TC 1-600

UNMANNED AIRCRAFT SYSTEM COMMANDER'S GUIDE AND AIRCREW TRAINING MANUAL

August 2007

HEADQUARTERS
DEPARTMENT OF THE ARMY

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Training Circular
No. 1-600

Headquarters
Department of the Army
Washington, DC, 23 August 2007

UNMANNED AIRCRAFT SYSTEM COMMANDER'S GUIDE AND AIRCREW TRAINING MANUAL

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***This publication supersedes TC 1-600, 23 June 2006.**

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Preface

This aircrew training manual (ATM) standardizes aircrew training programs (ATPs) and flight evaluation procedures by providing specific guidelines for executing unmanned aircraft system (UAS) aircrew training. It is based on the battle-focused training principles outlined in FM 7-1. It establishes crewmember qualification, refresher, mission, and continuation training and evaluation requirements. This manual applies to all RQ-5, MQ-5, and RQ-7 crewmembers and their commanders.

This manual, in conjunction with Army regulations, will help UAS commanders, at all levels; develop a comprehensive aircrew training program. By using the ATM, commanders ensure that individual and crew proficiency match their units' mission and that unmanned aircraft crewmembers (UACs) routinely employ standard techniques and procedures. UACs will use this manual as a "how to" source for performing crewmember duties.

This manual provides performance standards and evaluation guidelines so that crewmembers know the level of performance expected. Each task has a description that describes how it should be done to meet the standard.

Standardization officers, evaluators, and unit trainers will use this manual and Army Regulation (AR) 95-23 as the primary tools to assist the commander in developing and implementing this ATP. Technical Circular (TC) 1-210 does not apply to the UAS ATP.

This TC applies to the Active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the United States Army Reserve (USAR) unless otherwise stated.

The proponent of this publication is United States Army Training and Doctrine Command (TRADOC). Send comments and recommendations on Department of the Army (DA) Form 2028 (*Recommended Changes to Publications and Blank Forms*) through the aviation unit commander to United States Army Aviation Warfighting Center (USAAWC), Directorate of Evaluation and Standardization, ATTN: ATZQ-ES (UAS Branch), Building 4503, Kingsman Road, Fort Rucker, Alabama 36362-5263.

This publication has been reviewed for operations security considerations.

Chapter 1
Introduction

The training objective of any combat unit is for the unit to be able to conduct combined arms training. Toward that end, effective individual and crew training programs form the foundation for an aviation unit training program. Once the unit establishes individual and crew training programs, it must integrate them into an effective collective training program. As one of the commander's primary training documents, TC 1-600 links individual and unit collective tasks. The commander also uses FM 7-0 and FM 7-1 to link the aircraft operator's manual, ATM, and individual training program to the collective training program.

RESPONSIBILITIES

1-1. **Commander**. According to FM 7-1, the commander—

- Is the primary training manager and trainer for the unit.
- Is responsible for the ATP.
- Trains based on the unit's wartime mission, maintains standards, and evaluates proficiency.
- Provides the required resources and develops and executes training plans that result in proficient individuals, leaders, and units.
- Has subordinate leaders (officers and noncommissioned officers [NCOs]), instructor operators, and standardization officers/NCOs that help plan and prepare UAS training.

1-2. **Standardization Officer/NCO**. The UAS standardization officer is the commander's technical advisor and helps develop, implement, and manage the ATP.

1-3. **Evaluators/Unit Trainers**. These individuals are the standardization instructor operators (SOs), instructor operators (IOs), and unit trainers (UTs) that help the commander administer the ATP. They evaluate, train, and provide technical supervision for the UAS standardization program as specified by the commander.

1-4. **Mission Commanders (MCs)**. These individuals are responsible for coordinating all external needs as well as crew coordination. They maintain command and control over all flight operations from pre-mission through postmission, to include disseminating information. To perform duties as a MC, a crewmember must be qualified and current on the system being flown.

1-5. **Unmanned Aircraft Crewmember**. Operators and/or ground crewmembers perform duties controlling the flight of a UAS or the operation of its mission equipment. They also prepare, launch, recover, and/or maintain the UASs.

INDIVIDUAL, CREW, AND COLLECTIVE TRAINING

1-6. To design and manage an effective ATP, the commander must analyze individual, crew, and collective training.

Note. This ATM describes training requirements for crewmembers. It will be used with AR 95-23 and other applicable publications. The ATM and the unit's mission-essential task list (METL) are used by the commander to combine individual training with crew training.

1-7. **Individual Training**. Individual training—the building block to crew training—is the responsibility of the aviation platoon leader, with assistance from the unit IO. The operator's manual and the ATM guide the platoon leader and the IO in training the individual to mission-ready standards. UACs must ensure that they satisfy all ATP requirements.

1-8. **Crew Training**

- Crew training is the first step in developing a unit collective training plan. It is the building block for team training. The platoon leader and unit IOs train the crew. The platoon leader ensures that the crew is proficient in ATM tasks and in the tactics, techniques, and procedures outlined in other appropriate publications.
- The commander, subordinate leaders, and trainers must implement the crew coordination program into crew training. Crew coordination is critical training—it improves mission performance and enhances safety. To effectively employ modern Army UASs with their complex missions, more than one crewmember must perform crew tasks.

1-9. **Collective Training**. Collective training encompasses all training, including combined arms operations. The unit's METL links crew and collective training. These tasks are collective tasks that support the unit's wartime mission. Along with this ATM, FM 7-1 helps the commander link individual and crew training with the tasks required to execute the wartime mission. The mission training plan (MTP), applicable field manuals, and unit standing operating procedures (SOPs) establish the tasks to be performed, the conditions under which the tasks are performed, and the standard that the unit must maintain for unit readiness.

1-10. **Combined Arms Training**. Combined arms training is the training pinnacle in the preparation for combat. It is collective training that associated combat arms, combat support, and combat service support units conduct jointly. Combined arms training integrates all associated combat systems and applies that capability on the battlefield at the critical place and time. Combined arms training normally is executed at the battalion task force level and above. However, collective training at any level is considered combined arms training anytime it is conducted with another combat arm. Some examples of collective training are training to support brigade or division exercise evaluations, combat training center rotations, deployment exercises, combined arms live-fire exercises, brigade command post exercises, and battle command training programs.

