the 50-foot obstacle height. 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. D/H - Obtain the landing distance from the *Landing Distance Without Propeller Reversing – Flaps 100%* chart.

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

- b. **Back (figure 4-6, page 4-20)**. 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% 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. 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 procedure, the following information is provided:

- Balanced field is where Accelerate–Stop and Accelerate–Go are equal (Best scenario).
- 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.
- 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 ( $V_2$ ) The second segment begins from the point the gear is fully retracted, ends at 400 feet above ground level (AGL, or clear of obstacles and is flown at  $V_2$ . Recommended minimum gradient of climb is 2.4 percent for VMC. A climb gradient of 3.3 percent is required for IMC departures . A climb gradient of greater than 3.3 percent may be required for departures with other than standard takeoff/departure procedures.

**Item (3)** – CLIMB – ONE ENGINE INOPERATIVE ( $V_{YSE}$ ) %. Commanders should assign a minimum gradient of climb for the segment. Recommend a minimum of 1.2 percent climb gradient for VMC operations.

**Item (4)** – POSITIVE CLIMB at LIFT-OFF – FLAPS 0%. Determine if the planned takeoff WT is equal to or less than the charted limit. If the planned departure WT exceeds the charted limit, consider reducing departure WT to be within limits.

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**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 WT that will result in meeting requirements. Enter this WT in the Adjusted Takeoff WT block. This will be the new MAX takeoff WT and used for planning on the front of the TOLD card. If Guardrail mission requirements do not allow reducing WT, **the risk must brief at a higher level.**

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**Item (5)** – ACCELERATE – GO – FLAPS 0%. Obtain from the *Accelerate – Go Distance Over 50-ft Obstacle – Flaps 0%* Chart.

**Item (6)** – SINGLE ENGINE GRADIENT of CLIMB – FLAPS 0%. From *Takeoff Climb Gradient – One Engine Inoperative – Flaps 0%* chart, obtain the climb gradient for a  $V_2$  climb.

**Item (7)** – CLIMB ONE ENGINE INOP ( $V_{YSE}$ ). Record the  $V_{YSE}$  climb gradient from the *Climb – One Engine Inoperative* chart.

**Item (8)** – ADJUST TAKEOFF WT – FLAPS 0%. If the takeoff WT 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 WT.

**Item (9)** – POSITIVE CLIMB at LIFT-OFF – Flaps 40%. Determine if the planned takeoff WT is equal to or less than the charted limit. If the planned departure WT exceeds the charted limit, consider reducing departure WT to be within limits.

**Item (10)** – ACCELERATE – GO FLAPS 40%. Record the distance from the *Accelerate – Go Distance Over 50-ft Obstacle – 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 50 feet and ending after accelerating to  $V_{YSE}$  once clear of obstacles and rate of climb allows acceleration.

**Item (12)** – ADJUST TAKEOFF WT – FLAPS 40%. Record the planned departure WT. If the takeoff WT 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 WT.

**Item (13)** – REMARKS. Space available for crew member entries.

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**Note.** The same TOLD may suffice for consecutive takeoff and landings if the crew verifies that the existing TEMP, PA and WT do not degrade performance.

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- 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 than 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 50 feet (one engine inoperative) and obtain  $V_2$  using the Accelerate-Go Distance Over 50-Foot Obstacle 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 50 ft 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 4-7 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.

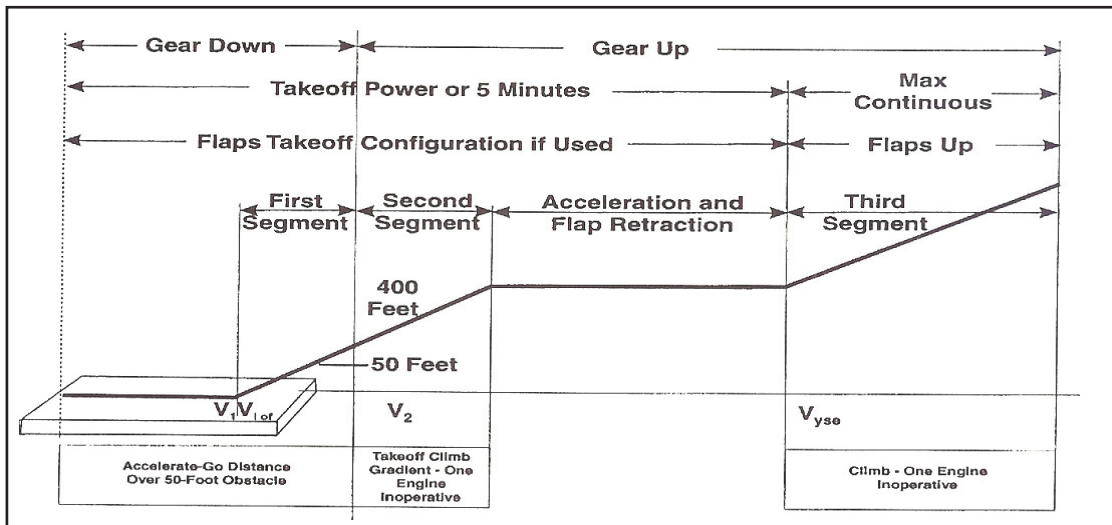


Figure 4-7. RC-12 D/H one engine inoperative takeoff profile

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references, TM 55-1510-219-10 **D**, and TM 55-1510-221-10 **H**.



**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 (RC-12 series), and completed or blank DD Form 365-4 (Weight and Balance Clearance Form F-Transport/Tactical), 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, 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 Flight at Minimum Control Speed with Critical Engine Inoperative ( $V_{mca}$ ) (Simulator Only)

**CONDITIONS:** In an approved FS.

**STANDARDS:** Appropriate common standards and 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  $\pm 10$  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 above ground level (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 speed at approximately 50 feet above the landing area.
  - b. At a given altitude, perform the single-engine go-around by applying takeoff power (or 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.

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*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.

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*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).

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**TRAINING AND EVALUATION REQUIREMENTS:**

1. Training will be conducted in a FS.
  2. This maneuver is not a required evaluation or iteration maneuver.
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*Note.* This maneuver is to be trained for familiarization purposes in a FS only.

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**REFERENCES:** Appropriate common references and 14 CFR 91FAA-S-8081-12A.

## TASK 1029

### Perform Preflight Inspection

**CONDITIONS:** In a RC-12 series 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 Forms 2408-12, 2408-13, and 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 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 RC-12 series airplane or in an approved FS and given the aircraft operator's manual/CL.

**STANDARDS:** Appropriate common standards and, 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. To prevent exceeding TQ limits when advancing the condition levers to HIGH IDLE during the start procedure, place the propeller lever(s) to HIGH RPM and the power levers to BETA before advancing the condition levers to HIGH IDLE **D/H**.

**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 FS.
2. Evaluation will be conducted in the aircraft or FS.

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

**TASK 1035****Perform Aircraft Taxi**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS with access to the CL.

**STANDARDS:** Appropriate common standards and 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.

**DESCRIPTION:**

1. Crew actions.
  - a. Each crewmember will complete the required checks or procedures pertaining to his or her crew duties IAW the CL and the preflight briefing.
  - b. The P, when directed by the P\*, will check the flight instruments in turns to verify proper indications. This will allow the P\* to keep his attention outside while the aircraft is moving. Both pilots attention should be directed outside for clearing purposes as much as possible.
2. Procedure. The P\*, assisted by the P, will perform the following actions:
  - a. After verifying completion of all before taxi checks with the CL, clear the immediate area. Release the parking brakes. Adjust propeller levers to FEATHER detent **K/N/P/X**, if desired, to obtain the P<sub>Y</sub> shift to reduce N<sup>1</sup> during ground fine operations. To initiate taxi, increase power until aircraft starts to move, then immediately retard power to IDLE, ground fine or beta, as required, and ensure that both sets of brakes operate properly.
  - b. Maintain a safe taxi speed compatible with airfield and environmental conditions. Apply controls as required by wind conditions. Regulate taxi speed with a combination of power, ground fine or beta, or brakes, as applicable. Do not drag brakes. Complete required taxi checks and verify with the CL. While taxiing, follow taxi lines (when applicable) and remain within approved taxi areas. Use taxi guides when operating in areas that are closely restricted.
  - c. The P should read the CL and help the P\* clear the area. He or she should complete all designated P checks and assist the P\* as required.

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*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.

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**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 CONSIDERATIONS:**

1. Before attempting to taxi, activate the brake deice system. 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:**

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*Note.* If ice vanes are used during ground operations, oil TEMPs must be monitored closely **D/H**.

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1. Warm-up and Ground Operations. Use normal procedures for warm-up and ground operations. Higher N<sup>1</sup> 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<sup>1</sup> speeds.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

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



**TASK 1045****Perform Engine Run-Up**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS and 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 crew member may task the right seat crew member 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.

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*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.

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**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 the FS.
2. Evaluation will be conducted academically in the aircraft or in the FS.

**REFERENCES:** Appropriate common references.

## TASK 1070

### Perform Emergency Procedures

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*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.

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**CONDITIONS:** In a RC-12 series airplane, in an approved FS or academically, and given a specific emergency.

**STANDARDS:** Appropriate common standards and these additions/modifications without error, perform, simulate the performance of, or describe the appropriate emergency procedure IAW the aircraft operator's manual and/or 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 station stations in which they are authorized to fly.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references and FIH.

## TASK 1077

### Perform Procedures for Two-Way Radio Failure

**CONDITIONS:** In a RC-12 series airplane, in an approved FS, 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, and land as soon as practicable.
    - (2) IMC conditions.
      - (a) (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) (b) If two-way radio failure occurs while operating outside continental United States (OCONUS), comply with International Civil Aviation Organization (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 the FS.
2. Evaluation will be conducted academically, in the aircraft, or in the FS.

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

## TASK 1104

### Perform Normal Takeoff and Climb

**CONDITIONS:** In an RC-12 airplane or an approved FS, day or night.

**STANDARDS:** Appropriate common standards and these additions/modifications:

1. Without error, complete before-takeoff, lineup, and after-takeoff checks.
2. Maintain 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  $V_1$  **D/H**,  $V_R$  **K/N/P/X**, -0/+5 KIAS.
5. Perform climb after lift-off at 160 KIAS or per climb schedule.

#### WARNING

**If premission planning indicates a negative first segment climb gradient, take-off distance + landing distance over a 50 foot obstacle + 2000 feet of runway distance is recommended for an aborted takeoff due to an engine failure. In the event of an engine failure with these conditions met and prior to gear handle movement, the P\* should take control of the power levers, reduce power and land the aircraft on the remaining runway available.**

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*Note.* The crew must ensure that static takeoff power is obtainable prior to brake release on or prior to the first takeoff of the day for RC-12 **K/N/P/X** 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 (140 KIAS or climb schedule) may be used if required for mission considerations.

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#### 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  $V_2$ .

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*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%) is required for runway length or tire speed limits

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2. Procedure. The P\*, assisted by the P, will perform the following actions:
  - a. Normal takeoff **D/H**.

(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 and complete it by the time the aircraft heading is aligned with the runway heading if it can be done safely. Align the aircraft with the runway heading.

(2) Power. P\* smoothly advances the power levers to within 5% 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.

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**Note.** The P\* does not relinquish control of the power levers to the P until the takeoff decision speed ( $V_1$ ) callout. The P is limited to assisting the P\* by setting and maintaining the take-off power as briefed. If there is a need to abort the take-off during the take-off 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\* will retain a light hold on the power levers until takeoff decision speed ( $V_1$ ) 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 and 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 a rate that will allow the nose tire to be just departing the ground at the “rotate” callout. The P will call, “ **$V_1$ , ROTATE**” upon attaining  $V_1$ ; the P\* will remove his hand from the top of the power levers and place both hands on the yoke. The P\* will slightly increase aft pressure on the elevator and smoothly rotate to the pitch attitude that will result in obtaining a 7-degree deck angle after liftoff. The P will continue to monitor instruments for proper indications and physically guard the power levers.

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**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.

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(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 deck angle 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 WT allow, 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.

(5) En route climb. The P\* may maintain 160 KIAS for increased visibility until 10,000 AGL before resuming the climb airspeed in the climb, fuel and distance chart of chapter 7 of the operator’s manual.

b. Normal takeoff **K/N/P/X**.

(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 and complete it by the time the aircraft heading is aligned with the runway heading if it can be done safely. Align the aircraft with the runway heading.

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*Note.* The RC-12N/P/X may produce power in excess of the static power charted TQ value. The P should monitor and adjust power as required to maintain MAX available takeoff power without exceeding engine limits.

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(2) Power. P\* smoothly advances the power levers to within 5% 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.

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*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 takeoff decision speed ( $V_1$ ) 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 the “**ROTATE**” callout. The P will announce “**V<sub>1</sub>**” 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 appropriate pitch attitude (RC-12K – 10 degrees, RC-12N/P/X – 7 degrees). The P will continue to monitor instruments for proper indications and physically guard the power levers.

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*Note.* The RC-12X PFD digital pitch reference is several degrees off from a true deck angle. As a result, pitching to 10 to 12 degrees will result in airspeeds slower than 160—two engines and slower than  $V_2$ —single engine. Aviators should adjust the climb out PFD deck angle to achieve the desired airspeed. Approximately, 5 degrees after liftoff and approximately, 7 to 8 degrees on climb out should result in the desired airspeed profile.

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- (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 deck angle 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) When the gear is confirmed up, the P\* will adjust pitch attitude to approximately 10 to 12° and allow the aircraft to accelerate to 160 KIAS in the climb. As the airplane accelerates, adjust forward trim to relieve control pressures.
- (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.
- (5) En route climb. The P\* may maintain 160 KIAS until 10,000 AGL before resuming the climb airspeed in the climb, fuel, and distance chart of chapter 7 of the operator's manual.
- c. 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.

#### **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 guarantees 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 deck 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°. 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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

**REFERENCES:** Appropriate common references and unit SOP.



**TASK 1120****Perform Steep Turns**

**CONDITIONS:** In a RC-12 series airplane under VMC or in an approved FS.

**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  $\pm 10$  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 bar 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, 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. About 20 to 25 degrees (left turn) or 10 to 15 degrees (right turn) before reaching the rollout heading, 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.

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*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.

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**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 might 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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

**REFERENCES:** Appropriate common references.

**TASK 1122****Perform Climbs and Descents**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS.

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

**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.

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*Note.* A technique for determining top of descent (TOD) (or a given point in space) to depart an altitude to reach an assigned altitude by another given point may be determined by: (altitude to lose) multiplied by 3, plus the altitude restriction point. Note the following example: a typical ATC clearance, while flying eastbound toward the Dothan (DHN) very high frequency omni-directional range tactical air navigation (VORTAC) at FL270, may be as follows: Army 12345, descend to reach 12,000 feet by 30 miles east of DHN VORTAC. Therefore  $(27,000 \text{ feet} - 12,000 \text{ feet}) \times 3$  plus 30 DME = 75 DME descent point. The rate of descent required is determined by dividing the ground speed (GS) by 2 then multiplying the resultant by 10 or multiplying the GS by 5. For example, if the GS is  $250/2 = 125 \times 10 = 1250 \text{ FPM}$  or  $250 \times 5 = 1250 \text{ FPM}$ . Therefore your descent should start at 75 DME from the DHN VORTAC at the rate computed in order to comply with ATC instructions.

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(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 by reducing the power to idle, increasing propellers to high RPM; place flaps to approach (at or below MAX flap extension speed); extend the gear (at or below MAX gear extension speed); and 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 air-speeds 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. Direct the **P** to retract the landing gear with a “**GEAR UP**” call out and “**FLAPS UP**” if recovering from the landing configuration. The maneuver should be practiced with the aircraft in both a cruise and a landing configuration. The P will perform 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 the FS.
2. Evaluation will be conducted in the aircraft or in the 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 RC-12 series airplane or in an approved FS 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.

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

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**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:

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

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- a. Prior to commencing the maneuver, note  $V_{MCA}$  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 100 percent. 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 altitude. Maneuver the airplane in straight-and-level flight, in climbs and descents, and in turns not to exceed a standard rate turn (10 percent of airspeed + 7 degrees = standard rate turn). The P\* should maintain coordinated flight while maneuvering through the proper use of the rudder and aileron.
- b. The P\* should complete the maneuver by returning to 160 KIAS in the clean configuration to a predetermined altitude (see Task 1177). 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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

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

**TASK 1144**  
**Perform Touch-and-Go Landing**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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 speed in excess of the mean wind speed)  $\pm 5$  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. 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 P\*, assisted by the P (IP), will perform the following actions after the aircraft has landed with both power levers at idle and is on the rollout:
  - a. The IP will state, “**STABILIZE POWER.**” The P\* will push the power levers up to about the 12 o’clock position **D/H** or 10 o’clock position **K/N/P/X** 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<sub>1</sub>**” and “**ROTATE**” at the appropriate times.
  - f. From this point, continue the takeoff using the procedures specified for a normal takeoff.