INDIVIDUAL AND COLLECTIVE TRAINING INTEGRATION

1-11. To achieve maximum training results from limited resources, planning must be detailed and flying hours that are devoted solely to individual training must be kept to a minimum. Integrating individual continuation training into collective training maximizes every hour of flight time. Units must incorporate collective training into every element of the ATP.

INDIVIDUAL TASKS AND COLLECTIVE MISSION-ESSENTIAL TASKS

1-12. Tasks are clearly defined, measurable activities that Soldiers and units must perform. These specific activities contribute to the accomplishment of missions or other requirements.

1-13. The link between the collective mission-essential tasks and the individual tasks that support them is critical to the battle-focused training concept. The commander plans, prepares, executes, and evaluates training based on the METL. The commander selects critical battle tasks from the subordinate unit's METL and emphasizes the execution of those tasks during training and evaluation.

SITUATIONAL TRAINING EXERCISES

1-14. Situational training exercises (STXs) are limited, mission-related exercises. They train crews or crewmembers to execute one collective task or a group of related tasks and drills through practice. (The terms "situational exercise" and "scenario" are used synonymously.) Based on the unit METL, commanders

may modify or expand STXs to meet special mission requirements. These exercises aid in the transition from individual task proficiency to collective task proficiency. The STX—

- Focuses training on weaknesses identified in previous training and evaluations.
- Provides repetitive training on parts of missions.
- Saves time by providing information needed to develop training.
- Allows the UAC, ground crewmember, or unit to practice selected critical parts of the mission before rehearsing the entire mission.

1-15. Commanders may develop STXs as a training and ATP management tool. If used, the STXs should permit simultaneous accomplishment of individual and collective tasks.

1-16. The commander develops STXs that support METL requirements by—

- Selecting the battle task to be performed. A battle task is a task that must be accomplished by a subordinate unit organization if the next higher headquarters is to accomplish a mission-essential task.
- Establishing the conditions and standards for the selected battle task (using the appropriate ATM/MTP).
- Developing a mission statement to support the battle task. One STX may have numerous mission statements.
- Identifying the company METL task that supports the battle task.
- Developing collective supporting tasks (using MTP tasks).
- Applying time standards.
- Identifying references.

1-17. Situational training exercises should have realistic training objectives. The commander must ensure that the STXs do not become "canned" training. The training goal must be clearly defined, and all participants in the training must understand the objectives.

1-18. The Army Training and Evaluation Program (ARTEP) MTPs give units a clear description of what and how to train to achieve wartime mission proficiency. They elaborate on wartime missions in terms of comprehensive training and evaluation outlines. They also provide exercise concepts and related training management aids to help field commanders plan and execute effective unit training. The applicable ARTEP MTP gives examples for developing and using STXs.

BATTLE ROSTERING

1-19. Battle rostering is the designation of two or more individuals to routinely perform as a crew. Studies show that certain specific performance areas may benefit from battle rostering. Commanders may battle roster crews at their discretion. However, commanders must be aware that prolonged battle rostering may produce crew complacency, overconfidence, implicit coordination behaviors, and nonstandard procedures, which result in a degradation of crew proficiency. Therefore, battle rostering is most beneficial when used for short periods, such as in training exercises and ARTEPs.

1-20. When battle rostering crews, commanders should consider individual, flight, and unit mission experience. They also should consider individual personalities and maturity.

RISK MANAGEMENT

1-21. Commanders are responsible for the effective assessment of risk when they establish a unit training program. Chapter 6 provides a simple decision-making process that will help the commander balance training demands against risk. Commanders should consider both the individual and the crew when they assess mission risks. They also must use risk-management concepts continually to prevent the unnecessary loss of Soldiers and equipment.

AIRCREW COORDINATION

1-22. Aircrew coordination is a set of principles, attitudes, procedures, and techniques that transforms individuals into an effective crew. It is a vital part of the overall ATP. As directed by the Department of the Army, all crewmembers must become aircrew coordination qualified.

Note. At the time of this revision, suspense dates for qualification in aircrew coordination are being staffed and will be issued by message at a later date.

1-23. Units will conduct initial aircrew coordination qualification training according to this publication and the USAAWC aircrew coordination exportable training package (ETP). The ETP includes slides and video tapes. To obtain information about this ETP, units may write to the Commander, U.S. Army Aviation Center, ATTN: ATZQ-ATB-NS, Fort Rucker, Alabama 36362-5218.

- **Qualified instructors**. An SO or IO qualified in aircrew coordination must conduct the pre-training and final evaluations of crewmembers. Properly trained UTs may conduct the academic and flight training, but they may not conduct the evaluations. A qualified SO or IO can qualify other SOs and IOs.
- **Documentation**. The aircrew coordination qualification will be annotated on the individual's DA Form 7122-R (*Crew Member Training Record*). It also will be noted in the Remarks section of the individual's DA Form 759 (*Individual Flight Record and Flight Certificate–Army*).

1-24. Aircrew coordination should be emphasized during readiness level (RL) progressions. It will be evaluated during the annual proficiency and readiness test (APART).

1-25. Including aircrew coordination in ATM task descriptions reflects the philosophy that a preflight, flight, or postflight task is not an individual undertaking; each task can be performed more effectively and safely by the coordinated efforts of the entire crew. ATM revisions will include individual and crew-coordinated actions in the task descriptions.

CREW STATION DESIGNATION

1-26. The commander will designate a crew station(s) and duties authorized for each crewmember. The individual's commander's task list (CTL) and the DA Form 7120-R (*Commander's Task List*) must clearly indicate all crew station designations and duties authorized. Training and proficiency sustainment is required in each designated crew station. Commanders should only designate single duty positions when an operational situation requires it. Failure to require UACs to perform all authorized duties will degrade individual and collective task skills.

SYMBOL USAGE AND WORD DISTINCTIONS

1-27. **Symbol Usage**. The diagonal (/) indicates three options—for example, IO/SO means either one (IO) or the other (SO) or both (IO and SO).

1-28. **Word Distinctions**

- Warnings, cautions, and notes.
  - A warning alerts users to the possibility of immediate personal injury or damage to equipment if an operating procedure, practice, condition, or statement is not correctly followed.
  - A caution alerts users to the possibility of personal injury or damage to equipment that may result from long-term failure to follow correct operating procedure or practice.
  - A note alerts users to an operating procedure, condition, or statement.

- Will, must, should, and may.
  - Will or must indicates a mandatory requirement.
  - Should indicates a preferred, but nonmandatory, method of accomplishment.
  - May indicates an acceptable method of accomplishment.

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Chapter 2

Aircrew Training Program

This chapter describes requirements for qualification, RL progression, and continuation training. Crewmember qualification requirements will be per AR 95-23 and this ATM.

GOAL AND APPLICABILITY

2-1. The ATP consists of qualification, refresher, mission, and continuation training. The goal of the ATP is to produce mission-ready UAS units.

2-2. The ATP applies to crewmembers that perform duties controlling the flight of a UAS or the operation of its mission equipment as well as preparation, launch, and recovery tasks essential to operate the UAS.

Note. Upon signing into the unit, all UACs in an operational status are members of the unit's ATP. Operators must present their individual aircrew training folder (IATF) and individual flight record folder (IFRF), if applicable, to the commander or the commander's designated representative upon signing into the unit. RL status is determined by the commander's evaluation.

TRAINING YEAR

2-3. **Active Army and USAR**. The ATP training year is divided into semiannual training periods. For Active Army and USAR crewmembers, the first training period begins the first day following the end of their birth month and continues for six months. The second training period begins the first day of the seventh month and continues through the end of the crewmember's birth month. For example, the first training period for a crewmember born on 15 April begins 1 May and ends 31 October. The second training period begins 1 November and ends 30 April.

2-4. **Army National Guard**. For ARNG crewmembers, the training year coincides with the fiscal year. The first training period begins 1 October and ends 31 March. The second training period begins 1 April and ends 30 September.

2-5. **Department of the Army Civilians (DACs)**. The unit commander designates the training year for DAC crewmembers.

FLIGHT ACTIVITY CATEGORIES

2-6. All operational UAS positions and other designated operator positions in the ATP are classified as one of three flight activity categories (FACs). Unit commanders designate each position FAC 1, FAC 2, or FAC 3. They base these designations on the proficiency required by the table of organization and equipment (TOE) or table of distribution and allowance (TDA) position. Commanders will not change a FAC level merely to reduce individual or unit flying-hour requirements.

Note. FACs do not apply to DACs.

2-7. **FAC 1**. FAC 1 positions require a high degree of flight proficiency in the tactical employment of the assigned aircraft. The higher semiannual flying-hour minimums required of FAC 1 operators reflects this need for increased flight proficiency. External operators (EOs) assigned to TOE units are classified as FAC 1.

2-8. **FAC 2**. FAC 2 duty positions (platoon sergeants and company level staff positions) require less tactical flight proficiency than FAC 1 positions.

2-9. **FAC 3**. Commanders may designate certain positions as FAC 3 based on METL requirements. Operators assigned to FAC 3 operational UAS positions must be qualified in their primary unmanned aircraft (UA). However, they shall not perform crewmember duties with Army UAS's. They do not have currency requirements, and they are not subject to readiness levels. Commanders would not use the operators in combat operations without providing refresher or mission training. FAC 3 operators, however, must maintain their basic flying skills using a flight simulator. A compatible simulator must be available for the operator's use. Simulator requirements for FAC 3 operators should not be waived.

- FAC 3 operators must maintain the simulator flying-hour minimums stated in the appropriate appendix of this ATM. The commander will specify simulator task and iteration requirements on DA Form 7120-R. They may prorate these requirements according to this publication.
- Within 90 days after being assigned FAC 3 and once annually thereafter, operators must demonstrate to an IO their proficiency in base flying tasks listed in the appropriate appendix of this ATM.
- Operators designated FAC 3 must maintain a current flight physical per AR 40-501.

COMMANDER'S EVALUATION

2-10. The commander's evaluation determines the initial RL of newly assigned crewmembers. This evaluation consists of a records review and possibly a proficiency flight evaluation.

- Active Army. The commander or designated representative will complete the evaluation within 45 calendar days after the crewmember signs in to the unit or after the effective date of the crewmember's flying status orders, whichever occurs last.
- Reserve Component. The commander or designated representative must complete the evaluation within 45 calendar days after the effective date of the crewmember's operational flying status orders or the effective date of transfer.

2-11. **Records Review**. Unit commanders or their designated representative will review the crewmember's IATF and IFRF. They will compare the individual's qualifications with the tasks required by the assigned duty position. If the appropriate RL can be determined from the review, the commander will document the RL on the individual's DA Form 7122-R.

2-12. **Proficiency Flight Evaluation (PFE)**. If the initial RL cannot be determined by the records review or if the commander desires, the crewmember will undergo a proficiency flight evaluation. The PFE should include tasks from each flight mode in which the crewmember can expect to perform duties. The results of the PFE will determine the crewmember's RL. The commander will document the RL on the individual's DA Form 7122-R.

2-13. **Considerations**

- Commanders may not assign an initial RL 2 or RL 1 to graduates of a UAS qualification course, who are on their first utilization tour, solely on the basis of a records review. For initial designations other than RL 3, the commander must also consider the results of a PFE.
- If, at the time of initial RL designation, 1 year has passed since the UAC has completed any element of an APART (standardization evaluation or UAS operator's manual examination), the UAC must complete that element before designation as, or progression to, RL 1. Graduates of a UAS qualification course who are on their first utilization tour are exempt from this requirement.

2-14. **Required Training**. After determining the initial RL, the commander will direct qualification, refresher, mission, or continuation training for the crewmember as applicable. Time allotted for completing

the required training will start accruing on the date of the RL designation. If recommended by the evaluator, crewmembers may credit the tasks satisfactorily completed on the PFE toward completion of their RL training requirements.

READINESS LEVELS

2-15. Readiness levels identify the training phase in which the operator is participating and measure readiness to perform assigned missions. They also provide a logical progression of individual and crew training based on task and mission proficiency. In some cases, a crewmember may have more than one readiness level. For example, RL 3 (refresher training) as EO and RL 1 (continuation training) as unmanned aircraft operator (AO)/ mission payload operator (PO).

Note. Readiness levels do not apply to DACs.