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**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.

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**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, 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 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 the FS.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## TASK 1145

### Perform Normal Landing

**CONDITIONS:** In an RC-12 airplane or in an approved FS.

**STANDARDS:** Appropriate common standards and these additions/modifications:

1. Attain landing approach speed ( $V_{REF}$ ) (plus one-half wind gust speed in excess of the mean wind speed)  $\pm 5$  KIAS.
2. Maintain approach angle at or above the instrument landing system (ILS) glide path, approach with vertical guidance (APV), VASI, or precision approach path indicator (PAPI) when available.
3. Obtain the  $V_{REF}$  plus speeds at the designated points in the pattern  $\pm 10$  KTS.
4. 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 9000 feet) and roll out with desired runway track between the main landing gear.
5. Maintain positive directional control and crosswind correction during the after landing roll.
6. Uses beta, reverse, ground fine, and brakes (as appropriate) in such a manner to bring the airplane to a safe stop or exit the runway at a safe speed.

#### WARNING

**If flaps are selected beyond approach prior to being landing assured, the P\* must be prepared to direct the P to retract the flaps to approach in the event of an engine failure.**

#### DESCRIPTION:

1. Crew actions. Each crew member 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° 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.



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**Note.** The P\* should complete the before-landing check on the downwind leg before turning base for a normal traffic pattern. For a modified traffic patterns complete the before-landing check no later than 2 miles from the threshold. The P\* may perform these procedures earlier. If the P\* does perform the before-landing procedure early, maintain airspeed at  $V_{REF} + 30$  KIAS as minimum until turning base leg.

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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.

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**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. Drag management is a key tool in the performance of an efficient traffic pattern or approach. Drag management techniques coupled with power settings for desired speeds and rates of descent will greatly enhance the quality of the maneuver and decrease P\* workload.

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

**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\*.

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e. Final. Turn final so as to complete the turn at, or above, 500 feet AGL. When established on final approach, select flaps (task the P to move the flap switch to the desired setting), as required, to reduce airspeed gradually so as to arrive at about  $V_{REF} + 10$  on mid-final. The landing check may be performed at anytime once the propellers are placed to HIGH RPM. From about mid-final to the threshold, the P\* should stabilize the approach by setting landing flaps (call for P action). Set landing trim and adjust power, as required, to maintain  $V_{REF} + 10$  until such time it is necessary to reduce power to arrive at  $V_{REF}$  (plus one-half the wind gust speed) at about 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 touch-down. After touchdown, gently lower the nose-wheel to the runway and use brakes, beta, propeller reversing, or ground fine, as necessary, to slow the aircraft. Maintain directional control during the landing roll with rudders/nose-wheel steering.

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**Note.** A common mistake is to use the aiming point marking located about 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; however, during a normal roundout, the aircraft will touchdown beyond the marking and is acceptable. Do not ‘duck under’ the approach angle at the last minute to try and touchdown on the marker and destabilize the approach.

**Note.** When landing on a precision approach instrumented runway, the 3-degree descent angle is to the aiming markers. The  $V_{REF}$  position at 50 feet will be approximately over the runway threshold. If landing on an unmarked runway or landing strip, the  $V_{REF}$  point will occur before 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, WT, winds, and runway length.

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**CROSSWIND CONSIDERATIONS:** During crosswind conditions, use the crab-into-the-wind method to correct for drift on all legs of the traffic pattern until short 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. Power will be required to resume a normal descent. During the after-landing roll, use

normal rudder or nose-wheel steering for directional control and position ailerons, as required, to correct for crosswind effect.

**NIGHT CONSIDERATIONS:** Normal approach and landing techniques are used at night. However, the addition of a slight amount of power is recommended to reduce the rate of descent and maintain minimum flying speed until touchdown. This is especially essential during dark field landings when the ground surface is not visible. When haze or smoke lowers visibility, the range of the landing light may be insufficient to see obstructions in time to avoid them. The VASI, 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 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.

**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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

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

**TASK 1148****Perform Fuel Management Procedures**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, under VMC, IMC, or simulated IMC.

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

1. Verify that the required amount of fuel is on board at the time of takeoff.
2. Correctly perform an inflight fuel consumption check after level-off or entry into mission profile.
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. As part of the cruise CL, 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 when he or she initiates the fuel check and the results of the check when completed.
  - b. The P\* will acknowledge the results of all fuel checks.

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*Note.* If the aircraft is equipped with a component that allows fuel calculations, such as a FMS or KLN-90B, it may be used provided fuel load and fuel flow are verified.

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2. Procedures.
  - a. Before-takeoff fuel check. The P\* 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.
  - b. Initial airborne fuel reading. After aircraft has leveled off or entered mission profile and appropriate power settings are obtained from chapter 7 of the operator's manual, the P will note the total fuel quantity and fuel flow.
  - c. Fuel consumption check. As part of the cruise check, after performing initial airborne fuel reading the P will determine the flight time remaining based on fuel remaining versus what is required for loiter time (Guardrail), to reach destination, alternate destination and have a fuel reserve available. He or she will determine if the remaining fuel is sufficient to complete the flight with the required reserve. If the fuel quantity is outside of planned parameters, the P will advise the P\* and the crew will determine an alternate course of action if necessary.
  - d. Fuel quantity and consumption. The P will periodically monitor the fuel quantity and consumption rate. If fuel quantity/flow indicates a deviation from computed values, the P will repeat the fuel consumption check to determine if fuel is adequate to complete the flight.
  - e. Perform cross-feed operation. During single engine operations, the P\* will set appropriate cross-feed controls or call for P action to equalize fuel quantities IAW the aircraft operator's manual.

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

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references, KLN-90B, applicable flight manual supplement, and operator's manual.

## TASK 1177

### Perform Go-Around

**CONDITIONS:** In a RC-12 series airplane or in an approved FS.

**STANDARDS:** Appropriate common standards and perform the 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.

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

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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° 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 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 PROP RPM TO 1900 D/H”**
- (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 1900, when directed by the P\* and state, **“PROPS SET 1900” D/H**.
- (6) Read go-around CL when P\* directs.
- (7) Advise ATC of the go-around/missed approach and intentions, if applicable.

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

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**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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

**REFERENCES:** Appropriate common references.

**TASK 1179****Perform Balked Landing**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, with flaps beyond approach, gear down 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  $V_{REF} + 10$  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 segments:

(1) The first segment is the MAX 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 100 KIAS **D/H** or  $V_{REF}$  **K/N/P/X**. 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 segment begins when clear of all obstacles. At this point, the pitch is lowered to begin a normal acceleration and climb. Where the full flaps were high lift devices during the initial climb, they start becoming drag devices when the aircraft tries to accelerate. When the flaps are retracted to APPROACH, lift decreases and stall speed increases. To offset this, allow the aircraft to accelerate to full flaps  $V_{REF} + 10$  KIAS before retracting the flaps to APPROACH. 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 segment, it creates parasitic drag during the acceleration segment, 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 **“SET POWER”**.

(2) The P\* will adjust the pitch attitude to maintain 100 KIAS **D/H** or  $V_{REF}$  **K/N/P/X** 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 full flaps  $V_{REF}$  plus 10 KIAS (110 KIAS **D/H**).

(5) Retract the landing gear (left seat crewmember) on the P's **“POSITIVE RATE”** callout.

(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 PROP RPM TO 1900”** **D/H**.

(9) Call for the Go-Around CL.

c. The P will—

- (1) Set MAX allowable power when directed and respond **“POWER SET”**.
- (2) State **“110 KIAS”** **D/H** or **“V<sub>REF</sub> PLUS 10”** **K/N/P/X** 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<sub>YSE</sub>, select the flaps to the UP position when directed by the P\* and state **“FLAPS UP”**.
- (6) Set propeller RPM to 1900, when directed by the P\* and state, **“PROPS SET 1900.”** **D/H**
- (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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

**REFERENCES:** Appropriate common references, Super King Air B200 pilot’s operating handbook (POH) and FAA approved Airplane Flight Manual, FAR Part 23, Section 23.77, CAE Simuflite King Air 350 Handbook, AR 95-1, AIM, flight information handbook (FIH) operator’s manual/CL, and DOD FLIP.

## TASK 1182

### Perform Radio Communications Procedures

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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.

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

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

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



**TASK 1200****Perform Instrument Takeoff**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, under IMC or simulated IMC.

**STANDARDS:** Appropriate common standards and these additions/modifications:

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

**DESCRIPTION:**

1. Crew actions.
  - a. The 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.

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*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. Procedure. 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.

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*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 7 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 7-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 attitude to obtain 10 to 12 degrees. 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. 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.

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*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.

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.

**TASK 1210****Perform Holding Procedures**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, IMC, or simulated IMC.

**STANDARDS:** Appropriate common standards and these 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.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.

## TASK 1212

### Perform Enhanced Ground Proximity Warning System-Terrain Avoidance Warning System Operations

**CONDITIONS:** In a RC-12 series airplane or in an approved FS equipped with ground proximity altitude advisory system (GPAAS)/ground proximity warning system (GPWS), enhanced ground proximity warning system (EGPWS), and/or terrain awareness and warning system (TAWS), under 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.
4. Use correct terrain avoidance phraseology.

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

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#### DESCRIPTION:

Crew actions.

1. 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.
2. 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 WX 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.
3. 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.
4. 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.
5. 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.
6. The terrain awareness and display (TAD) function should be inhibited by selecting the TERRAIN INHIBIT switch when:
  - a. 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.)
  - b. The flight management system (FMS), or other long-range navigation system providing position information to the TAWS, is in the dead reckoning (DR) mode (if applicable).
  - c. Conducting repetitive day closed traffic/traffic pattern operations.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common reference and equipment operating handbook (instructions) Allied Signal document #060-4267-000.

## TASK 1215

### Perform Precision Approach

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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: full flaps  $V_{REF} + 20$  ( $\pm 10$ ) KIAS final approach descent inbound.
4. For an ILS approach, remain within full-scale deflection of course deviation indicators (CDI). On final approach, maintain glide slope indicator within a full-scale deflection.
6. During precision approach radar (PAR) approaches, maintain headings  $\pm 5$  degrees and make immediate heading and altitude corrections as issued by ATC.
7. Comply with the decision altitude (DA)/decision height (DH)/PAR minimums prescribed for the approach.
8. Execute correct missed approach procedure immediately upon reaching DA/DH if a landing cannot be accomplished.

#### WARNING

**If flaps are selected beyond approach prior to being landing assured, the P\* must be prepared to direct the P to retract the flaps to approach in the event of an engine failure.**

#### 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 WX, 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. Standard items to review include type of approach, final approach course, DA/DH, 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. During refresher or qualification training, 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) Glide slope intercept altitude.
    - (3) Decision height.
    - (4) The initial missed approach climb, including heading/course, and altitude.

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

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**Note.** For the **D** when the FD mode controller and AP power switches are mounted on the left side, the P\* will engage the desired functions.

**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) Airspeed. 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 approximately two miles from the final approach fix. 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) Visual. During the final approach descent, if the P determines the P\* can complete the approach to landing visually (chapter 6), the P will report, **“RUNWAY IN SIGHT, 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. If the flaps have not already been selected to full down, task the P to set **“FULL FLAPS”** 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) Missed approach. If the runway environment is not in sight by DA/DH, the P will report, **“MISSED APPROACH.”** The P\* will initiate a go-around/missed approach.

b. Single-engine considerations.

(1) If an engine fails under IMC or simulated IMC, the P\* must continue to fly the approach while managing the emergency. 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.

#### TRAINING AND EVALUATION REQUIREMENTS:

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

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

## TASK 1220

### Perform Non-Precision Approach

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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 descent inbound.
3. Maintain a speed of: full flaps  $V_{REF} + 20$  ( $\pm 10$ ) KIAS final approach descent inbound.
4. Maintain prescribed courses as follows:
  - a. Non-directional radio beacon (NDB) courses  $\pm 5$  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  $\pm 5$  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  $\pm 5$  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.

**WARNING**

**If flaps are selected beyond approach prior to being landing assured, the P\* must be prepared to direct the P to retract the flaps to approach in the event of an engine failure.**

**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 WX, 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. 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.

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**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.

- (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 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 full flaps  $V_{REF} + 20$  KIAS no later than final approach descent.
  - (a) Visual. During the final approach descent, if the P determines the P\* can complete the approach to landing visually (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. If the flaps have not already been selected full down, the P\* will task the P to set **"FULL FLAPS"** 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.

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

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- (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 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. If a visual descent point is not published, an acceptable method for determining a VDP is as follows:
  - (a) MAP based on time: Inbound Time – (height above touchdown [HAT] x 10%)

**Example**

Inbound time for the approach is 2:20 (2 minutes, 20 seconds).  
HAT is 600 feet. (HAT x 10%) = :60 (sixty seconds).  
Adjusted inbound time is 1:20 (2:20 - :60).  
VDP will be reached when the elapsed time is 1:20.

(b) MAP is based on DME: DME at approach end  $\pm$  (HAT  $\div$  300)

**Example**

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

HAT is 600 feet (HAT  $\div$  300) = 2 NM  
Adjusted DME is 3.6 NM (1.6 + 2)  
VDP will be reached when the DME readout is 3.6 NM

b. Single engine considerations.

- (1) In the event of an engine failure under IMC or simulated IMC, the P\* must continue to fly the approach while managing the emergency. The P must assist the P\* with the appropriate crew 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.

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*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, WX conditions, and aircraft performance. If the aircraft will not maintain altitude at  $V_{YSE}$  while circling to land, retract the landing gear and, if required, also retract the flaps. However, once this is done, the entire check must be repeated prior to the landing.

*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 no later than 2 miles from the runway threshold.

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

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

**TASK 1240****Perform Missed Approach**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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  $\pm 5$  degrees.

**WARNING**

**If flaps are selected beyond approach prior to being landing assured, the P\* must be prepared to direct the P to retract the flaps to approach in the event of an engine failure.**

**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.

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*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. Procedure. A missed approach is a go-around with a published or ATC directed procedure to follow. When a missed approach is necessary, perform the 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 “**MISSED APPROACH, SET POWER**”. If performing a coupled approach disconnects the AP using the AP disconnect (DISC) button or by depressing the go-around button on the left power lever, no later than MAP or DA/DH.
    - (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, as instructed by ATC at or above circling minimums.
    - (5) Re-engage the FD and AP (if desired) above 400 feet AGL. 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\*, “DA/DH” or “TIMES UP”, “MISSED APPROACH.”
    - (2) Set MAX allowable power when directed by the P\*.
    - (3) After observing two positive climb indications, call “POSITIVE RATE”.

- (4) 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.
- (5) 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 procedure, and verify with the CL.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.

**TASK 1245****Perform Unusual Attitude Recovery**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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 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 is low and 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 is fast and increasing:
    - (1) Smoothly reduce power as required.
    - (2) Level the wings.
    - (3) Adjust the pitch up to the horizon.
    - (4) Adjust power to maintain desired airspeed and altitude.
    - (5) Cross-check the slip indicator.
    - (6) Trim the aircraft for normal flight.

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

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.

**TASK 1253****Perform Autopilot/Flight Director Operations**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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.

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**Note.** For those systems with an altitude preselector, 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 FEET SELECTED, AND ARMED**”). The P\* will confirm the new altitude setting: “**CONFIRM ONE ZERO THOUSAND FEET**”.

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

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

## TASK 1254

### Perform Instrument Flight Rules Navigation

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, using the FMS, INS, GPS, VOR, TACAN, or NDB under VMC, IMC, or simulated IMC.

**STANDARDS:** Appropriate common standards and these additions/modifications:

1. Correctly program WPTs into the FMS, INS, 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. Equipment check. Check or have the P check all radio navigational equipment to be used during the mission. Equipment must be operable and within accuracy tolerances, if applicable, as specified in FM 3-04.240, AIM, the aircraft operator's manual or equipment manufacturer's TM.
  - b. 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.
  - c. 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.
  - d. Course interception. After identifying the desired station, determine the location of the aircraft in relation to the desired course. Turn 45 degrees toward the course (90 degrees to expedite), 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.
  - e. 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.
  - f. Intersection arrival. Determine arrival at radio intersections IAW procedures in FM 3-04.240.
  - g. 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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

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



**TASK 1260****Operate Weather Avoidance System(s)**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, under VMC, IMC, or simulated IMC with WX avoidance systems.

**STANDARDS:**

1. Correctly test and operate the airborne WX 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 WX detection, echo interpretation, and hazardous WX avoidance actions.

**DESCRIPTION:**

1. Crew actions.
  - a. The crew will test WX 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 WX radar, echo interpretation, and hazardous WX avoidance is the PC's responsibility.
  - c. The operation of the lightning sensor, interpretation, and hazardous WX avoidance are the PC's responsibility.
2. Procedure.
  - a. Ground operation. The P will ground test all WX avoidance system(s) IAW the operator's manual for satisfactory performance. The P will advise the P\* should any WX 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 WX 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. Override the receiver transmitter antenna (RTA) ground safety circuitry N/P/X 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 WX 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 WX avoidance equipment to maintain effective WX depiction and keep the P\* advised of changes. The crew will advise ATC of required or desired changes to routing for WX avoidance.
  - c. En route procedure.
    - (1) The P will adjust the WX avoidance system(s) to maximize "early" detection of WX hazards for planning avoidance maneuvers as required. The crew will use all resources available; (for example: center WX advisory, flight watch, air route traffic control center [ARTCC] advisories, hazardous in-flight WX service [HIWAS], and pilot WX reports [PIREPs] to supplement WX avoidance displays). Crew will advise ATC of required/desired changes to routing for WX avoidance.
    - (2) Once established in level flight, adjust WX 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  $\pm 1$  degree equates to moving the beam center  $\pm 1,000$  feet per 10 nautical miles [nm]).

## d. Arrival/approach procedure.

(1) The P will adjust the WX avoidance equipment, as required, to maintain the most accurate WX 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 WX 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. RC-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). RC-12N/P/X series aircraft are configured with an integrated WX radar/lightning sensor controller and dual electronic flight instrument system (EFIS) display indicators. RC-12D/H/K series aircraft may have independent WX radar and storm scope controllers and display indicators. Most RC-12 series WX radar features include:

(1) Range–Range selection from 5 to 300 nm full scale (240 nm full scale RC-12D/H). If FPLN mode is available, increased ranges of 500 to 1,000 nm may be selected.

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**Note.** WX 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 WX radar platform acts independently of the aircraft attitude source reference.

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

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

(10) Sector (SCT/SECT)—Selects either the normal 14 looks/minute 120-degree sector scan, or the faster update 28 looks/minute 60-degree sector scan.

b. RC-12 series airborne WX 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 WX penetration device.

*Note.* WX 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 WX precipitation types lack the size required to “bounce back” accurate WX 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 WX 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 RC-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. RC-12 series lightning sensor systems provide bearing and intensity information within a 100-nm range at 360 degrees. Refer to aircraft operator’s manual for target rate intensity indications. Providing supplementary information to airborne WX radar, the lightning sensor can assist flight crews in the detection and avoidance of hazardous WX systems. It is not a WX penetration device.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references, equipment manufacturer's instruction booklet, aircraft operator's manual, and FAA Advisory Circulars AC 00-24B and AC 20-68B.

## TASK 1261

### Perform Circling Approach

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, under VMC.

**STANDARDS:** Appropriate common standards and these 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. Avoid descent below the appropriate circling MDA.
4. Maneuver the airplane, after reaching the authorized circling approach altitude at the appropriate point, by visual references to maintain a flight path that permits a normal landing on the active runway.
5. The angle of bank should not exceed 30 degrees.
6. Maintain the desired altitude  $-0, +100$  feet.
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. Procedure.
  - 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. Maneuver the shortest path to the base or downwind, as appropriate, considering existing WX conditions. There are no restrictions from passing over the airport or other runways.

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**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.

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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.

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

**TRAINING AND EVALUATION REQUIREMENTS:**

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

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

## TASK 1264

### Perform Global Position System Approach

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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 required check(s) prior to final descent inbound.
3. Do not descend passing the final approach WPT (FAWP) unless the GPS is in approach/active mode.
4. Maintain  $V_{REF} + 20, \pm 10$  KIAS final approach descent inbound.
5. Maintain prescribed course within full-scale deflection (when in the navigation mode), using the course indicator, or  $\pm 5$  degrees using the RMI.
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 MAWP if a landing cannot be accomplished, or if RAIM is lost during the approach procedure.

#### WARNING

**If flaps are selected beyond approach prior to being landing assured, the P\* must be prepared to direct the P to retract the flaps to approach in the event of an engine failure.**

#### 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. The P will obtain WX, winds, current altimeter, active runway and remarks from ATIS, ASOS/AWOS or ATC, as appropriate, before commencing the approach 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.

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*Note.* Vertical descent profile guidance provided by an approved FMS is required to utilize lateral navigation (LNAV)/vertical navigation (VNAV) 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 WPT (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) Final approach fix (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.

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*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 approach, the P\* may complete the before-landing check and slow to full flaps  $V_{REF} + 20$  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 FAWP.
    - (a) Visual. During the final approach descent, if the P determines the P\* can complete the approach to landing visually (chapter 6), the P will report, **"RUNWAY IN SIGHT, 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). If the flaps have not already been selected full down, The P\* will task the P **"FULL FLAPS,"** 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.

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

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- (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. If a visual descent point is not published, an acceptable method for determining a VDP is as follows:

- (a) MAP based on time: Inbound Time – (height above touchdown [HAT] x 10%)

**Example**

Inbound time for the approach is 2:20.

HAT is 600 feet. (HAT x 10%) = :60 (sixty seconds).

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

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

- (b) MAP is based on DME: DME at approach end ± (HAT ÷ 300).

**Example**

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

HAT is 600 ft. (HAT ÷ 300) = 2 NM.

Adjusted DME is 3.6 NM (1.6 + 2).

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

- b. Single-engine considerations.

- (1) In the event of an engine failure under IMC or simulated IMC, the P\* must continue to fly the approach while managing the emergency. The P must assist the P\* with the appropriate crew callouts and emergency actions.
- (2) If a missed approach is executed, comply with Task 1320 while complying with the published missed-approach procedure or ATC instructions.

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*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, WX 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.

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

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

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*Note.* Units performing GPS approaches will evaluate GPS approach procedures during RL progression and APART evaluations.

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**REFERENCES:** Appropriate common references, manufacturer's equipment operating handbook



**TASK 1265****Perform Traffic Alert and Collision Avoidance System Operations**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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 120-55B: "[CALL SIGN] TCAS CLIMB/DESCENT." For example, if the crew of Sunny 12 experienced the following resolution advisory (RA), "CLIMB, CLIMB, CLIMB," they would report to ATC as soon as possible as follows: "APPROACH/CENTER, SUNNY 12 TCAS CLIMB."
  - 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 1h (above) and AC 120-55C.
4. TCAS Event Phraseology. IAW AC 120-55C.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references, , FAA Advisory Circular 120-55C, Title 14 CFR Part 91.221, and 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 an RC-12 series airplane or in an approved FS under VMC with an IP.

**STANDARDS:** Appropriate common standards and these 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 RC-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\*.

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**Note.** As an aid to recovery practice, do not use nose up trim below 100 KIAS **D/H** or 110 KIAS **K/N/P/X**.

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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 release back pressure 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 20%. Maintain heading and altitude. Observe up trim limits.
    - (4) At the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet), simultaneously apply power and release the elevator back pressure 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 20 percent. 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) simultaneously apply power and release the elevator back pressure sufficiently to obtain a level flight attitude for a level recovery. Once the aircraft is level with increasing airspeed, 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 100 percent when airspeed permits.
  - (4) Set TQ to approximately 20 percent. Maintain heading and altitude. Observe up trim limits.
  - (5) At the first indication of an approaching stall (stall horn, lack of control responsiveness, buffet), perform the following procedures:
    - (c) (a) P\* applies MAX available power and tasks the P to “**SET POWER**”.
    - (d) (b) Release sufficient elevator back pressure and simultaneous apply power as necessary to recover the aircraft then adjust elevator to achieve a normal climb attitude (approximately 5 to 7 degrees).
    - (e) (c) Accelerate a minimum of 10 KIAS above the pre-stall warning indication, and then direct P to “**SET FLAPS APPROACH**”.
    - (f) (d) Left seat pilot will retract the landing gear on the P’s “**POSITIVE RATE**” callout.
    - (g) (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.

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*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.

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#### **TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references, 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 RC-12 series airplane with an IP/IE, VMC, simulated IMC, or in an approved FS.

**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  $\pm 10$  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 will set zero thrust at the appropriate time, if applicable. The IP will complete the required checks or procedures pertaining to the P's crew station. The IP will also read the CL and perform all designated P actions and crew callouts per chapter 6, and those actions requested by the P\*.

*Note.* Zero thrust is propeller at the feather detent – power lever idle **K/N/P/X** series. TQ 8% to 12% **D/H** series.

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.

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**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.

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- b. The P\* will—
- (1) Disconnect the AP with the yoke AP disconnect (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: **“I AGREE, 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.

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*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.

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**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 the FS.
2. Evaluation will be conducted in the aircraft or in the FS.

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

## TASK 1315

### Perform Single-Engine Landing

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*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.

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**CONDITIONS:** In a RC-12 series airplane or in an approved FS, 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 speed in excess of the mean wind speed  $\pm 5$  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 speed in excess of the mean wind speed  $\pm 5$  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 9000 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. The IP should 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, "**CHECK COMPLETE.**" when the last item is verified. Plan for a normal approach, allowing for sufficient time on final so minor alignment, speed, and altitude corrections can be accomplished without excessive low-altitude maneuvering. Turn final and complete the turn at or above 500 feet 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 speed in excess of the mean wind speed at approximately 50 feet above the landing area. (A go-around should not be attempted after flaps are extended beyond approach below 400 feet.)
  - b. Reduce airspeed so as to be at  $V_{REF}$  plus one-half the wind gust speed in excess of the mean wind speed 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.

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*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.

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**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, 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 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 the FS.
2. Evaluation will be conducted academically, in the aircraft or in the 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, and the airplane is below 400 feet AGL. This does not mean that flaps are limited to approach until short final. It does means the P\* has committed himself to landing.**

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*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.

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**CONDITIONS:** In a RC-12 series airplane, with an IP, VMC or in an approved FS.

#### STANDARDS:

1. Perform single-engine go-around IAW the operator's manual.
2. Make the decision to go-around at the appropriate altitude for the flaps selection.
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, WX, 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 and in the landing configuration, RC-12's normally often cannot 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**” at  $V_{YSE}$  or above.
    - (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 the FS.
2. Evaluation will be conducted academically, in the aircraft or in the 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 RC-12 D/H aircraft and simulated engine failures will not be initiated below  $V_{sse}$ .

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*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.

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**CONDITIONS:** In a RC-12 D/H series airplane or in an approved FS, with an IP, VMC, and a non-contaminated runway (Contaminated runway as defined by the Aeronautical Information Manual).

**STANDARDS:** Appropriate common standards and these 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 will initiate the engine failure above  $V_{sse}$ . The IP should not simulate an inoperative autofeather until a safe altitude and  $V_{sse}$  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\*.

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*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.

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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.

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**Note.** If an engine fails at or immediately after liftoff, climb to 50 feet may be critical. Positive pilot actions will be required to maintain aircraft control. The distance required to attain 50 feet 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 DID FEATHER?**” All RC-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: “**I AGREE, 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 LIFTOFF 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<sub>2</sub> IS \_\_\_”** (for the flap setting).
  - (f) Retract the flaps at V<sub>YSE</sub> (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<sub>YSE</sub>. Any additional airspeed above V<sub>YSE</sub> 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<sub>YSE</sub>. 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.

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*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. The IP will advance the power lever to establish zero thrust as soon as practical (8 to 12 percent TQ).

*Note.* For training in the airplane, the V<sub>2</sub> 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.

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**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<sub>1</sub> or after lift-off below V<sub>SSC</sub> flight continued, task must be trained and evaluated in the FS.
2. Engine failure airborne after obtaining V<sub>SSC</sub>, task may be trained and evaluated in the aircraft or in the FS.

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

**TASK 1330****Perform Emergency Procedures for Engine Failure after  $V_1$** **WARNING**

**Before performing this task, the crew will verify that there is a minimum of positive 0.5% climb gradient in first segment for training.**

*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, this maneuver will not be performed.

*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 RC-12, K, N, P, X series airplane or in an approved FS, with an IP, under day 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 positive aircraft control.
2. Confirm the failed engine's propeller feathered.
3. Maintain up to a 5-degree bank angle into the operating engine (ball one-half off center).
4. Obtain or maintain  $V_2$ , +5, -0 KIAS until 400 feet AGL.
5. Accelerate to  $V_{ENR} \pm 5$  KIAS after 400 feet AGL.
6. Complete and verify the procedure with the CL after obtaining  $V_{ENR}$ .

**DESCRIPTION:**

1. Crew actions.
  - a. The crew will discuss takeoff abort criteria and crew responsibilities during the departure brief.
  - b. The crew will review the TOLD card and determine the course of action in the event of an engine failure after  $V_1$ .
  - c. The IP will initiate the engine failure, complete the required checks, procedures, and callouts pertaining to the P's crew duties, read the CL, and perform those actions requested by the P\*.
2. Procedure. The P\*, assisted by the P, will perform a normal takeoff using standard callouts until the engine failure is initiated then the crew will perform the actions described below:

*Note.* The engine failure after  $V_1$  procedure applies from  $V_1$  to 400 feet AGL. Consult chapter 7 of the operator's manual for performance profiles and data.

- a. Discussion. The most critical point to lose an engine is at  $V_1$ . This is a decision point for the crew. Do they abort the takeoff and stop or continue the takeoff? One of the criteria to continue the takeoff has been met by obtaining  $V_1$ . 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.
- b. Engine failure after  $V_1$ .
  - (1) The IP will—

- (a) Initiate the simulated engine failure after making the  $V_1$  callout and the P has transferred both hands to the yoke.
  - (b) Simultaneously, bring the power lever to idle and the propeller to the feather detent (The simulated engine failure will be with autofeather if still on the runway.)
  - (c) Announce **“SIMULATED ENGINE FAILURE”** when the simulated engine failure is given.
- (2) The P\* will—
- (a) Attempt to maintain centerline with rudder and apply aileron in the opposite direction of drift caused by the engine failure.
  - (b) When the P calls **“ROTATE,”** smoothly raise the nose of the aircraft to a pitch attitude of 7 degrees (IAW chapter 9 of the operator’s manual). The RC-12X PFD pitch attitude reference of 5 degrees should be approximately 7 degrees actual aircraft attitude.
  - (c) Apply aileron and rudder, as necessary, to maintain heading and ground track during lift-off. If this is done correctly, the aircraft will be in trim for single-engine climb (up to 5-degree bank angle into the operating engine and ball one-half off center). Do not pull the airplane off the ground abruptly or a TQ roll will result.
  - (d) At the **“POSITIVE RATE,”** callout, retract the gear (left seat crewmember).
  - (e) Accelerate to and climb at  $V_2$  for the aircraft configuration.
  - (f) Identify the failed engine and verify with the P. **“CONFIRM NUMBER ONE (OR TWO) ENGINE HAS FAILED.”**
  - (g) 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: **“I AGREE, FEATHER THE PROP’ or ‘NEGATIVE, RE-IDENTIFY THE NUMBER \_\_ PROP.”**
  - (h) Transfer power control back from the P by stating, **“MY POWER”** or P stating, **“YOUR POWER”** at 400 feet AGL.
  - (i) Level the aircraft with pitch and accelerate to  $V_{ENR}$ .
  - (j) Upon reaching  $V_{ENR}$  direct the P **“FLAPS UP,”** if extended. Reduce power to MAX CONT.
  - (k) Continue climb out at  $V_{ENR}$ . When time and altitude permit, complete the engine failure after  $V_1$  CL.
- (3) The P will—
- (a) Call **“ $V_1$ ”** and **“ROTATE”** at  $V_R$ .
  - (b) Call **“Positive rate”** when two climb indications are observed.
  - (c) Verify for the P\*, **“I CONFIRM NUMBER \_\_ HAS FAILED’** or **‘NEGATIVE, THE \_\_ (opposite) ENGINE HAS FAILED.’** In addition state: **“YES, THE NUMBER ONE/TWO PROPELLER HAS FEATHERED’** or **‘NO, IT DID NOT FEATHER.’** If an actual engine fails, the autofeather system should feather the propeller in less than 10 seconds. Visual identification is easy if one propeller is stationary.
  - (d) Manually feather the failed engine’s propeller when the P\* directs and state **“PROP FEATHERED.”**
  - (e) Transfer power control to P\* by stating **“YOUR POWER”** at 400 feet AGL.
  - (f) Retract the flaps at  $V_{ENR}$  (if used) when directed by the P\* and state, **“FLAPS UP”** when the switch is moved.
  - (g) Read the CL when asked by the P\*.
  - (h) Inform ATC of the emergency and intentions.
- c. The IP may initiate a simulated engine failure after the aircraft is airborne and above  $V_{sse}$ . The P\* will adjust pitch to achieve  $V_2$  appropriate to the flap setting.



*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.

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**NIGHT CONSIDERATIONS:** Engine failure after  $V_1$  (prior to lift-off) is a day VFR task only.