2-16. Progression

- Active Army UACs, USAR technicians, and USAR Active Guard and Reserve (AGR) UACs have 90 consecutive days to progress from one RL to the next. USAR crewmembers have 1 year to progress. All ARNG crewmembers, including AGR crewmembers and technicians, progress according to Nation Guard regulations. Readiness level progression will exclude days lost because of—
  - Temporary duty (TDY).
  - Medical or nonmedical suspension from operations.
  - Leave approved by the unit commander.
  - Grounding of UASs.
  - UASs that are unavailable or in transit due to unit deployment.
- If the exclusion period exceeds 45 consecutive days, operators must restart their current RL progression. They will restart on that date and have 90 consecutive days to progress to the next readiness level. (ARNG crewmembers should refer to ARNG regulations.)
- An operator may progress to the next RL in less time than prescribed above (paragraph 2-16, first bullet) by demonstrating proficiency to an IO/SO.
- During RL progression, crewmembers must demonstrate proficiency in each mode of flight (day or night) required by the ATM and CTL for each task. The provision pertaining to the more demanding mode of flight does not apply. RL progression evaluations may be continuous.
- When a crewmember is reclassified to RL 2 or RL 3 because of a flight deficiency, the crewmember needs to demonstrate proficiency in only the tasks that were graded unsatisfactory.
- When an operator has not progressed within the required period, the unit commander will take action according to AR 95-23.

2-17. **Readiness Level 3 (Qualification/Refresher Training)**. An operator is RL 3 while undergoing qualification or refresher training. Refresher training is for an operator to regain proficiency in academics and all base tasks for the duty position. An operator progresses from RL 3 to RL 2 by demonstrating proficiency in all base tasks to a SO/IO.

- A crewmember returning to an operational flying position after not having flown within the previous 180 days must be designated RL 3 for refresher training. Refresher training should include academic courses.
- There are no task or iteration minimums or APART requirements while an operator is designated RL 3. However, to smoothly transition from RL 3 to RL 2, the commander may establish minimum hours and iterations with assistance from the SO/IO.

2-18. **Readiness Level 2 (Mission Training)**. An operator who has completed RL 3 training or has been initially designated RL 2, based on the commander's evaluation, will begin training on mission and additional tasks as designated by the unit commander. Mission training programs help RL 2 operators to verify and develop their ability to perform specific tasks (selected by the commander) that support the

unit's METL. Because the goal is proficiency in mission-related tasks, commanders should tailor their task list to meet specific unit needs. An operator progresses from RL 2 to RL 1 by demonstrating proficiency in all selected mission and additional tasks to a SO/IO. An operator has 90 consecutive days to progress to RL 1. There are no task or iteration minimums or APART requirements while an operator is designated RL 2. However, to smoothly transition from RL 2 to RL 1, the commander may establish minimum hours and iterations with assistance from the SO/IO. During mission training, crewmembers do not have minimum hour, task, iteration, or APART requirements. The only requirements they have are those designated by the commander with assistance from the SO/IO.

2-19. **Readiness Level 1 (Continuation Training)**. An operator who has completed RL 2 training is considered mission ready and designated RL 1. The operator must perform those tasks designated by the unit commander for the operator's TOE or TDA position. Once designated RL 1, the UAC must complete APART requirements during the 3-month period ending the last day of the UAC's birth month.

FLYING-HOUR REQUIREMENTS

2-20. **Individual Semiannual Hours**. Minimum semiannual hours for a crewmember's primary UAS and simulator are in the applicable appendix of this manual.

2-21. **Unit Trainer and Evaluator Minimums**. Unit trainers and evaluators may credit toward their semiannual flying-hour minimums those hours they fly while performing their duties.

2-22. **Flying-Hour Reprogramming**

- A highly proficient FAC 1 crewmember may require fewer hours of training to sustain RL 1 proficiency than an average crewmember. Considering this, commanders may reduce the semiannual flying-hour requirements for a highly proficient FAC 1 crewmember up to 25 percent. They can then reprogram these extra hours to support other training requirements. Reprogramming does not affect the unit's annual flying-hour program (FHP).
- Commanders may adjust unit and crewmember semiannual ATM flying-hour requirements before the beginning of the ATP year by as much as 15 percent to meet training and mission requirements. They may authorize up to 65 percent of the annual requirements in one semiannual period but not less than 35 percent in the other semiannual period. This will not change the unit's annual FHP nor will it reduce a crewmember's annual task or flying-hour requirements, which may have been reprogrammed.
- Commanders may adjust flying-hour minimums during the crewmember's first semiannual period but not after the crewmember completes the first semiannual period. When commanders exercise the option to adjust, they must clearly annotate the new semiannual minimums on the crewmember's task list. They also must make the appropriate entries in the Remarks section of the crewmember's DA Form 759. Adjusting minimums helps a commander manage flying hours to meet training and mission requirements. If the minimums for the first semiannual period were designated as 35 percent and the flying hours exceeded 35 percent, the commander may reduce the second period by the excess amount so that the annual flying-hour requirement is not greater than required. However, the minimums for the second period may not be less than 35 percent of the annual requirement.

2-23. **Flying Hour/Simulator Minimums Prorating**

- Commanders prorate flying-hour/simulator minimums when a UAC—
  - Is newly designated RL 1.
  - Has the primary UAS re-designated.
  - Changes duty position, which involves a change in the FAC level.
- The minimum will be one-sixth of semiannual requirements and/or one-twelfth of annual requirements for each full month remaining in the training period. Any previous flying-hour requirement no longer applies.

2-24. **Determination that minimums have been met**

- At the end of the training period, commanders determine if the UAC's minimums have been met. If the minimums have not been met, commanders reduce minimums by 1 month for each 30 days the crewmember was unable to fly for the reason listed below. Then adds the total number of days lost because of—
  - TDY.
  - Medical or nonmedical suspension.
  - Grounding of the UAS.
  - UASs that are unavailable or in transit due to unit deployment.
- Days in different categories may be added together for 30-day totals. Concurrent days (for example, simultaneous medical suspension and TDY) will not be added together.

2-25. **Removal from RL 1 or FAC 3**

- **Training deficiency**. A crewmember removed from RL 1 for a training deficiency must still meet all RL 1 ATP requirements. ATP requirements met while RL 2/3 will be applied to RL 1 requirements.
- **Other than a training deficiency**. A crewmember has until the end of the training period to complete ATP requirements. If a crewmember is removed from RL 1 or FAC 3 for other than a training deficiency before the end of the training period (for example, a permanent change of station [PCS] departure), the ATP requirements no longer apply.