**TRAINING AND EVALUATION REQUIREMENTS:**

1. Engine failure after obtaining  $V_1$ : Task to be trained and evaluated in the aircraft or in the FS.
2. Engine failure below  $V_{sse}$ : Task to be trained and evaluated in the aircraft or in the 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 RC-12 series airplane, with an IP, VMC or simulated IMC, or in an approved FS.

**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. Procedure. The P\*, assisted by the P, will perform the following actions:
  - a. Long final. Long final is defined, as where the remaining distance from the runway threshold is of sufficient length to permit a complete engine failure procedure (for example, feathering the propeller). Continue the approach to landing, maintaining aircraft control and computed approach speed. The distance from the runway to the point where the engine fails will determine the extent of the corrective procedures to be applied. When an engine fails on final, immediately apply sufficient power to prevent the airspeed from decreasing; simultaneously coordinate pitch, rudder and aileron to maintain runway alignment and approach angle. If the autofeather did not feather the propeller, direct the P to identify the correct propeller. When the P\* confirms the correct propeller has been identified, command the P to feather it using callouts IAW chapter 6. Once the drag is removed, the aircraft will start accelerating. It will be necessary to reduce power slightly to maintain approach airspeed. Complete the landing, crossing the threshold in normal descent and airspeed profile. If distance remaining (short final) is minimal, time may not allow verification that the propeller feathered.
    - (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: “**I AGREE, 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. Short final is defined as where the remaining distance from the runway threshold is too short to permit verifying and performing a manual prop feathering operation. 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.

---

*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  $V_{YSE}$  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 speed in excess of the mean wind speed 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, when available, is the most accurate and reliable means of approach angle indications and will be used to maintain a safe glide path. If VASI is not available, the obstruction lights and the threshold lights should be used to establish a sight picture during the approach. The apparent distance between runway lights can also be used as an aid in establishing the flare-out point.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.

**TASK 1340****Perform Emergency Landing Gear Extension**

**CONDITIONS:** In a RC-12 series airplane or in an approved FS with an IP, VMC (day only) 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 P\*'s main focus will be inside the aircraft since the extension handle is located on the P\*'s 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.

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**TRAINING AND EVALUATION REQUIREMENTS:**

1. Training will be conducted academically, in the aircraft or in the FS.
2. Evaluation will be conducted academically, in the aircraft or in the 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 ( $V_{mcg}$ ) limits may be exceeded causing loss of control.

#### WARNING

If premission planning indicates a negative first segment climb gradient, take-off distance + landing distance over a 50 foot obstacle + 2000 feet of runway distance is recommended for an aborted takeoff due to an engine failure. In the event of an engine failure with these conditions met and prior to gear handle movement, the P\* should take control of the power levers, reduce power and land the aircraft on the remaining runway available.

**CONDITIONS:** In a RC-12 series airplane or in an approved FS 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. 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. IPs 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 capability 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 the FS.
- 2. Evaluation will be conducted academically, in the aircraft, or in the FS.

**REFERENCES:** Appropriate common references.

## TASK 1800

### Perform After-Landing Tasks

**CONDITIONS:** In a RC-12 series airplane or in an approved FS 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.

**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.

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

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.



## TASK 2425

### Operate Aircraft Survivability Equipment

**CONDITIONS:** In a RC-12 series airplane equipped with ASE in a simulated threat environment or in a classroom environment.

**STANDARDS:** Appropriate common standards and these additions/modifications:

1. Correctly prepare the equipment for operation.
2. Without error, perform a self-test check, if required.
3. Without delay, identify the threat from the visual display/audio warning.
4. Properly operate the equipment.

**DESCRIPTION:** The crew will perform/simulate operational and employment procedures/precautions for all ASE installed in the aircraft. Procedures include preflight inspection, turn-on, self-test, and operational checks; mission employment doctrine and operating procedures; partial-failure alternatives; indications and/or signal interpretations; and shutdown procedures.

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*Note.* Because of its security classification, this task is not fully described.

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#### TRAINING AND EVALUATION REQUIREMENTS:

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

**REFERENCES:** Appropriate common references, aircraft operator's manual, current threat information, TM 9-1095-206-12&P, TM 11-5841-283-12, TM 11-5865-200-12, TM 11-5865-202-12, TM 11-5865-229-12, TM 11-5865-263-12, TM 11-5895-1199-12, and unit SOP.

## TASK 2432

### Perform Improved Guardrail/Guardrail Common Sensor Minus Mission

**CONDITIONS:** In a RC-12D/H series airplane, under VMC, IMC, or simulated IMC.

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

1. Correctly plan the mission profile.
2. Correctly perform the mission profile.

#### DESCRIPTION:

1. Crew actions. The crew will identify the required mission equipment and coordinate mission planning so that each crew member is acutely aware of his mission duties. The crew should know and understand the factors requiring the mission to be aborted.
2. Procedures.
  - a. Preflight. The crew will plan the flight to and from the mission area. As a minimum, they will:
    - (1) Determine WX conditions en route and in the operational area, evaluating the effects of the WX on the mission.
    - (2) Review ground-controlled intercept (GCI) call signs and frequencies.
    - (3) Review recall procedures, if appropriate.
    - (4) Confirm the mission equipment configuration.
    - (5) Obtain appropriate transponder/IFF procedures.
  - b. During flight. The crew will perform the following actions:
    - (1) The P will make the appropriate radio calls to ATC, IPF and GCI.
    - (2) The P\* will fly the mission profile at the appropriate airspeed and altitude.
    - (3) The P will monitor and update the INS when appropriate.
    - (4) The P\* will monitor aircraft survivability equipment and respond appropriately if a threat occurs.

---

*Note.* Because of its security classification, this task is not fully described. A full description of the mission is found in the appropriate Army manuals and unit SOP.

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#### TRAINING AND EVALUATION REQUIREMENTS:

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

**REFERENCES:** Appropriate common references, classified references (MI units) and unit SOP.

**TASK 2440****Perform Flat Turns**

**CONDITIONS:** In a RC-12 series airplane, under VMC, IMC, day or night.

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

1. Recognize the mission event requiring a flat turn.
2. Correctly execute the flat turn.
3. Angle of bank 3 degrees MAX.
4. MAX of 5 degrees pitch attitude for communications intelligence (COMINT).

**DESCRIPTION:**

1. Select ATT 3 for attitude source **N/P**.
2. Disengage yaw damp for initial entry into the maneuver. Yaw damp is required for flight above 17,000 feet MSL.
3. From straight and level flight at 130 to 140 KIAS, initiate the turn by turning the rudder trim knob in the desired direction of turn (or call for P action). Maintain the wings level with aileron, trimming the control forces to neutral with the aileron trim knob.
4. Once the turn is established (see timing parameters below), have the P turn on the AP and press ALT on the FD. Make minor adjustments to the angle of bank by using the AP turn knob and turn rate adjustments with the rudder trim knob. Small rudder trim adjustments to correct rate of turn may be made with the yaw damp engaged. If large corrections are needed, disconnect the AP and manually re-trim then reengage the AP.
5. Timing for flat turns is normally checked every 90 degrees: For example, for 10-minute flat turn, 2.5 minutes should have elapsed at the first 90-degree point. Adjust trim settings as required to either speed up or slow down the rate of turn. Check timing in the turn by elapsing 16.6 seconds for every 10 degrees of arc or 10 seconds for every 6 degrees of arc.
6. Terminate the turn on the desired heading as dictated by mission requirements.

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*Note.* If the #1 or #2 NAC LOW caution light illuminates, stop the flat turn and confirm fuel status with the fuel gauges. Continue flight in trim until the NAC LOW light extinguishes.

*Note.* Approximate rudder/aileron trim settings for flat turns are “2” increments for rudder and “4” for aileron.

*Note.* Flat turns may induce vertigo or airsickness. Aviators should exercise caution when performing flat turns, and terminate the maneuver should vertigo be encountered.

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**NIGHT CONSIDERATIONS:** Flat turns may enhance night visual illusions.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references, aircraft operator's manual, operations manual for high accuracy carousel (HAC) IV-E INS and unit SOP.

## TASK 2448

### Perform Guardrail Common Sensor Mission

**CONDITIONS:** In a RC-12K/N/P/X series airplane; under VMC, IMC, or simulated IMC.

**STANDARDS:** Appropriate common standards and these additions/modifications:

1. Correctly plan the mission profile.
2. Correctly perform the mission profile.

**DESCRIPTION:**

1. Crew actions. The crew will identify the required mission equipment, receive a mission briefing, and review crew and individual duties. The crew should know and understand the recall and abort procedures.
2. Procedure.
  - a. Preflight. The crew will plan the flight to and from the mission area. As a minimum, they will-
    - (1) Determine the WX conditions en route and in the operational area, evaluating the effects of the WX on the mission.
    - (2) Review call signs and frequencies.
    - (3) Review recall procedures, if appropriate.
    - (4) Confirm mission equipment configuration.
    - (5) Note Mode 1 and Mode 2 codes, as appropriate.
    - (6) Review the threat for the mission.
    - (7) Perform Data Transfer System procedures, as required (RC-12N/P, see Task 2472).
    - (8) Program the INS (see Task 2476).
    - (9) Pre-flight and test CMWS, as required.
    - (10) Program the HaveQuick II and/or single channel ground and air radio system (SINCGARS), as required (RC-12N/P/X, see Task 2484).
  - b. During flight. The crew will perform the following actions:
    - (1) The P will make appropriate radio calls to ATC, and appropriate mission coordinating facilities. .
    - (2) The P\* will fly the mission profile at loiter speed and assigned mission altitude.
    - (3) The P will manage the INS/FMS as required for the mission.
    - (4) The crew will monitor the aircraft survivability equipment and respond appropriately if a threat occurs.
    - (5) The P\* will coordinate with the other aircraft to synchronize the aircraft on mission track (see Task 2488) if required.
    - (6) The P will arm the auto pattern steering before reaching the initial point if required.
    - (7) The P will compute the fuel burn rate and determine on-station time and return to base time.

---

*Note.* Because of its security classification, this task is not fully descriptive of the Guardrail common sensor mission. A full description of the mission is found in appropriate Army manuals and unit SOPs.

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**NIGHT CONSIDERATIONS:** Normal night considerations.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references, classified references (MI units) and unit SOP.

## TASK 2472

### Perform Data Transfer System Procedures

**CONDITIONS:** In a RC-12N/P series aircraft, equipped with the ASE/ACS, and given the aircraft operator's manual/CL and a data cartridge.

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

1. Properly load the data cartridge into the data cartridge receptacle.
2. Load information from the data cartridge to the ASE/ACS.
3. Store data from the ASE/ACS to the data cartridge.

#### DESCRIPTION:

1. Crew actions. A crew member will obtain a data cartridge from flight operations with the COMM, NAV, ASET and SETUP DATA loaded on the cartridge for the mission to be flown.
2. Loading procedure. The crew member will perform the following actions:
  - a. Open the data cartridge receptacle door; insert the data cartridge, and secure the door.
  - b. With power applied to the aircraft and the ASE/ACS:
    - (1) Press UTIL.
    - (2) Press DATA TRANSFER (L1).
    - (3) Box the position to be filled by pressing L1 thru L5 or R4, as appropriate.
    - (4) Press LOAD (R1).

---

**Note.** The LOAD Legend is boxed and the advisory message data transfer system (DTS) LOADING is displayed while data is being loaded. If successfully loaded, the identifier of the data will be displayed after the semicolon on the first line at the bezel with the selected identifier. If the data is not successfully loaded, the advisory message DTS FAIL will be displayed.

**Note.** If an identifier has not been given to that data location, dashes will act as place holders. Only the boxed position will be loaded. The box must be moved, and R1 must be pressed for each position to be filled.

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3. Store procedure.
  - a. Press UTIL.
  - b. Press DATA TRANSFER (L1).
  - c. Box the position L1 thru L5 to be loaded.
  - d. Enter a valid identifier in the scratchpad.
  - e. Press STORE (R2).

---

**Note.** The STORE legend will be boxed and the advisory message DTS STORING will be displayed while data is being stored. The CL (R4) cannot be stored, only loaded. If a valid identifier is scratch-padded, the data will be stored with that identifier at the selected box location.

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#### TRAINING AND EVALUATION REQUIREMENTS:

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

**REFERENCES:** Appropriate common references, aircraft operator's manual, ASE/ACS operator's manual and ASE/ACS CL.

**TASK 2476****Perform Navigation with an Inertial Navigation System**

**CONDITIONS:** In a RC-12D/H/K series airplane, under VMC, IMC or simulated IMC.

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

1. Correctly operate the INS IAW the aircraft operator's manual.
2. Maintain the desired track.
3. Correctly determine the position of the aircraft along the route of flight.

**DESCRIPTION:**

1. Crew actions.
  - a. Each crew member will complete the required checks or procedures pertaining to his crew duties IAW the CL and the preflight briefing. The P\*'s main focus (inside/outside the aircraft) will vary depending on whether the aircraft is operating in VMC or IMC. He or she will announce all frequency changes, instrument settings, and any ATC information that the P does not monitor.
  - b. The P will assist by keeping the area cleared when operating in VMC, checking and tuning equipment upon request, and performing actions requested by the P\*. He or she will verify all frequency changes requested by the P\*, follow the position of the aircraft on the chart, make all the required radio transmissions, and maintain the flight log.
2. Procedure. The P\*, assisted by the P, will perform the following actions:
  - a. Secure the required flight publications for the appropriate route structure and perform INS mission planning.
  - b. Perform the INS turn-on procedure.
  - c. Perform the INS programming procedure.
  - d. Perform the INS system alignment.
  - e. Select the INS course.
  - f. Fly a selected INS course.
  - g. Select an intercept course to a destination.
  - h. Obtain readouts from the INS.
  - i. Manually update the INS.
  - j. Update the INS TACAN.
  - k. Perform shutdown procedures.

**NIGHT CONSIDERATIONS:** Normal night considerations.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references and operator's manual HAC IV-E INS.

**TASK 2478****Operate the Guardrail Aviation Mission Planning Station**

**CONDITION:** Given an IBM or compatible computer with an 80386 or higher processor with the GRAMPS installed.

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

1. Log on and log off the GRAMPS.
2. Format a DTS cartridge.
3. Retrieve, create and store MISSION data to the DTS cartridge, hard drive or floppy disk.

**DESCRIPTION:**

1. To start GRAMPS from the hard disk, perform the following:
  - a. At the "C:" prompt, type "CD\GRAMPS." The prompt "C:\GRAMPS" will appear.
  - b. Type "GRAMPS." The screen will now show the GRAMPS at the "GRAMPS CONTROL" page.
2. To format a new DTS cartridge, perform the following steps:
  - a. Load a blank DTS cartridge into the DTS receptacle.
  - b. From the GRAMPS CONTROL page, press "Shift-F1" to access the UTIL Mode.
  - c. Press "F1" for "DATA TRANSFER" page.
  - d. Press "F8" to format the cartridge. A "DTS FORMATTING" advisory message will appear for the duration of the formatting process. Once the formatting is complete, MISSION data is now ready to be created.
3. To create new MISSION data, press one of the following keys to enter one of the ASE/ACS modes:
  - a. Shift-F1 – UTIL Mode
  - b. Shift-F2 – FLIGHT Mode
  - c. Shift-F3 – ASE (T) Mode
  - d. Shift-F4 – COMMS Mode from within these pages, data can be entered throughout the GRAMPS in exactly the same manner as with using the ASE/ACS system installed in the aircraft. Because the computer monitor does not come with push-bezel buttons the following computer keys must be used to enter data (table 4-1):

**Table 4-1. ASE/ACS mode shortcut key strokes**

<b>COMPUTER</b>	<b>MULTI-FUNCTION DISPLAY (MFD)</b>	<b>COMPUTER</b>	<b>MFD</b>
F1	L1	F6	R1
F2	L2	F7	R2
F3	L3	F8	R3
F4	L4	F9	R4
F5	L5	F10	R5

4. To store new MISSION data, perform the following steps:
  - a. Press "Shift-F1" to access the Utility Mode.
  - b. Press "F1" for Data Transfer.
  - c. Press "F1" through "F5" as required selecting COMM, NAV, ASET, C/W HISTORY or SETUP data.
  - d. Press "F7" to store the selected data. A "DTS STORING" advisory message will appear for the duration of the storing process.
5. To retrieve MISSION data from the DTS cartridge, perform the following steps:
  - a. Load the DTS cartridge into the DTS receptacle.
  - b. Press "Shift-F1" to access the Utility Mode.
  - c. Press "F1" for Data Transfer.
  - d. Press "F1" through "F5" as required selecting COMM, NAV, ASET, C/W HISTORY, or SETUP data.



- e. Press “F6” to load the selected data from the DTS cartridge into the GRAMPS. A “DTS LOADING” advisory message will appear for the duration of the loading process.
6. To retrieve CL data from a floppy disk, perform the following steps:

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*Note.* CL data is different from MISSION data in that it cannot be created or modified using GRAMPS display pages. CL data also cannot be loaded into GRAMPS from a DTS cartridge and cannot be stored to a floppy disk or the hard disk using the normal GRAMPS environment. CL data can only be loaded into GRAMPS from a floppy disk or from the hard disk, and then stored on a DTS cartridge.

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- a. From the GRAMPS CONTROL page, press “F1” to select “CL” as file type.
  - b. Press desired drive path, then press “F2”; for example, type “B:\” then “F2.”
  - c. Press “F3” to “Load from Disk.” Once the CL data has been loaded into GRAMPS, it can now be stored to a DTS cartridge for loading into the aircraft. To do this, follow the same steps listed above under storing MISSION data.
7. To retrieve ASET data from a floppy disk, perform the following steps:

---

*Note.* The ASET classified/unclassified database is different from MISSION data in that it cannot be created or modified using the GRAMPS display pages. The ASET database also cannot be loaded into GRAMPS from a DTS cartridge and cannot be stored to a floppy disk or the hard disk using the normal GRAMPS environment. The ASET database can be loaded into GRAMPS from a floppy disk or from the hard disk, and then stored on a DTS cartridge. The ASET database should be loaded before defining ASET MISSION data.

---

- a. From the GRAMPS CONTROL page, press “F1” to select “ASET” as file type.
  - b. Press desired drive path, then press “F2”; for example, type “A:\” then “F2.”
  - c. Press “F3” to “Load from Disk.” Once the ASET data has been loaded into GRAMPS, it can now be stored to a DTS cartridge for loading into the aircraft. To do this, follow the same steps listed above under storing MISSION data.
8. To end a GRAMPS session at any place within GRAMPS, press “ESC.” The “C:\GRAMPS” prompt will then be displayed.

---

*Note.* ASE/ACS MISSION data will be lost when the GRAMPS session is ended. Save all changes before ending the GRAMPS session.

---

#### **TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references and ASE/ACS operator's manual.

## TASK 2482

### Program Aircraft Survivability Equipment/Avionics Control System Flight Plan

**CONDITION:** In a RC-12N/P series airplane equipped with a Delco carousel IV INS and ASE/ACS.

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

1. Correctly enter required WPT numbers in the scratchpad.
2. Enter the WPTs into the ROUTES page.
3. Create a NEW FPLN from the ROUTES page.

#### DESCRIPTION:

1. Crew actions. The PC will designate which crew member will program the ASE/ACS FPLN.
2. Procedure.
  - a. Access the WPT page and enter the WPT numbers in the scratchpad in the order of desired use. Up to nine WPTs can be entered. Example: 11 13 23 25 15 12 34 36 27. The WPT numbers can be entered by two methods:
    - (1) Enter the WPT numbers by using the keyboard.
    - (2) Box desired WPTs with PREV (R2) or NEXT (R3) and press LOAD SCRATCH PAD (L5).
  - b. Press ROUTES (R5). Select which route to use, first, second or third and press adjacent line number to move WPT numbers into a route.
  - c. To activate a route into the active FPLN, select which route to use by pressing the line button (1st, 2nd or 3rd route).
  - d. Press NEW FPLN (L1). The "INS LOADING" message will appear and the new FPLN will transfer to the FPLN page and the aircraft will steer to the first WPT if NAV CAP is engaged on the AP mode controller.

---

*Note.* Once the route has been entered in the route box it may be inverted by pressing the associated L2, L3, or L4 button and pressing INVERT (L5).

---

#### TRAINING AND EVALUATION REQUIREMENTS:

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

**REFERENCES:** Appropriate common reference, aircraft operator's manual, aircraft CL, and ASE/ACS source data book.

**TASK 2484****Program the ARC-164 HaveQuick II Radio Using Aircraft Survival Equipment/Avionics Control System**

**CONDITIONS:** In a RC-12N/P series airplane equipped with an ARC-164 HaveQuick II radio and an ASE/ACS.

**STANDARDS:** Perform the appropriate steps in sequence without error resulting in successful normal and anti-jam communications.

**DESCRIPTION:**

1. Crew actions. The PC will designate the crew member to program the ARC-164.
2. Procedure.
  - a. Single channel.

- (1) Press the (D) mode button on the MFD to access the COMM CONTROL page.
- (2) Press L2/L3 on the MFD to display the ARC-164 preset frequency list.

---

**Note.** The COMM CONTROL page will automatically default to the FM ARC-201(A) preset frequency list. Either the #3-ultra high frequency (UHF) or the #5-UHF radio (buttons L3 and L4 on the MFD) must be selected to display the UHF preset frequency list.

---

- (3) To add a frequency to the preset list scratch pad in the preset number, the frequency, a cipher fill (as necessary) and a Net ID (as necessary). Then press R1 (add) to add it to the preset list.
- (4) To tune a preset frequency, scratch pad in the desired preset number and press L2/L3 to tune the desired UHF radio.

---

**Note.** Text containing the preset number, frequency, cipher fill, and station ID appears under the selected radio after tuning.

---

- (5) The radio is now programmed to communicate in the normal mode.

---

**Note.** To set a manual frequency, scratch pad in the desired frequency, cipher fill, and station ID and press either L2 to tune the #3 UHF radio or L3 to tune the #5 UHF radio. The letter M (manual) will precede the frequency, fill, and ID under the selected radio.

---

b. HaveQuick II.

**Note.** To use the anti-jam mode, the radio requires five elements of information to be programmed before it can be used: a frequency management table (FMT); Date; word of day (WOD); NET number; and time of day (TOD).

---

- (1) Frequency management table programming.
  - (a) Press the (D) mode button on the MFD to access the COMM CONTROL page.
  - (b) Press L2/L3 on the MFD to display the ARC-164 UHF SETUP (R5).
  - (c) Press UHF SETUP (R5).
  - (d) Press NORM/AJ (L1) to select NORM. This allows L5 WOD/FMT SETUP access.
  - (e) Press WOD/FMT (L5) to access WOD/FMT SETUP page.
  - (f) Press FMT/WOD (L1) to box FMT.
  - (g) Scratchpad segment 20 frequency and press SEGMENT 20 ENTRY (R1). If a valid frequency was entered, it will appear in the center of the page at "20 = " and the segment number at R1 will decrease to 19. Repeat until all 16 frequencies have been entered.

---

**Note.** It is not necessary to enter decimal points when scratch-padding frequencies.

---

- (2) WOD programming.
  - (a) On the WOD/FMT SETUP page press WOD/FMT (L1) to select WOD.

- (b) Scratchpad the DATE (day of the month) for the WOD to be programmed and press DATE (L3).
  - (c) Scratchpad WOD 20 and press SEGMENT 20 ENTRY (R1). The WOD will appear in the center of the page at 20 = if valid. The segment number at R1 will decrease by one to 19. Enter the remaining WODs by repeating the procedure until all 6 have been entered.
  - (d) If an error is made, press HQII WOD ERASE (L5) and reprogram using the above procedure.
- (3) NET number programming.
- (a) From the WOD/FMT SETUP page, access the UHF SETUP page by pressing UHF SETUP (R5).
  - (b) (b) Scratchpad in the training NET number. Press NET (L4).

---

**Note.** Training net numbers are: .3 odd days and .4 even days.

---

- (4) TOD programming.
- (a) To receive a TOD coordinate with another radio to send a TOD over normal UHF.
  - (b) When he is ready to send the TOD, press TOD CONTROL (R4).
  - (c) When he sends the TOD, press TOD RECEIVE (R4).
  - (d) If another radio is not available, use one of the following two methods to send a TOD to your radio. Press TOD CONTROL (R4). To start the time using the internal clock, press EMER TOD STARTUP (R3). To receive a TOD from the GPS, press GPS TOD (R5).

---

**Note.** To verify the radio has a valid TOD press TONE (R3) on the UHF SETUP page. A single tone–No TOD, Double tone–Valid TOD.

---

- (e) Press NORM /AJ (L1) and box AJ. (f) Conduct a communication check.
- (5) Sending a TOD.
- (a) To send a TOD, coordinate over normal UHF with the aircraft receiving.
  - (b) When ready, press TONE (R3) to send.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references and ASE/ACS operator's manual.

**TASK 2486****Interpret Aircraft Survivability Equipment/Avionics Control System Threat Indications****CAUTION**

A null envelope exists because of antenna placement on the aircraft that will cause the CONT. wave signal reception to diminish or disappear in certain aircraft attitudes. A sudden loss of tone or indication does not necessarily mean the threat is no longer present. Continue to evade and employ countermeasures until clear.

**CONDITIONS:** In a RC-12N/P series airplane equipped with the ASE/ACS system and with a data transfer cartridge loaded with threat database.

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

1. Program ASE (T) threat data.
2. Configure ASE (T) suite.
3. Program M-130. 4. Interpret threat indications.

**DESCRIPTION:**

1. Crew actions.
  - a. The PC will ensure the data transfer cartridge is loaded with threat and be responsible for safeguarding it.
  - b. The P and/or the P\* will load and verify the threat, coordinates, engagement parameters, ASE suite and flare/chaff program.
2. Procedure.
  - a. Program ASE (T) threat data.
    - (1) Load the classified ASET database using the DTS.
    - (2) Press ASE + (C) – Displays ASE page.
    - (3) Press ASE SETUP (R5) - Displays ASE SETUP page.
    - (4) Press ASE TRAINING SETUP (R5) – Displays ASE TRAINING SETUP page. This page allows the operator to enter simulated threat locations and operating parameters. Up to 10 threat lines may be entered.
    - (5) Scratchpad in threat type and press THREAT TYPE (L1). The threat type will be entered in the threat data entry window. Table 4-2 provides valid threat types.

**Table 4-2. Valid threat types**

2=SA-2	9=SA-9	A=AAA
4=SA-4	10=SA-10	Z=ZSU
5=SA-5	11=SA-11	H=HAWK
6=SA-6	12=SA-12	25=MIG-25
7=SA-7	13=SA-13	29=MIG-29
8=SA-8	14=SA-14	IR=MIG-IR

- (6) Scratchpad in threat latitude and press LAT (L2).
- (7) Scratchpad in threat longitude and press LONG (L3).

- (8) Scratchpad in the range (kilometers) at which the threat will initially engage the aircraft. Press RANGE (L4).
- (9) Scratchpad in the acquisition to launch time and press TIME (L5).

---

**Note.** If the threat in the data entry window is an airborne threat, the legend at L5 is FRONT/REAR. Successive presses of L5 causes the direction of approach of the airborne threat to toggle between FRONT and REAR. Select the desired approach direction of the fighter.

---

(10) A string of threat data may also be scratch-padded entered into any threat position. For example: Scratchpad in 1 5 36.30.45 110.20.30 25 20 and press ADD/SEL. An SA-5 threat has been entered into position 1 at N 36.30.45 W 110.20.30. The range at initial engagement is 25 miles, and the acquisition to launch time is 20 seconds.

(11) Single or multiple threat lines may be deleted by pressing R4. If one or more threat numbers are in the scratchpad with spaces between them, pressing R4 causes the listed threats to be deleted. If two threat numbers are in the scratchpad with a dash between them, pressing R4 causes the range of threats listed to be deleted.

b. Configure ASE (T) suite.

- (1) Press ASE + (C)—Displays ASE page.
- (2) Press ASE SETUP (R5)—Displays ASE SETUP page.
- (3) Press ASET (R5)—Toggles ASET Mode ON/OFF. Toggle ASET ON.
- (4) Press ASE TRAINING SETUP (R5)—Displays ASE TRAINING SETUP page.
- (5) Press ASET MISSION SUMMARY (R5)—Displays ASET MISSION SUMMARY page.
- (6) Press ASET SUITE CONFIGURATION (R1)—Displays ASET SUITE CONFIGURATION page and allows selection of the ASE equipment configuration for the training mission.
- (7) PULSE/CW WARN (L1)—Successive presses of L1 cause the APR-39 and APR-44 equipment configuration to toggle from NONE to APR-39(V)1/44(V)3 to APR-39(V)2/44(V)3 to APR-39A(V)2/44(V)3. Toggle as required.

---

**Note.** When the ASE training equipment configuration is an APR-39A(V)2, the legend at L1 will read “RADAR WARN”.

---

- (8) DISPENSER (L3)—Press L3 to read EM NOT CONFIG.
- (9) PULSE JAM (R1)—Successive presses of R1 toggle the ALQ-136 from NONE to ALQ-136(V) 2. Toggle as required.
- (10) CW JAM (R2)—Successive presses of R2 toggle the ALQ-162 from NONE to ALQ-162(V) 2. Toggle as required.
- (11) MSL APPR (R3)—Successive presses of R3 toggle the ALQ-156 from NONE to ALQ-156(V) 2. Toggle as required.

c. Program the M130 flare/chaff.

- (1) Press ASE + (C)—Displays ASE page.
- (2) Press ASE SETUP (R5)—Displays ASE SETUP page.
- (3) Press ASET ON/OFF (R1) to ON.
- (4) Enter the CHAFF COUNT in the scratch pad and press CHAFF COUNT (L1). Valid CHAFF COUNT data is any whole number from 0-127.
- (5) Enter the FLARE COUNT in the scratch pad and press FLARE COUNT (L2). Valid FLARE COUNT is any whole number from 0-127.
- (6) Enter the Chaff/Flare program as follows:

- (c) Enter into the scratchpad, in the order specified on the MFD, the desired numbers for SALVO COUNT, SALVO INTERVAL, BURST COUNT, and BURST INTERVAL. Example: 3 2 2 3. Press Program Chaff (L3) or Program Flare (L4), as required.
- (d) The SALVO COUNT is the number of salvos that will be fired as a result of pressing the chaff firing switch. This can be either a whole number from 1 to 99 or the letter "C" (continuous).
- (e) The SALVO INTERVAL is the time interval (measured in whole seconds) between the first cartridge firing in one salvo and the first cartridge firing in the next salvo. Valid SALVO INTERVAL data is any whole number from 1 to 99 or the letter "R" (random).
- (f) The BURST COUNT is the number of single expendable loads that will be fired in each salvo. Valid BURST COUNT data is any whole number from 1 to 99.
- (g) The BURST INTERVAL is the time interval (measured in tenths of seconds) between each expendable firing in each salvo. Valid BURST INTERVAL data is all tenths of a second from .1 to .9.

---

**Note.** In a valid chaff/flare program, the calculation (BURST COUNT) X (BURST INTERVAL) < (SALVO INTERVAL) must be true. If the relationship is not true, the message INVALID CHAFF PROGRAM is displayed and a valid program must be reentered.

---

- (7) Press ASE "C" to return to the ASE page.
  - (8) Press DISPENSER (L3). Check M130 mode is safe.
  - (9) Press CHAFF (L4) or Flare (L5) to select "MANUAL" or "PRGM". Successive presses of L4/L5 toggles the M-130 chaff/flare mode from "MANUAL" to "PRGM". Set as required.
  - (10) Press ASE Setup (R5). Pressing RIPPLE FIRE FLARES (L5) – Successive presses of L5 toggle the RIPPLE FIRE FLARES mode of the M-130. When L5 is initially pressed, a "RIPPLE ARMED" message is "boxed" and displayed for 7 seconds. During the 7 second time period, if either pilot presses the FLARE FIRE button on either control yoke, flare ripple firing is initiated. If RIPPLE ARMED is displayed and L5 is pressed again, the armed mode is aborted and the RIPPLE FIRE FLARES text reappears. The RIPPLE FIRE FLARES text also reappears if the 7 second time period elapses before either pilot presses the flare fire button. If flare ripple firing is initiated and L5 is pressed, flare ripple firing is aborted.
- d. Threat equipment and indications. AN/APR-39(V) 2: This pulse wave radar warning receiver audibly and visually warns pilots that they are being tracked by a threat radar system. Antennas located on the wing pods and one blade antenna on the underside of the fuselage receives pulse wave radar signals. The AN/APR-39 displays azimuth to the threat radar and relative lethality thru the MFD. The AN/APR-39 will supply missile tracking and missile guidance information for the SA-2/3/4 and tracking information only for the SA-6/8/11, ZSU, and aircraft radars.
- (1) Components:
    - (a) Spiral antennas: (4) (two right/two left) Located on the fore and aft portions of the wing pod. Receive high-band pulse wave radar signals (missile tracking).
    - (b) Blade antenna: (1) Located on the bottom of the fuselage. Receives low-band pulse wave radar signals (missile guidance).
    - (c) Processor: (1) Analyzes received signals and matches them to pre-programmed criteria and then displays information on the MFD.
    - (d) Receivers: (fore/aft) Send received signals to the processor.
    - (e) MFD: power switch, altitude select switch, BIT and volume control.
  - (2) Indications:
    - (a) In flight in a radar-free environment, the screen will display a diamond at each of the four cardinal points and an "H" or "L" in the center of the screen. This is the "no signal" display. A threat display will be announced by a high-pitched tone and a flashing symbol. The symbol will only flash momentarily, then become steady. A steady symbol indicates the radar is in

tracking mode. The closer to the center of the screen the symbol is, the greater the interpreted relative lethality. The display will indicate direction of the threat by placing the symbol in a position to show relative bearing from the nose of the aircraft. Lethality interpretation is based on received signal strength compared to lowest known output power of the radar being received.