TASK AND ITERATION PRORATION

2-26. During the training year, all RL 1 crewmembers must complete one iteration of each task on their list in each of the modes indicated. The commander may increase these requirements as training and proficiency requirements if a crewmember is initially designated RL 1 as follows:

- If more than 6 months remain in the crewmember's training year, the crewmember must complete one iteration of each task in each of the modes indicated on the list. The commander may increase the requirements.
- If less than 6 months remain in the crewmember's training year, the crewmember will not have task and iteration requirements unless specified by the commander.

Note. A task iteration performed at night may be substituted for a day task iteration.

2-27. If the crewmember is removed from RL 1 or FAC 3, the provisions of paragraph 2-26 apply.

LOCAL AREA ORIENTATION

2-28. **Airfield Operations and Procedures**. The commander will ensure that crewmembers are given a tour of and a briefing on the airfield operations facilities. The tour should include the flight planning room (location of maps and other flight planning aids) and airfield operations office. If the weather facility is located on the airfield, it also should be part of the tour.

2-29. The briefing should include procedures for—

- Obtaining maps and charts.
- Ensuring operations security of the airfield.
- Obtaining weather information.
- Obtaining range and restricted-area information.

2-30. The briefing should also include—

- Information on local medical facilities, frequencies, and access phone numbers.
- A review of visual flight rules (VFR) and special VFR requirements for the airfield and local area.
- A review of airspace in the local area.

- A review of the local area map, to include—
  - Boundaries.
  - Flight corridors.
  - Reporting points.
  - Noise abatement procedures.
  - Prominent terrain features.
  - Maintenance test flight areas.
  - Obstacles or hazards to flight.
  - Tactical training and range areas.
  - Restricted areas and no-fly areas.
  - Airfields, helipads, and frequently used landing zones (LZs).
  - High intensity radio transmission areas

2-31. **Airfield Layout and Facilities**. The commander will ensure that crewmembers are given a tour of the airfield area. This tour should include—

- Petroleum, oils, and lubricant facilities.
- Crash rescue facilities.
- Air traffic control (ATC) facilities.
- Simulation and procedural training devices.

2-32. **Local Area Orientation Flight**. Before progressing to RL 1, crewmembers must receive a local area orientation flight. (Units may conduct this flight along with other training.) The commander will determine which orientation items are required for the flight and if it should be accomplished both day and night. Items peculiar to the local area or those that cannot be adequately covered during the ground portion will be pointed out, demonstrated, or discussed during the flight. The orientation flight should include familiarization with local—

- Boundaries.
- Flight corridors.
- Reporting points.
- Prominent terrain features.
- Noise abatement procedures.
- Maintenance test flight areas.
- Restricted areas and no-fly areas.
- Tactical training and range areas.
- Airfields, helipads, and frequently used LZs.
- Obstacles or hazards to flight.

Note. Army commands, particularly those operating near sensitive borders, may establish additional requirements or restrictions for local area orientations.

MAINTENANCE OPERATOR QUALIFICATION AND TRAINING REQUIREMENTS

2-33. **Prerequisites**. Commanders are authorized to designate individuals as maintenance operators. Candidates for maintenance operators are to be selected from the most qualified/experienced IO who has qualified in the type and model of aircraft. The crewmember who performs maintenance duties will receive training and demonstrate proficiency in all maintenance flight tasks in the appropriate technical manual.

2-34. **Qualification Requirements**. Maintenance operator qualification training will be conducted at the unit level. The training will be accomplished by a maintenance operator qualified SO/IO designated by the

commander in writing on DA Form 7120-R. The crewmember undergoing maintenance operator qualification training will receive academic and flight training and must demonstrate proficiency in all maintenance operator tasks listed in the appropriate technical manual/ATM. The commander must designate the maintenance operator in writing on the DA Form 7120-R.

UAS GROUND CREWMEMBER REQUIREMENTS

2-35. UAS ground crewmembers (mechanics and technicians) perform duties on the UASs that are essential to specific phases of the flight mission. They will be—

- Designated in writing by the UAS unit commander.
- Military occupational specialty and additional skill identifier qualified to perform specific UAS operations.
- Trained to perform their duties according to this ATM, systems technical manuals, and the unit's training SOP.

2-36. UAS ground crewmembers that are authorized to start, run up, taxi, launch, and conduct recovery operations will—

- Undergo appropriate normal and emergency procedures training conducted by a SO.
- Be evaluated semiannually by an SO/IO on all functions that they are required to perform.
- Have tasks to be performed and evaluation requirements listed on the DA Form 7120 series and maintained in an IATF. (Minimum task requirements are listed in the appropriate appendix of this manual.)

Note. FAC levels and RL levels do not apply to UAS ground crewmembers.

SERIES QUALIFICATION TRAINING REQUIREMENTS

2-37. **General**. Unit commanders are authorized to conduct series qualification at unit level. UACs receiving the training must have attended the initial UAC qualification course for the UAS being flown. To become qualified in a UAS series, a UAC must complete—

- **Academic Training**. The UAC will receive training and demonstrate a working knowledge of the applicable topics in paragraph 3-18 and complete the operator's manual written examination.
- **Flight Training**. The UAC must demonstrate proficiency to an IO/SO in all base tasks and mission tasks as designated by the commander.

ANNUAL CBRN TRAINING REQUIREMENTS

2-38. Annual chemical, biological, radiological, and nuclear (CBRN) training is mandatory for all FAC 1 and those FAC 2 positions selected by the commander. Operators must wear full chemical protective over garments at mission-oriented protective posture (MOPP) level IV during this training.

2-39. Operators will receive CBRN training in the base tasks listed below. The commander may also select additional tasks based on the unit's mission.

- Task 1022, Perform Preflight Inspection.
- Task 1024, Perform Engine-Start/System Check.
- Task 1034, Perform UAS Taxi (as applicable).
- Task 1040, Perform Normal Takeoff and Climb.
- Task 1145, Perform Normal Landing.
- Task 1800, Perform After-Landing Tasks.

2-40. While conducting CBRN training, the commander will ensure that—

- Operators use extra care while performing duties or training when wet bulb globe temperatures are above 75 degrees Fahrenheit.

- A qualified and current operator, without a protective mask, is monitoring training at all times.

Note. Commanders may waive CBRN training requirements for those operators who require corrective lenses and do not have suitable inserts. Operators requiring such inserts must be identified and provided with corrective inserts as soon as possible.

2-41. **Evaluations**. Commanders will establish, in writing, a CBRN evaluation program. Units may conduct CBRN evaluations as part of the commander's no-notice program, along with the APART, or during ARTEP evaluations.