- (b) Range normalization is as follows: symbols just inside the edge of the screen are targets at approximately twice (2x) lethal weapon range. Symbols just outside the outermost ring indicate a target at (1.5x) lethal range. Symbols just outside the innermost ring indicate targets at lethal range. Symbols at the innermost ring indicate targets at (.5x) lethal range. Airborne radar targets are shown when initially detected regardless of range.
- (c) Low Band Missile Guidance is as follows: A diamond indicates that the system is receiving low band pulse wave missile guidance signals. When the guidance signal can be correlated with the threat tracking radar, the symbol for that system will appear inside the diamond. If the system cannot correlate the low band guidance signal with received tracking signals, a "U" will appear in the diamond. If the diamond appears in the center of the screen, it indicates that only the low band guidance signal is being received.

e. AN/APR-44(V) 3: The AN/APR-44(V)3 is an airborne system used to detect CONT. wave radar signals. Detection is indicated by a message on the MFD coupled with a Master Caution annunciator and a tone heard in the headset. CONT. wave radar is used by surface-to-air-missile (SAM) and aerial intercept (AI) systems to affect semi-active guidance for their associated missiles. The CONT. wave signals reflect off the aircraft and are received by the antennas located on the missile. The signal is then used for missile guidance. It gives indications of an SA-5/6/11/17/AI and possibly an SA-10 and 12. If used in conjunction with the AN/APR-39(V) 2, SEMA aircraft are warned of virtually every radar Air Defense/Aerial Interdiction threat.

(1) Components:

- (a) The MFD consists of a power switch, volume control, and when activated, a message box at the lower left hand corner of the MFD indicating a SAM or AI missile alert.
- (b) The receiver has two filters, a low band and high band pass. The receiver responds to a CONT. wave signal and converts it to an audio alert and MFD alert. If a SAM threat is detected, it will illuminate "SAM-MISSILE ALERT." If an AI threat is detected, it will illuminate "AI-MISSILE ALERT" on the MFD.
- (c) Four antennas are located on poles attached at the forward empennage. Two are for SAM targets and two, for AI targets.

(2) Indications: The AN/APR-44(V) 3 gives no indication of threat radar relative bearing or relative lethality. The pilot must become familiar with the AN/APR-44(V) 3 tone to effectively use the system. The only indication will be the Master Caution annunciator and display given on the MFD indicating a SAM or AI Missile Alert.

**TRAINING AND EVALUATION:**

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

**REFERENCES:** Appropriate common references, ASE/ACS operator's manual, and classified references.



## TASK 2487

### Perform Tactical Air Navigation Air-to-Air Operations

**CONDITIONS:** In a RC-12K/N/P/X series airplane, properly equipped with a TACAN/DME system (AN/ARN-154).

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

1. Correctly set assigned TACAN frequency for air-to-air operations.
2. Correctly display air-to-air distance on the DME indicator.

**DESCRIPTION:**

1. Coordinate between the two participating aircraft for correct channel spacing. There must be a 63-increment channel separation for the air-to-air feature to operate correctly. As a mnemonic remember “29.92”. One aircraft sets channel 29 and the other sets 92 in the TACAN frequency. This will give the 63 or greater channel separation.
2. Place the toggle switch on the TACAN control head to the A/A position.
3. Set the DME control switch to the #1 position.
4. Ensure that both aircraft’s TACAN mode (X or Y) is at the same setting.
5. Verify the AA/DME being displayed is correct with the other aircraft.

---

*Note.* No azimuth or bearing information will be displayed.

*Note.* Only two aircraft may participate in TACAN air-to-air ranging.

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**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common reference.

## TASK 2488

### Perform Track Sync Procedures

**CONDITIONS:** In a RC-12 series airplane, on track in INS/FMS auto pattern steering.

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

1. Make coordinating radio calls providing ground speed, distance and time to the next WPT.
2. Synchronize with the AMC or designated aircraft within  $\pm 1$  minute or 3 NM.
3. Do not exceed the MAX deck angle for COMINT.

#### DESCRIPTION:

1. Crew actions.
  - a. Determine the relation of other aircraft to your own in the track pattern.
  - b. Discuss the appropriate method to maneuver the aircraft to arrive in sync with the AMC or designated airplane.
2. Procedures.
  - a. Airspeed adjustment.
    - (1) If the sync aircraft is a few miles ahead in the pattern consider increasing airspeed to close the distance. Evaluate the penalty of an increased fuel burn rate while using a higher power setting.
    - (2) If the sync aircraft is behind you in the pattern, slow the airplane. If the MAX COMINT deck angle is reached notify the AMC that you are at MAX deck angle. The AMC will determine if the other aircraft will increase airspeed to close the gap.
  - b. Delaying the end point turn. If the theater operations allow it, and the aircraft is ahead of the flight in the pattern engage the heading mode at the next end point and fly beyond it a predetermined range. Then turn the aircraft with the heading mode in the direction of the next leg of the pattern and reengage NAV on the FD.
  - c. Early turn.
    - (1) If a large gap in distance or time exists between your aircraft and the sync airplane execute an early turn. This procedure applies when the sync airplane is flying to a WPT in the opposite direction you are flying. When the sync airplane calls his "numbers", note the distance and time to the next end point on the INS.
    - (2) Determine the halfway point between you and the other aircraft. When the early turn point is reached use the heading mode on the FD to start the turn. Command the INS to fly the new course by programming a WPT change/NEXT LEG as appropriate to intercept the track. NAV mode may be reengaged after the INS has loaded the new leg and 90 degrees of the turn has been completed.
    - (3) Once wings are level call the sync airplane for their number to determine if any other adjustments are necessary.
    - (4) Reenter pattern steering at the start point.

---

*Note.* The INS may be forced into pattern steering if the early turn intercepts the leg outbound from the start point.

---

#### TRAINING AND EVALUATION REQUIREMENTS:

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

**REFERENCES:** Appropriate common reference, SH-96099-H, operator's manual, and DELCO carousel IV-E INS ASE/ACS operator's handbook.

## Chapter 5

# Maintenance Pilot Tasks

This chapter describes the essential tasks for maintaining maintenance crewmember skills. It defines the task title, number, conditions, and standards by which performance is measured. A description of crew actions, along with training and evaluation requirements, also is provided. This chapter contains tasks to be performed by qualified RC-12 MPs IAW AR 95-1 and chapter 2 of this document. This chapter contains tasks and procedures to be used by contractor MPs IAW AR 95-2, Volume 1 (DLAM 8210), section 3.4 (publications). For those aircraft that do not have an Army operator's manual or MTF manual, units are authorized to use the manufacturer's pilot operating handbook (POH) or operator's manuals provided by other services (Air Force, Navy).

### WARNING

**A MTF is an exceptionally demanding operation and requires a thorough flight readiness inspection (preflight). The flight readiness inspection is prescribed in the applicable operator's manual and must be completed prior to each MTF. Emergency procedures are found in the applicable -10 or CL and are not duplicated in this publication. Prior to each MTF, the PI(s) will contact maintenance/quality control personnel to determine the maintenance that has been performed. This manual should be used only by qualified MPs as required in AR 95-1.**

#### 5-1. TASK CONTENTS.

- a. **Task number.** Each ATM task is identified by a 10-digit SAT number that corresponds to the MP tasks listed in chapter 2 (table 2- 14, page 2-13). The task title identifies a clearly defined and measurable activity. The first three digits of each task in this ATM are 011 (U.S. Army Aviation School); the second three digits are 219 (RC-12 series) aircraft. The last four digits of maintenance tasks are assigned 4000-series numbers. For convenience, only the last four digits are referenced in this training circular.
  - Individual tasks are 1000-series numbers.
  - Crew tasks are 2000-series numbers.
  - Maintenance tasks are 4000-series numbers.
- b. **Task title.** This identifies a clearly defined and measurable activity. Task titles may be the same in many ATMs, but task content will vary with the airframe.
- c. **Conditions.** The conditions specify the common wartime or training/evaluation conditions under which the MP tasks will be performed. The tasks listed that are common to RC-12 are listed as such. When the task condition applies to one group, the condition will add the series designator to the RC-12 series. MTFs will normally be conducted under day VMC IAW TM 1-1500-328-23.
- d. **Standards.** The standards describe the minimum degree of proficiency or standard of performance to which the task must be accomplished. Standards are based on ideal conditions to which the task must be accomplished. 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 the 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 IAW the appropriate MTF manual/CL as required.
  - (3) Brief the P on the procedures to be completed based on the mission of the flight; for example, limited test flight for a primary governor change. When practical, review the steps for airborne tasks with the P before performing them.
  - (4) Perform crew coordination actions IAW the task description and chapter 6.
  - (5) Assess and address any malfunctions or discrepancies as they occur and apply appropriate corrective actions or troubleshooting procedures.
  - (6) Complete the appropriate entries on the MTF check sheet and in the logbook and record data, as required for the checks to be performed.
- e. **Description.** The description explains how the elements of the task should be done to meet the standards. For a complete description refer to the appropriate MTF CL. When specific crew actions are required, the task will be broken down into crew actions and procedures as follows.
- (1) Crew actions. These actions define the portions of a task to be performed by each crew member 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 a 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 the MP performs or directs in order to execute the task to standard.
- f. **Contractor officer representative (COR).** The COR has the authority and responsibility to determine when a test flight is required and what items need to be checked on the test flight.
- g. **Training and evaluation requirements.** Some of the tasks incorporate more than one check from the MTF CL. This section defines the checks in each task that, as a minimum, are required for MP training. Refer to Table 2-14 for a list of tasks that must be evaluated during the 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, FS, or academic environment. Training and evaluations will be conducted only in the listed environments, but may be done in any or all combinations. Listing only “aircraft” under evaluation requirements does not preclude the maintenance-designated IP/SP from evaluating elements of the task academically to determine depth of understanding or troubleshooting processes. However, the evaluation must include hands-on performance of the task in the listed environment(s). If one or more checks are performed unsatisfactorily, the task will be graded unsatisfactory. However, when the task is reevaluated, only those unsatisfactory checks must be reevaluated.
- h. **References.** The references are sources of information relating to that particular task. In addition to the common references listed in chapter 4, the following references apply to all MTP tasks. (These references apply to each of the tasks listed in this chapter and will not be listed for each task):
- (1) AR 700-138.
  - (2) Aircraft logbook and historical records.
  - (3) TM 1-1500-328-23.
  - (4) DA Pam 738-751.
  - (5) Operator’s manual, CL, and MTF manual.
  - (6) Applicable airworthiness directives or messages from the U.S. Army aviation and missile command (AMCOM) or Aviation Missile Life Cycle Management Command (AMLCMC) and PEO-AV.
  - (7) Applicable commercial maintenance manuals.

(8) AR 95-1.

**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,” for example, 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. **MP Tasks.** The following numbered tasks are RC-12 series MP critical tasks:

## **TASK 4910**

### **Perform Taxiing Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft MTF manual.

**STANDARDS:** Appropriate common standards outlined in chapter 4 and chapter 5 of this document.

#### **DESCRIPTION:**

1. Crew actions. The MP will ensure the checks are conducted IAW 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 on what checks are necessary. Each crewmember will complete the required checks or procedures IAW the MTF manual and the preflight briefing.
2. Procedure. Perform the checks IAW 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 their attention outside the aircraft at all times during aircraft taxi. Review the task in the MTF manual prior to the individual check to be accomplished to ensure all items required to complete the check will be accomplished. 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4915**

### **Perform Engine Run-Up/Aircraft Systems Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual. The MP may direct the P to perform or assist in the required checks, but he or she will verify that all required checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. Each crewmember will complete the required checks or procedures IAW the MTF manual and the preflight briefing. The MP will stress ground safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual. Other publications and references such as the aircrew CL may be used as necessary. Conduct a briefing to delineate the duties the MP and P may be required to perform, stressing safety during ground operations. Crewmembers will focus their attention outside the aircraft as much as possible to ensure the aircraft does not move during the checks. Review the task in the MTF manual prior to the individual check to be accomplished to ensure all items required to complete the check will be accomplished. 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4921**

### **Perform Before-Takeoff Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual. The aircraft CL may be used; however, the checks will be done to the detail level of chapter 8 of the appropriate aircraft -10 and the MTF manual. The MP may direct the P to perform or assist in the required checks, but he or she will verify that all checks have been completed. The MP will stress ground safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual or aircraft CL. Conduct a briefing to delineate the duties that 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.



## **TASK 4923**

### **Perform During-Takeoff Checks**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual. The MP may direct the P to perform or assist in the required checks, but he or she will verify that all checks have been completed. The MP will determine the checks necessary for the test flight (general/limited), and he will brief the P on what checks to be performed. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties that 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. The MP may dictate the recording be accomplished by the P. At least one crew member will focus his 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4925**

### **Perform After-Takeoff Checks**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual. The aircraft CL may be used; however, the checks will be done to the detail level of chapter 8 of the appropriate aircraft -10 and the 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 brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4927**

### **Perform During-Climb Checks**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 he will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4929**

### **Perform Pressurization System Checks**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 his 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4931**

### **Perform During-Cruise Checks**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4935**

### **Perform Speed Check at Maximum Cruise Power**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety during 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. Obtain the necessary ATC clearances for the altitudes being flown. Review the task in the MTF to ensure all items required for the check 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 IAW data from figure 4. Adjust the power on the other engine to reach the airspeed listed in figure 4. After conditions are allowed to stabilize for 1 minute, record the data required to complete the check. The MP may dictate the recording be accomplished by the P. At least one crew member will focus his 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4936**

### **Perform Speed Performance Check at Maximum Cruise Power**

**CONDITIONS:** In a RC-12K/N/P/X series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, section IV, Special Procedures. 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual, section IV. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety during 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. Obtain the necessary ATC clearances for the altitudes being flown. Review the task in the MTF to ensure all items required for the check are noted for data recording. Set the TQ on the left and right engine from the chart. Task the P to record the required data. If the observed TGT exceeds the chart value, conduct the engine performance at MAX cruise power check. 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4937**

### **Perform Maximum Power-Lever Position Check/Maximum Turbine Gas Temperature/N<sup>1</sup> Availability**

**CONDITIONS:** In a RC-12D/H series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety during 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. Obtain the necessary ATC clearances for the altitudes being flown. Review the task in the MTF to ensure all items required for the check 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 crew member will focus his 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references



## **TASK 4938**

### **Perform Engine Performance Check at Maximum Continuous Power**

**CONDITIONS:** In a RC-12K/N/P/X series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Check the affected engine IAW the appropriate aircraft MTF manual, section IV. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety during 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. Obtain the necessary ATC clearances for the altitudes being flown. Review the task in the MTF to ensure all items required for the check are noted for data recording. Set the power on the engine to be checked IAW data from figure 4. Adjust the power on the other engine to reach the airspeed listed in figure 4. After conditions are allowed to stabilize for 1 minute, record the data required to complete the check. The MP may dictate the recording be accomplished by the P. At least one crew member will focus his 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. Task the P to record the required data. If the observed TGT exceeds the chart value, conduct the engine performance at MAX cruise power check.

#### **TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references

## **TASK 4939**

### **Perform Engine-Acceptance Check/Engine Performance at Maximum Continuous/Cruise Power**

**CONDITIONS:** In a RC-12D/H series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 RC-12, as well as additional checks to be accomplished. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. Conduct a briefing to delineate the duties the MP and P must perform. The briefing will emphasize safety during 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. 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

**TASK 4940****Perform Engine Performance Check at Maximum Cruise Power**

**CONDITIONS:** In a RC-12K/N/P/X series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. If the TGT exceeded the chart value during the speed performance at MAX cruise power check, perform engine performance at MAX cruise power check on the affected engine IAW the appropriate aircraft MTF manual, section IV. Conduct a briefing to delineate the duties the MP and P must perform. The briefing will emphasize safety during 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. 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. Set the power on the engine to be checked IAW data from figure 4. Adjust the power on the other engine to reach the airspeed listed in figure 4. After conditions are allowed to stabilize for 1 minute, record the data required to complete the check. The MP may dictate the recording be accomplished by the P. At least one crew member will focus his 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. Task the P to record the required data.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.