TASK CONTENTS

2-42. **Task Number and Title.** A number and title identify each task. The 1000-series tasks are base tasks. 2000-series tasks are mission tasks, which the commander may select. The 3000-series tasks are additional tasks. (They are tasks that the commander determines are essential to METL accomplishment and are not included in the ATM.)

2-43. **Conditions**. Tasks are performed in the situation that the conditions specify. Conditions describe the important aspects of the performance environment. UACs must meet all conditions before receiving credit for the task iterations.

2-44. **Standards**. The standards describe the minimum degree of proficiency or performance for accomplishing the task under ideal conditions.

2-45. **Description**. The description is a preferred method of completing the maneuver to the standards and will allow safe accomplishment of the maneuver in most circumstances. Deviations from the task description may be acceptable provided all the standards are still met and the safety of the UA and crew is not in question.

2-46. **Night Considerations**. Where applicable, night considerations are included.

2-47. **References**. The references are sources of information relating to that particular task. Certain references apply to many tasks. Besides the references listed with each task, the following common references apply as indicated.

- All flight tasks (tasks with engines operating).
  - AR 95-23.
  - AR 95-20.
  - FM 1-203.
  - FM 1-230.
  - Applicable operator’s manual and checklist.
  - Federal Aviation Regulation (FAR)/host-country regulations.
  - Unit/local SOPs.
  - Aircraft logbook (DA Form 2408 series).
  - DA Pam 738-751.
  - Current USAAWC-approved student handouts.
  - Department of Defense (DOD) flight information publication (FLIP).
- All tasks with environmental considerations.
  - FM 1-202.
  - TC 1-204.
- All medical tasks.
  - FM 3-04.301.
  - AR 40-8.

TASK CONSIDERATIONS

2-48. References to the IO in the task conditions include the SO.

2-49. When a UT, IO, or SO is part of a condition, a UT, IO, or SO will be in a location that facilitates visually monitoring and assisting the operator being trained/evaluated.

2-50. Unless otherwise specified in the conditions, all in-flight training and evaluations will be conducted under visual meteorological conditions (VMC).

MULTIPLE UNMANNED AIRCRAFT DESIGNATION

2-51. The commander designates a primary UA for each crewmember. When a crewmember must perform duties with more than one UA, the commander designates an alternate/additional UA.

2-52. **Primary UA**. A primary UA is designated by the commander or required by the TOE or TDA position to which the crewmember is assigned.

2-53. **Alternate UA**. An alternate UA is in the category (fixed wing or rotary wing) opposite the primary UA.

2-54. **Additional UA**. An additional UA is in the same category as the primary UA.

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Chapter 3

Evaluation

This chapter describes evaluation principles and considerations. It also contains guidelines for conducting academic and hands-on performance testing. Evaluations are a primary means of assessing standardization and crewmember proficiency. Evaluations will be conducted per AR 95-23 and this ATM.

EVALUATION PRINCIPLES

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

- The evaluators must be selected not only for their technical qualifications but also for their demonstrated performance, objectivity, and ability to observe and provide constructive comments. These evaluators are the SOs and IOs who assist the commander in administering the ATP.
- 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. The evaluator must ensure a complete evaluation is given in all areas and refrain from making a personal “area of expertise” a dominant topic during the evaluation.
- All participants must completely understand the purpose of the evaluation.
- Cooperation by all participants is necessary to guarantee the accomplishment of the evaluation objectives.
- The evaluation must produce specific findings to identify training needs. The examinee needs to know what is being performed correctly or incorrectly and how improvements can be made.

3-2. The evaluation will determine the examinee's ability to perform essential tasks to prescribed standards. Flight evaluations will also determine the examinee’s ability to exercise crew coordination in completing these tasks.

3-3. 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 crew coordination as outlined in chapter 4.

3-4. In all evaluation phases, the evaluator is expected to perform as an effective crewmember. At some point during the evaluation, circumstances may prevent the evaluator from performing as a crewmember. In such cases, a realistic, meaningful, and planned method should be developed to pass this task back to the examinee effectively. During the conduct of the flight evaluation, the evaluator will normally perform as outlined in the task description or as directed by the examinee. At some point, the evaluator may perform a roll reversal with the examinee. The examinee must be made aware of both the initiation and termination of roll reversals. The examinees must know when they are being supported by a fully functioning crewmember.

Note. When evaluating a UT, IO or SO, the evaluator must advise the examinee that during role reversal, the evaluator may deliberately perform some tasks or crew coordination outside the standards to check the examinee's diagnostic and corrective action skills.

Note. All evaluations will be conducted by an SO/IO. SOs evaluate IOs and other SOs.

GRADING CONSIDERATIONS

3-5. **Academic Evaluation**. The examinee must demonstrate a working knowledge and understanding of the appropriate subject areas.

3-6. **Flight Evaluation**

- **Academic**. Some tasks are identified in Training and Evaluation Requirements as tasks that may be evaluated academically. The examinee must demonstrate a working knowledge of these tasks. Evaluators may use computer-based instruction, mock-ups, or other approved devices to assist in determining the examinee's knowledge of the task.
- **Flight or simulator**. Tasks requiring evaluation under flight or simulator conditions must be performed with a compatible simulator. Task standards are based on an ideal situation. Grading is based on meeting the minimum standards. The evaluator must consider deviations (high wind, turbulence, or poor visibility, and so forth) from the ideal conditions during the evaluation. If other than ideal conditions exist, the evaluator must make appropriate adjustments to the standards.

ANNUAL PROFICIENCY AND READINESS TEST

3-7. The APART measures a crewmember's proficiency and readiness. It consists of a written examination and a hands-on performance test evaluated by an IO/SO. RL 1 crewmembers must pass each component of the test during their APART period. (The APART period is the three-month period ending on the last day of the operator's birth month.) A crewmember designated RL 1 at anytime within this three-month period must complete all APART requirements. Crewmembers may receive credit for the operator's manual written examination and hands-on performance test during RL training if they complete the tests within the three-month APART period. Those crewmembers participating in RL 3 or RL 2 training programs are not subject to the APART unless they were removed from RL 1 because of a training deficiency. At the end of the training year, the commander must certify that each operator has completed all APART requirements. This action serves to re-certify operators in their designated duty position(s).