## **TASK 4941**

### **Perform Engine Ice Vanes Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P must 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. In some models of RC-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 aircraft 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4942**

### **Perform Maximum Turbine Gas Temperature/N<sup>1</sup> Availability Check**

**CONDITIONS:** In a RC-12K/N/P/X series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Conduct the check IAW the appropriate aircraft MTF manual, Section IV. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will emphasize safety during 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. The P will assist the MP in monitoring TGT, N<sup>1</sup>, and TQ to ensure no operating limit is exceeded when the power levers are advanced. Determine if sufficient power lever travel is available to obtain MAX TGT, TQ or N<sup>1</sup> before hitting the forward power lever stop. 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4943**

### **Perform Trim and Rigging Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 RC-12, as well as additional checks to be accomplished. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual, section IV, Special Procedures. 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references

## **TASK 4945**

### **Perform Auto-Pilot Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual, Section IV, Special Procedures. 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references

## TASK 4948

### Perform Stall Warning System Check

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft MTF manual.

**STANDARDS:** Appropriate common standards outlined in chapter 4 and chapter 5 and the following additions/modifications:

#### WARNING

The RC-12 may not produce a clean aerodynamic “break” (for example, in the RC-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 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° down, and a sink rate of up to 8,500 FPM. Recovery from a “deep stall” requires a 10 to 15° nose down pitch change to break the stall. Allow the airspeed to increase to at least 25 KTS above stall speed before recovery.

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*Note.* **Do not** perform the Stall warning system checks in greater than occasional light turbulence.

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1. Correctly compute stall warning horn range.
2. Terminate maneuver if stall warning horn does not sound at least 5 KIAS above the computed stall speed.

#### DESCRIPTION:

1. Crew action.



- a. The MP will ensure the checks are conducted IAW 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.
  - b. The briefing will include actions to be taken in the event the aircraft begins to roll during the maneuver. Prior to flight, the MP, with assistance from a contractor maintenance person, will physically check with a measuring tape or other approved device, the proper measurements and installation of the stall strips IAW the appropriate maintenance manual.
  - c. The MP will consult the power off stall speed table to determine the stall speed and stall warning horn speed range for the aircraft at its WT and configuration during the flight. During the MTF, the MP must ensure that the aircraft is not decelerated slower than 5 KIAS above the computed stall speed. MP will stress flight safety considerations and procedures during the briefing.
2. Procedures.
- a. Discussion. Perform the checks IAW the appropriate aircraft MTF manual. 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 and set power as dictated by the appropriate MTF manual. The MP may dictate the recording be accomplished by the P. 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 IAW the MTF manual. Once the aircraft is configured, the power will be reduced to idle. The crew will adjust the aircraft controls using normal control inputs 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 of 1 knot per second. The crew will note the indicated airspeed the stall warning horn activates. At the onset of the stall warning horn, immediately reduce the pitch angle, apply MAX available power and complete the approach to stall recovery procedure described in task 1303 disregard the reference to minimum loss of altitude. 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 angle to lower the angle of attack, if necessary, apply opposite rudder to stop any roll and complete the approach to stall recovery procedure described in Task 1303. After the recovery procedure, the P will record data, as required, for the checks performed.

**TRAINING AND EVALUATION REQUIREMENTS:**

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

**REFERENCES:** Appropriate common references.

## **TASK 4949**

### **Perform Flap Operation Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4951**

### **Perform Minimum Elevator Trim Check**

**CONDITIONS:** In a RC-12D/H series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4953**

### **Perform Auto Ignition Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 and set power as dictated by the appropriate MTF manual. Caution must be exercised while performing this task. Engine TGT could be exceeded, and care must be exercised to avoid excessive TGT. If it appears TGT limits will be exceeded, discontinue the task by placing the condition lever for the engine being checked to the fuel cutoff position, manually feather the propeller, and 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

**TASK 4955****Perform Manual Propeller Feathering and Unfeathering Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will include actions to be taken in the event the propeller does not feather. It is imperative that the crew does not allow the airspeed to decay. In the event the propeller does not feather the crew should consider restarting the engine. The briefing will emphasize safety during 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 and set power as dictated by the appropriate MTF manual. This task specifies airspeeds to be flown during the check. It is important that the specified airspeed is maintained during the feathering or check until the prop is feathered and rotation has stopped. The description of a feathered prop is described in the MTF for the appropriate aircraft. 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 will be accomplished by the P. At least one crewmember will focus his 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## TASK 4957

### Perform Propeller Auto-Feathering System Check

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW the appropriate aircraft MTF manual. Conduct a briefing to delineate the duties the MP and P are required to perform. The briefing will include actions to be taken in the event the propeller does not feather. It is imperative that the crew does not allow the airspeed to decay. In the event the propeller does not feather the crew should consider restarting the engine. The briefing will emphasize safety during 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 and set power as dictated by the appropriate MTF manual. This task specifies airspeeds to be flown during the check. It is important that the specified airspeed is maintained during the feathering or check until the prop is feathered and rotation has stopped. The description of a feathered prop is described in the MTF for the appropriate aircraft. 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 will be accomplished by the P. At least one crewmember will focus his 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4961**

### **Perform Maximum Rate-of-Descent Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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. 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4963**

### **Perform Landing Gear Warning Horn Operation Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references



## **TASK 4967**

### **Perform Emergency Landing Gear Extension Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

## **TASK 4969**

### **Perform Elevator Trim Check**

**CONDITIONS:** In a RC-12D/H series airplane with access to the aircraft 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 IAW 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 RC-12. The MP will determine the checks necessary for the test flight (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references

## **TASK 4980**

### **Perform Communication and Navigation Equipment Check**

**CONDITIONS:** In a RC-12 series airplane with access to the aircraft 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 IAW 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 RC-12 series. The MP will determine the checks necessary for the TF (general/limited), and will brief the P on what checks are necessary. The MP will stress flight safety considerations or procedures during the briefing.
2. Procedures. Perform the checks IAW 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 in the aircraft or academically.
2. Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references.

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## 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.

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*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.

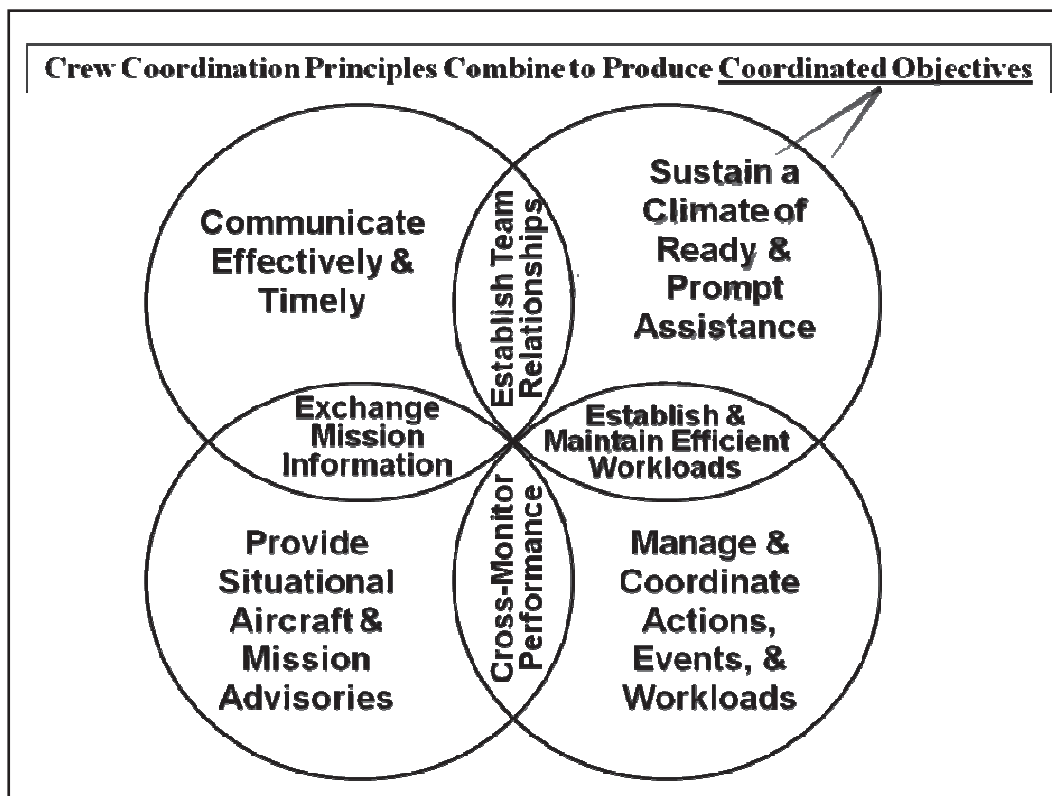
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6-1. **AIRCREW COORDINATION BACKGROUND AND PLANNING STRATEGY.** An analysis of U.S. Army aviation accidents revealed that a significant percentage of aircraft accidents resulted from one or more aircrew coordination errors committed during and even 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 would 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. Remember, this discussion and critique of crew decisions and actions must remain professional. "Finger pointing" is not the intent and shall be avoided; the emphasis should remain on education with the singular purpose of improving crew and mission performance.

6-2. **AIRCREW COORDINATION PRINCIPLES.** Broadly defined, 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 below (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 NAV, 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 this crew climate that enables 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.

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*Note.* The two-challenge rule allows one crewmember to assume the duties of another crewmember who fails to respond to two consecutive challenges automatically. 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.

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- 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 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 (i.e. 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 detects errors or sees that another crewmember needs help. In the case where 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. This means that you 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 relationships.** 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 pilot flying (P\*) are transferred to the pilot not flying (P). Clear division of cockpit responsibilities is of particular importance during the arrival and departure phases of flight. The individual operator's manual designate RC-12s as two-pilot aircraft. Besides the circled items in the operator's manual and the CL that delineates copilot (P) duties, the crew callouts and responsibilities outlined in this chapter should serve to fully integrate the P\* and P as a flight crew. The following paragraphs serve as a guide.
- 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 P\*'s 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 WX broadcast, ATIS, 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 and INS 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 WX 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 (IAS) or vertical speed (VS).
  - (c) Selecting heading (HDG) or NAV.
  - (d) Selecting standby (STBY).
- (4) Changes to the status of the FD system that is 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 3000 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 takeoff power as briefed until  $V_1$  is announced. During the takeoff 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).

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, P calls “**GEAR DOWN/CONFIRM,**” P\* responds – “**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 takeoff 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 RC-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 crew members 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, do the following:

- (1) **Heads-Up/Heads-Down Operations.** The design and placement of cockpit displays and NAV units allows both pilots to maintain heads-up to lookout as often as possible. Take full advantage of mission planning and preflight time to complete tasks that would otherwise require heads-down time during flight.

- (2) **Data Entry.** Do not allow data entry to consume the attention of both pilots and 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 NAV/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 copilot. 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, etc. The P verifies all settings and call outs made by the PF.
  - (b) When flight is conducted with the AP engaged, the P\* may select or direct the P to select FD modes and NAV sources. When manually flying the aircraft the P\* should direct the P to select FD modes and NAV sources whenever possible. In normal flight situations, only the P\* should disengage the AP and announce “**AUTOPILOT ENGAGED**” or “**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 X**”), verbalizes the displayed indications, if applicable, and accomplishes immediate action items as directed by PC. 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, moving a propeller lever or condition lever. The crew member performing the action points to the affected switch/handle and verbally seeks confirmation from an opposite crew member (for example “**CONFIRM NUMBER ONE**”). The crew member confirming the action looks at the affected switch/handle and acknowledges “**NUMBER ONE 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 crew members 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 crew members and allow them to focus on flying the aircraft efficiently, staying abreast of traffic and ATC communications. Table 6-2, page 6-9, provides examples of standardized crew callouts. Crews should not interpret making crew callouts as 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 unit SOP.

Table 6-1. Standard crew terminology

<b>Term</b>	<b>Definition</b>
Abort	To terminate a preplanned maneuver; for example, an aborted takeoff.
Adjusting (Guardrail)	Changing ground speed or track length to sync with the other mission aircraft.
Affirmative	Yes.
Bandit	An identified enemy aircraft.
Bogey	An unidentified aircraft assumed to be enemy.
Braking	Announcement made by the rated crew member (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 crew member.
Clear	No obstacle present to impede aircraft movement along the intended direction of flight or while taxiing on the ground. Will be followed by direction of movement. 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	Traffic in sight or 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.
Go plain/red (Guardrail)	Command to discontinue secure operations.
Go secure/green (Guardrail)	Command to activate secure operations.
Hold	Command to maintain present position.
I have the controls	Used as a command or announcement by the RCM assuming control of the flight controls.
Inside	Primary focus of attention is inside the aircraft.
In sight	Preceded by the word "traffic," "target," "obstacle," or descriptive term. Used to confirm the traffic, target, or obstacle is positively seen or identified.
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 takeoff roll indicating the airspeed indicators are alive, autofeather lights are illuminated, and instrument indications are within limits.
Numbers (Guardrail)	An announcement by the base aircraft stating the ground speed, distance to

Table 6-1. Standard crew terminology

<b>Term</b>	<b>Definition</b>
	WPT, and time to WPT.
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 <sub>1</sub> <b>D/H</b> or Vr <b>K/N/P/X</b> .
Set power	Command by the P* for the P to set takeoff power or MAX available power during a go-around or missed approach.
Stop	Command to go no further; halt present action.
Strobe	Indicates that the AN/APR-39 has detected a radar threat; will be followed by a clock position.
Sync (Guardrail)	An announcement that an aircraft is flying the same ground speed, distance to WPT, and time to WPT as the base or sync aircraft.
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 (ICS) 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

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
POWER LEVERS ADVANCE	<b>"SET POWER"</b>	"POWER SET"
65 KTS INDICATED (AIRSPEED INDICATORS CHECKED, AND SYSTEMS NORMAL)		<b>"NORMAL"</b>
AIRSPEED AT V <sub>1</sub> <b>D/H</b>	REMOVES HAND FROM POWER LEVERS AND PLACES HAND ON THE YOKE AND ROTATES.	<b>"V<sub>1</sub>, ROTATE"</b>
AIRSPEED AT V <sub>1</sub> <b>K/N/P/X</b>	REMOVES HAND FROM POWER LEVERS AND PLACES HAND ON THE	<b>"V<sub>1</sub>"</b>

Table 6-2. Takeoff

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
	YOKE.	
AIRSPEED AT $V_R$ <b>K/N/P/X</b>	ROTATES	<b>“ROTATE”</b>
ABNORMAL OR EMERGENCY CONDITION BEFORE $V_1$ (IDENTIFIED BY P)	“ABORTING”	<b>“ABORT, ABORT, ABORT”</b>
P* ELECTS TO ABORT BEFORE $V_1$	<b>“ABORTING”</b>	“ROGER”
POSITIVE RATE OF CLIMB (TWO INDICATIONS)	“AFTER P “POSITIVE RATE,” LEFT SEAT RAISES THE GEAR HANDLE	<b>“POSITIVE RATE”</b> <b>“GEAR IS UP or GEAR DID NOT RETRACT”</b>
FLAPS UP AT $V_{YSE}$	<b>FLAPS UP”</b>	“FLAP UP”

b. Climb, cruise, and descent (table 6-3). If passing the 1,000-foot prior point and ATC communications is preventing the callout, either crew member may indicate the 1,000-foot prior point by raising the index finger in the view of the other crew member.

Table 6-3. Climb, cruise, and descent

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
1,000 FEET BEFORE LEVEL OFF	EXAMPLE <b>“5000 FOR 6000”</b>	<b>1,000 TO GO”</b>
DESCENDING THROUGH TRANSITION LEVEL	<b>“30.XX SET LEFT</b>	<b>“30.XX SET RIGHT AND CENTER””</b>
CLIMBING THROUGH TRANSITION ALTITUDE	<b>“29.92 SET LEFT”</b>	<b>“29.92 SET RIGHT AND CENTER”</b>

c. All phases of flight (table 6-4).

Table 6-4. All phases of flight

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
BANK ANGLE EXCEEDS 30°	“CORRECTING”	<b>“BANK ANGLE”</b>
AIRSPEED DEVIATES $\pm 10$ KIAS	“CORRECTING”	<b>“AIRSPEED”</b>
ALTITUDE DEVIATES $\pm 100$ FEET	“CORRECTING”	<b>“ALTITUDE</b>
HEADING DEVIATES $\pm 10^\circ$	“CORRECTING”	<b>“HEADING</b>

d. Instrument approach (table 6-5, page 6-11). Applies to all instrument approaches except GCA.