3-8. **UAS Operator's Manual Written Examination.** This open book exam is prepared at the unit level and consists of 50 objective questions that cover the entire UAS operator's manual. The minimum passing score is 70 percent.

3-9. **Hands-on Performance Tests.** This component consists of academic and job position evaluations. Paragraph 3-18 contains a list of academic subjects. Evaluation tasks are listed in the appropriate appendix of this manual.

NO-NOTICE EVALUATION

3-10. Each commander will establish a no-notice evaluation program to measure crewmember effectiveness. Evaluations may consist of flight or a compatible simulator and an oral or written examination.

PROFICIENCY FLIGHT EVALUATION

3-11. The commander directs the proficiency evaluation and administers it using the guidelines established in paragraph 2-10. This evaluation is conducted to determine—

- The individual's readiness level upon assignment to the unit if the readiness level cannot be determined through a records review.
- The individual's proficiency when UAS currency has lapsed.
- The individual's proficiency when questioned by the commander.

3-12. After the evaluation, the examiner will debrief the individual and complete DA Form 7122-R.

POSTACCIDENT FLIGHT EVALUATION

3-13. The commander requires this type of evaluation when an accident or incident occurs. The type and nature of the evaluation will depend on the duties performed by the operator at the time of the accident. Special emphasis should be placed on evaluating the task(s) being performed at the time of the accident and, if possible, evaluate the task(s) under similar conditions. The simulator may be used, if applicable. Under no circumstance should safety be sacrificed in an effort to exactly duplicate the conditions at the time of the accident. After the evaluation, the examiner will debrief the individual and complete the DA Form 7122-R.

CREWMEMBER EVALUATION

3-14. Evaluations are conducted to determine the crewmembers' ability to perform the tasks on their CTL and to check their understanding of the required academic subjects listed in the ATM. When the examinee is an evaluator/trainer, the recommended procedure is for the evaluator to reverse roles with the examinee. When the evaluator uses this technique, the examinee must understand how the role reversal will be conducted and when it will be in effect. Initial validation of an evaluator's qualifications at a new duty station will be conducted with the UA.

3-15. **Performance and Evaluation Criteria**

- **AO/PO.** The AO/PO must demonstrate a basic understanding of the appropriate academic subjects listed in paragraph 3-18. In addition, AOs/POs must be familiar with their IATF and understand the requirements of their CTL.
- **MC.** The MC must meet the AO/PO requirements listed above. In addition, the MC must demonstrate sound judgment and maturity in managing the mission, crew, and assets.
- **UT.** The UT must meet the AO/PO requirements listed above. In addition, the UT must be able to instruct in the appropriate tasks and subjects, recognize errors in performance or understanding, make recommendations for improvement, train to standards, and document training.
- **IO.** The IO must meet the MC requirements listed above. In addition, the IO must be able to objectively instruct, evaluate, and document performance of the ground crewmembers, AO/PO, MC, and UT, using role reversal as appropriate. The IO must be able to develop and implement an individual training plan and must have a thorough understanding of the requirements and administration of the ATP. IOs designated by the commander as maintenance qualified will be evaluated annually on their performance of selected maintenance tasks during the APART by a maintenance designated SO/IO.
- **SO.** The SO must meet the MC and IO requirements listed above. The SO must be able to instruct and evaluate SOs, IOs, UTs, MCs, and ground crewmembers as appropriate, using role reversal. The SO must also develop and implement a unit-training plan and administer the commander's ATP.

Note. SOs/IOs/UTs will be evaluated on their ability to apply the learning and teaching process.

- **UAS ground crewmembers**. Ground crewmembers must demonstrate an understanding of conditions, standards, descriptions, and appropriate considerations of tasks on their CTL. They must perform selected tasks to ATM standards while applying aircrew coordination. The ground crewmembers must also demonstrate a basic understanding of the appropriate academic subjects listed in paragraph 3-18, be familiar with their IATF, and understand the requirements of their CTL.

EVALUATION SEQUENCE

3-16. The evaluation sequence consists of four phases. The evaluator will determine the amount of time devoted to each phase.

3-17. **Phase 1 – Introduction.** In this phase, the evaluator will—

- Review the examinee's IFRF and IATF records to verify that the examinee meets all prerequisites for designation and has a current DA Form 4186 (*Medical Recommendation for Flying Duty*).
- Confirm the purpose of the evaluation, explain the evaluation procedure, and discuss the evaluation standards and criteria to be used.

3-18. **Phase 2 – Academic Evaluation Topics.** The examinee must have a working knowledge and understanding of all applicable topics in the respective subject areas below. As a minimum, the evaluator will select two topics from each appropriate subject area. An evaluator/trainer will also demonstrate an ability to instruct and evaluate any topic. A unit trainer will demonstrate an ability to instruct topics in the areas in which the unit trainer performs UT duties.

- **Regulations and publications (AR 95-23, AR 95-2; DA Pamphlet 738-751; and local SOPs and regulations).** Topics in this subject area are—
  - ATP requirements.
  - SOP requirements.
  - Map reading.
  - VFR minimums and procedures.
  - Weight and balance requirements.
  - Publications required for using the aircraft.
  - Forms and records.
- **Operating limitations and restrictions (applicable technical manuals [TMs]).** Topics in this subject area are—
  - System limits.
  - Power limits.
  - Airspeed limits.
  - Maneuvering limits.
  - Environmental restrictions.
  - Other limitations.
- **Aircraft emergency procedures and malfunction analysis (applicable TMs).** Topics in this subject area are—
  - Emergency terms and their definitions.
  - Engine malfunctions.
  - Fires.
  - Fuel system malfunctions.
  - Electrical system malfunctions.
  - Landing procedures.
  - Flight control malfunctions.
  - Mission equipment.
- **Aeromedical factors (AR 40-8 and FM 3-04.301).** Topics in this subject area are—
  - Flight restrictions due to exogenous factors.
  - Stress.
  - Fatigue.