**Table 6-5. Instrument approach**

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
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	“ <b>TIME</b> ” (IF APPLICABLE)	“TIME STARTED”
1,000 FEET BEFORE DA/DH/MDA	“ROGER”	“ <b>1,000 TO GO</b> ”
500 FEET BEFORE DA/DH/MDA	“ROGER”	“ <b>500 TO GO</b> ”
100 FEET BEFORE DA/DH/MDA	“ROGER”	“ <b>100 TO GO</b> ”

- e. Missed approach (table 6-6). These callouts apply when–
- (1) The aircraft has reached the DA/DH or 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**

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
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 CREW MEMBER MONITORING OUTSIDE WHILE CIRCLING WILL INITIATE THE CALLOUT.)	“ <b>VISUAL LOST, MISSED APPROACH</b> ” (FOLLOWED BY MISSED APPROACH ACTIONS)  “ROGER, MISSED APPROACH” (FOLLOWED BY MISSED	“ROGER”  “ <b>VISUAL LOST, MISSED APPROACH</b> ”

Table 6-6. Missed approach

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
	APPROACH ACTIONS)	
GO AROUND SEGMENT AFTER P* INITIATES THE POWER APPLICATION	<b>"SET POWER"</b>	"POWER SET"
AFTER VERIFYING TWO POSITIVE CLIMB INDICATIONS	<b>"GEAR UP" (LEFT SEAT PILOT RAISES GEAR HANDLE)</b>	<b>"POSITIVE RATE"</b>
FLAPS BEYOND APPROACH	<b>"FLAPS APPROACH"</b>	"FLAPS APPROACH"
AIRSPPEED REACHES $V_{YSE}$	<b>"FLAPS UP"</b>	"FLAPS UP"
WHEN TIME AND ALTITUDE PERMITS	<b>"MY POWER"</b>	"YOUR POWER"

f. Visual transition from instruments (table 6-7).

(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

<b>ACTION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
APPROPRIATE VISUAL REFERENCES IN SIGHT	"ROGER" (OR OTHER INTENTIONS)	<b>"APPROACH LIGHTS (OR OTHER FEATURES IDENTIFIABLE WITH RUNWAY ENVIRONMENT) IN SIGHT ; CONTINUE (OR OTHER RECOMMENDED ACTION)"</b>
RUNWAY IN SIGHT	(AFTER RUNWAY IS IN SIGHT) "VISUAL"	<b>"RUNWAY IN SIGHT (CLOCK POSITION), GO VISUAL"</b>
P* DEPARTS MDA TO LAND	<b>"LEAVING MDA"</b>	"ROGER"



- g. Approach deviations (table 6-8). The two-challenge rule applies to these callouts.

**Table 6-8. Approach deviations**

<b>OBSERVATION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
±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).

**Table 6-9. Touch and go**

<b>OBSERVATION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
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 <sub>1</sub> <b>D/H</b>	REMOVES HAND FROM POWER LEVERS, PLACES HAND ON YOKE, AND ROTATES	"V <sub>1</sub> , ROTATE"
AIRSPEED AT V <sub>1</sub> <b>K/N/P/X</b>	REMOVES HAND FROM POWER LEVERS AND PLACES HAND ON YOKE	"V <sub>1</sub> "
AIRSPEED AT V <sub>R</sub> <b>K/N/P/X</b>	ROTATES	"ROTATE"

- i. Engine failures (table 6-10, page 6-14). The callout sequence begins after Power has been applied and aircraft is stabilized.

Table 6-10. Engine failure

<b>OBSERVATION</b>	<b>P* CALL/RESPONSE</b>	<b>P CALL/RESPONSE</b>
LOSS OF AN ENGINE (ONE OR TWO) BY CONTROL PRESSURES AND/OR INSTRUMENT INDICATIONS	<p><b>"CONFIRM THE NUMBER (ONE OR TWO) ENGINE HAS FAILED"</b></p> <p><b>"DID THE PROPELLER FEATHER?"</b></p>	<p>"I CONFIRM NUMBER (ONE OR TWO) ENGINE HAS FAILED OR NEGATIVE NUMBER ___ (OPPOSITE) ENGINE HAS FAILED."</p> <p>"YES, THE NUMBER ___ PROP FEATHERED" OR "NO, IT DID NOT FEATHER."</p>
PROPELLER DID NOT FEATHER	<p><b>"IDENTIFY THE NUMBER (ONE OR TWO) PROP LEVER"</b></p> <p>VISUALLY CONFIRMS THE CORRECT PROP LEVER HAS BEEN IDENTIFIED.</p> <p><b>"CONFIRMED, FEATHER THE PROP" OR</b> <b>"NEGATIVE, RE-IDENTIFY THE NUMBER ___ PROP"</b></p>	<p>PLACES INDEX FINGER ON THE APPROPRIATE PROP LEVER.</p> <p>"NUMBER ___ PROP LEVER IDENTIFIED"</p> <p>WHEN DIRECTED BY THE P*, MOVE THE PROP TO FEATHER. "PROP FEATHERED."</p>
Additionally for Engine Failure After Takeoff/Engine Failure after V <sub>1</sub>		
UPON REACHING V <sub>YSE</sub>	<b>"FLAPS UP"</b>	"FLAPS UP"

# Glossary

<b>AAR</b>	after action review
<b>ADF</b>	automatic direction finding
<b>AEB</b>	aerial exploitation battalions
<b>AGL</b>	above ground level
<b>AHO</b>	above highest obstacle
<b>AIM</b>	Aeronautical Information Manual
<b>ALSE</b>	aviation life support equipment
<b>AMC</b>	air mission commander
<b>AMCOM</b>	Army aviation and missile life cycle management command
<b>AP</b>	autopilot
<b>APART</b>	annual proficiency and readiness test
<b>AR</b>	Army regulation
<b>ARNG</b>	Army National Guard
<b>ASE</b>	aircraft survivability equipment
<b>ASET</b>	aircraft survivability equipment trainer
<b>ATC</b>	air traffic control
<b>ATGM</b>	antitank guided missiles
<b>ATM</b>	aircrew training manual
<b>ATP</b>	aircrew training program
<b>AVAIL</b>	available
<b>AWR</b>	airworthiness release
<b>BATT</b>	battery
<b>BIT</b>	built-in test
<b>C</b>	Celsius
<b>CBRN</b>	chemical, biological, radiological, and nuclear
<b>CDI</b>	course deviation indicator
<b>CDU</b>	central display unit
<b>CG</b>	center of gravity
<b>CL</b>	checklist
<b>CNTRL</b>	control
<b>COMM</b>	communication
<b>COMSEC</b>	communication security
<b>CONT</b>	continuous
<b>CONUS</b>	continental United States
<b>CTL</b>	commander's task list; crew task list
<b>DA</b>	Department of the Army
<b>DA Pam</b>	Department of the Army pamphlet
<b>DAC</b>	Department of the Army civilian
<b>DES</b>	Directorate of Evaluation and Standardization

## Glossary

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<b>DH</b>	decision height
<b>DLU</b>	data loader unit
<b>DME</b>	distance measuring equipment
<b>DOD</b>	Department of Defense
<b>DOT</b>	Department of Transportation
<b>DSN</b>	defense switched network
<b>DTS</b>	data transfer system
<b>DTU</b>	data transfer unit
<b>EFIS</b>	electronic flight instrument system
<b>ELA</b>	en route low altitude
<b>EM</b>	electronic manual
<b>EMERG</b>	emergency
<b>EQUIP</b>	equipment
<b>ETA</b>	estimated time of arrival
<b>ETE</b>	estimated time en route
<b>ETP</b>	exportable training package
<b>EVAL</b>	evaluation
<b>FAA</b>	Federal Aviation Administration
<b>FAC</b>	flight activity category
<b>FAF</b>	final approach fix
<b>FAR</b>	Federal Aviation Regulation
<b>FD</b>	flight director
<b>FIH</b>	flight information handbook
<b>FLIP</b>	flight information publication
<b>FM</b>	field manual
<b>FMS</b>	flight management system
<b>FPM</b>	feet per minute
<b>FPLN</b>	flight plan
<b>FS</b>	flight simulator
<b>FWMEQC</b>	fixed-wing multi-engine qualification course
<b>GPAAS</b>	ground proximity altitude advisory system
<b>GPS</b>	global positioning system
<b>GPWS</b>	ground proximity warning system
<b>GR</b>	grade
<b>GRAMPS</b>	Guardrail aviation mission planning station
<b>GRCS</b>	Guardrail common sensor
<b>GRCSPQC</b>	Guardrail common sensor pilot qualification course
<b>GMTF</b>	general maintenance test flight
<b>GWT</b>	gross weight
<b>HA</b>	holding area
<b>HAATS</b>	high-altitude Army aviation training site

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<b>HF</b>	high fidelity
<b>HQDA</b>	Headquarters, Department of the Army
<b>IAF</b>	initial approach fix
<b>IAS</b>	indicated airspeed
<b>IATF</b>	individual aircrew training folder
<b>IAW</b>	in accordance with
<b>IE</b>	instrument examiner
<b>IETM</b>	interactive electronic technical manual
<b>IF</b>	intermediate approach fix
<b>IFF</b>	identification, friend or foe
<b>IFH</b>	instrument flying handbook
<b>IFR</b>	instrument flight rules
<b>IIMC</b>	inadvertent instrument meteorological conditions
<b>IMC</b>	instrument meteorological conditions
<b>ILS</b>	instrument landing system
<b>IND</b>	indicated
<b>INTERCOMM</b>	intercommunication
<b>IP</b>	instructor pilot
<b>IPH</b>	instructor pilot handbook
<b>JP</b>	joint publication
<b>KIAS</b>	knots indicated airspeed
<b>KTAS</b>	knots true airspeed
<b>KTS</b>	knots
<b>lbs</b>	pounds
<b>LOC</b>	localizer
<b>LMTF</b>	limited maintenance test flight
<b>MAHF</b>	missed approach holding fix
<b>MAP</b>	missed approach point
<b>MAX</b>	maximum
<b>MDA</b>	minimum descent altitude
<b>ME</b>	maintenance test flight evaluator
<b>MEF</b>	maximum elevation figures
<b>METL</b>	mission essential task list
<b>METT-TC</b>	mission, enemy, terrain and weather, troops and support available, time available, civil considerations (the major factors considered during mission analysis)
<b>MFD</b>	multi-function display
<b>MIJI</b>	meaconing, interference, jamming and intrusion
<b>MOC</b>	maintenance operational check
<b>MOPP-IV</b>	mission-oriented protective posture-4
<b>MP</b>	maintenance test pilot
<b>MSA</b>	minimum safe altitude

## Glossary

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<b>MSL</b>	mean sea level
<b>MTF</b>	maintenance test flight
<b>MTP</b>	mission training plan
<b>NA</b>	not applicable
<b>NAV</b>	navigation
<b>NAVAID</b>	navigational aid
<b>NDB</b>	Non-directional beacon
<b>NG</b>	National Guard
<b>NGR</b>	National Guard regulation
<b>nm</b>	nautical mile
<b>NOE</b>	nap-of-the-earth
<b>NOTAM</b>	notice to airmen
<b>P</b>	pilot not on the controls
<b>P*</b>	pilot on the controls
<b>PA</b>	pressure altitude
<b>PAR</b>	precision approach radar
<b>PC</b>	pilot in command
<b>PEO</b>	program executive office
<b>PFE</b>	proficiency flight evaluation
<b>PGRM</b>	program
<b>PI</b>	pilot
<b>PM</b>	preventive maintenance
<b>PMD</b>	preventive maintenance daily
<b>POI</b>	program of instruction
<b>PMFE</b>	Post-mishap flight evaluations
<b>PPC</b>	performance planning card
<b>RAIM</b>	receiver autonomous integrity monitoring
<b>RC</b>	Reserve component
<b>R/C</b>	rate of climb
<b>REL</b>	required equipment list
<b>RET</b>	retract(ed)
<b>REV</b>	reversionary
<b>RL</b>	readiness level
<b>RPM</b>	revolutions per minute
<b>SA</b>	situational awareness
<b>SE</b>	single engine
<b>SFTS</b>	synthetic flight training system
<b>SI</b>	standardization instructor
<b>SOP</b>	standing operating procedure
<b>SP</b>	standardization instructor pilot
<b>STANAG</b>	Standardization Agreement

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<b>TACAN</b>	tactical air navigation
<b>TACOPS</b>	tactical operations
<b>TACS</b>	traffic alert and collision avoidance system
<b>TAMMS-A</b>	the Army maintenance management system-aviation
<b>TAS</b>	true airspeed
<b>TAWS</b>	terrain awareness and warning system
<b>TC</b>	training circular
<b>TEMP</b>	temperature
<b>TERPS</b>	terminal instrument procedures
<b>TF</b>	test flight
<b>TM</b>	technical manual
<b>TOLD</b>	take-off landing data
<b>TRADOC</b>	Training and Doctrine Command
<b>TSP</b>	training support package
<b>TTP</b>	tactics, techniques, and procedures
<b>U.S.</b>	United States
<b>USA</b>	United States Army
<b>USAACE</b>	United States Army Aviation Center of Excellence
<b>USAPA</b>	United States Army publishing agency
<b>UT</b>	unit trainer
<b>VASI</b>	visual approach slope indicator
<b>VDP</b>	visual descent point
<b>VFR</b>	visual flight rules
<b>VHF</b>	very high frequency
<b>VMC</b>	visual meteorological conditions
<b>VOR</b>	very high frequency omni-directional range
<b>WPT</b>	waypoint
<b>WT</b>	weight

<b>Accelerate-Go Distance Over 50-Foot Obstacle</b>	This chart is used to determine the total distance required from brake release to accelerate to takeoff decision speed ( $V_1$ ); experience an engine failure; continue accelerating to lift-off; then climb and accelerate to achieve takeoff safety speed ( $V_2$ ) at 50 feet.
<b>Accelerate-Stop</b>	The sum of the distances necessary to: <ol style="list-style-type: none"> <li>(1) Accelerate the airplane from a standing start to <math>V_{EF}</math> with all engines operating.</li> <li>(2) Accelerate the airplane from <math>V_{EF}</math> to <math>V_1</math>, assuming the critical engine fails at <math>V_{EF}</math>.</li> <li>(3) Come to a full stop from the point at which <math>V_1</math> is reached.</li> </ol>
<b>Climb-One Engine Inoperative</b>	Used to determine the rate of climb in FPM 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 $V_{YSE}$ .
<b>Climb-Two Engines Flaps 0%</b>	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.
<b>Climb-Two Engine Flaps 40%</b>	This chart is not a true $V_X$ or $V_Y$ , 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 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.
<b>Minimum Takeoff Power at 2000 RPM</b>	The minimum TQ required to achieve the takeoff performance in the performance section of the operator’s manual as a function of ice vanes position, PA, 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.
<b>Takeoff Climb Gradient One Engine Inoperative</b>	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 where Accelerate-Go Distance over 50-Feet Obstacle ends.
<b>Takeoff Distance</b>	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.
<b>Takeoff Weight to Achieve a Positive One Engine Inoperative Climb at Liftoff</b>	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.
$V_1$	Critical engine failure recognition speed; the maximum speed in the takeoff at which the pilot must take the first action (apply brakes, reduce thrust, deploy speed brakes) to stop the airplane within the accelerate-stop distance.
$V_2$	Takeoff safety speed. The speed as which the aircraft may safely become airborne with one engine inoperative.
$V_{ENR}$	Single engine en route climb speed is the airspeed that is flown during the third segment from 400 feet AGL to 1,500 feet AGL with gear and flaps up.
$V_{LOF}$	Lift off speed. Also called takeoff screen speed, the minimum speed in the second



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	segment of a climb following an engine failure.
$V_{MC}$	Minimum control speed with Critical engine inoperative.
$V_{mca}$	Minimum control speed in the takeoff configuration-the minimum calibrated airspeed at which the aircraft is directionally controllable in flight with a sudden Critical engine failure and takeoff power on the operative engine(s).
$V_{meg}$	Minimum control speed in the ground-the minimum airspeed at which the aircraft is directionally controllable during acceleration along the runway with one engine inoperative, takeoff power on the operative engine(s), and with nosewheel steering assumed inoperative.
$V_R$	Rotation speed. The speed at which the aircraft's nosewheel leaves the ground.
$V_{REF}$	Landing reference speed or threshold crossing speed. Speed (in calm air) at the landing screen height of 50 feet. Often used by pilots as a base from which to calculate speeds to be used during landing, and calculated as $1.3xV_{S0}$ .
$V_{sse}$	Safe single engine speed.
$V_X$	Speed that will allow for best angle of climb.
$V_Y$	Speed that will allow for best rate of climb.
$V_{YSE}$	Speed for best rate of climb with the critical engine inoperative.

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**TC 3-04.52**  
29 July 2013

By order of the Secretary of the Army:

**RAYMOND T. ODIERNO**  
*General, United States Army*  
*Chief of Staff*

Official:

A handwritten signature in black ink, appearing to read "Gerald B. O'Keefe". The signature is fluid and cursive, with the first name "Gerald" being the most prominent.

**GERALD B. O'KEEFE**

*Administrative Assistant to  
the Secretary of the Army*

1318212

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