- **Aerodynamics (FM 1-203)**. Topics in this subject area are—
  - Airflow during flight.
  - Lift.
  - Drag
- **Tactical and mission tasks (FM 1-114, FM 1-400, FM 55-450-2, FM 55-450-3; and unit SOP).** Topics in this subject area are—
  - Mission statement and employment methods.
  - Terrain analysis.
  - Navigational chart, map, and tactical overlay interpretation.
  - Battlefield environment.
  - Fratricide prevention.
  - Tactical reports.
  - Fire support.
  - Downed aircraft procedures.
  - Mission equipment.
  - Tactical airspace coordination.
  - LASER Operations
- **Night mission operation and deployment (FM 3-04.301 and TC 1-204)**. Topics in this subject area are—
  - Basic infrared (IR) theory.
  - Using internal and external lights.
- **Hunter UAS external operators only.** Topics in this subject area are—
  - Types of vision.
  - Dark adaptation, night vision protection, and central night blind spot.
  - Distance estimation and depth perception.
  - Visual illusions.
  - Night vision limitations and techniques.
- **Maintenance (applicable TMs).** Topics in this subject area are for maintenance-qualified personnel only.
  - Engine start.
  - Instrument indications.
  - Electrical system.
  - Caution panel indications.
  - Power plant.
  - Engine performance check.
  - Flight controls.
  - Fuel system.
  - Communication and navigation equipment.
  - Automatic flight control system.
  - Maintenance operational check requirements.
  - Forms and records.
- **SO, IO, UT, instructor pilot handbook**. Topics in this subject area are—
  - Effective communication.
  - Teaching methods.
  - Techniques of instruction.
  - Human behavior.
  - Teaching process.

- Critique and evaluations.
- Learning process.

3-19. **Phase 3 – Flight Evaluation**. If this phase is required, the following procedures apply:

- **Briefing**. The evaluator will explain the flight evaluation procedure and brief the examinee on which tasks will be evaluated. When evaluating an evaluator/trainer, the evaluator must advise the examinee that during role reversal, the evaluator may deliberately perform some tasks outside standards to check the examinee's diagnostic and corrective action skills. The evaluator will conduct or have the examinee conduct a crew briefing according to task 1000.
- **Preflight Procedures**. The evaluator will evaluate the examinee's use of the appropriate TMs/checklists (CLs)/technical bulletins (TBs), and/or the integrated electronic technical manual (ETM) as appropriate. The evaluator will have the examinee identify and discuss the functions of at least two aircraft systems.
- **Flight Tasks**. As a minimum, the evaluator will evaluate those tasks listed on the CTL as mandatory for the designated crew station(s) for the type of evaluation being conducting and those mission or additional tasks selected by the commander. The evaluator, in addition to the commander-selected tasks, may randomly select for evaluation any task listed on the mission or additional task list. An IO, SO, and UT must demonstrate an ability to instruct and/or evaluate appropriate flight tasks. When used as part of the proficiency flight evaluation, the evaluation may include an orientation of the local area, checkpoints, and other pertinent information.
- **After-landing Tasks**. The evaluator will evaluate the examinee's use of the appropriate TMs/CLs/TBs, and/or the integrated ETM as appropriate.

3-20. **Phase 4 – Debriefing**. Upon completing the evaluation, the evaluator will—

- Discuss the examinee's strengths and weaknesses.
- Offer recommendations for improvement.
- Tell if the examinee passed or failed the evaluation and discuss any tasks not performed to standards.
- Complete the applicable forms and ensure that the examinee reviews and initials the appropriate forms.

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

Chapter 4

Crew Coordination

This chapter describes the background of crew coordination development. It also describes the crew coordination elements, basic qualities, and objectives as found in the Army aircrew coordination training program.

BACKGROUND

4-1. An analysis of U.S. Army aviation accidents revealed that a significant percentage of accidents resulted from one or more crew coordination errors committed before or during the mission flight. Often an accident was the result of a sequence of undetected crew errors that combined to produce a catastrophic result. Additional research showed that even when accidents were avoided; those same errors could result in degraded mission performance. A systematic analysis of these error patterns identified specific areas where crew-level training could reduce the occurrence of such errors and break the error chains leading to accidents and poor mission performance.

ELEMENTS

4-2. Broadly defined, aircrew coordination is the necessary interaction between crewmembers for the safe, efficient, and effective performance of tasks. The essential elements of crew coordination are described below.

- **Communicate Positively**. Good teamwork requires positive communication among crewmembers. Communication is positive when the sender directs, announces, requests, or offers information; the receiver acknowledges the information; and the sender confirms the information based on the receiver's acknowledgment or action.
- **Direct Assistance**. Crewmembers will direct assistance when they cannot maintain aircraft control, position, or clearance. They will also direct assistance when they cannot properly operate or troubleshoot aircraft systems without help from the other crewmembers.
- **Announce Actions**. To ensure effective and well-coordinated actions in the aircraft, all crewmembers must be aware of the expected movements and unexpected individual actions. Each crewmember will announce any action that affects the actions of the other crewmembers.
- **Offer Assistance**. Crewmembers will provide assistance or information that has been requested. They also will offer assistance when they see that another crewmember needs help.
- **Acknowledge Actions**. Communications in the aircraft must include supportive feedback to ensure that crewmembers correctly understand announcements or directives.
- **Be Explicit**. Crewmembers should use clear terms and phrases and positively acknowledge critical information. They must avoid using terms that have multiple meanings, such as "Right," "Back up," or "I have it." Crewmembers must also avoid using indefinite modifiers such as, "Do you see that?" or "You are a little fast."
- **Provide UA Control and Obstacle Advisories**. Although the AO is responsible for UA control, the other crewmembers may need to provide control information regarding airspeed, altitude, or obstacle avoidance.
- **Coordinate Action Sequence and Timing**. Proper sequencing and timing ensure that the actions of one crewmember mesh with the actions of the other crewmembers.

BASIC QUALITIES

4-3. The crew coordination elements are further broken down into a set of 13 basic qualities. Each basic quality is defined in terms of observable behaviors. The paragraphs below summarize these basic qualities.

4-4. **Flight Team Leadership and Crew Climate Are Established and Maintained.** This quality addresses the relationships among the crew and the overall climate of the flight deck. Aircrews are teams with a designated leader and clear lines of authority and responsibility. The MC sets the tone for the crew and maintains the working environment. Effective leaders use their authority but do not operate without the participation of other crewmembers. When crewmembers disagree on a course of action, they must be effective in resolving the disagreement. Specific goals include the following:

- The MC actively establishes an open climate where crewmembers freely talk and ask questions.
- Crewmembers value each other for their expertise and judgment. They do not allow differences in rank and experience to influence their willingness to speak up.
- Alternative viewpoints are a normal and occasional part of crew interaction. Crewmembers handle disagreements in a professional manner, avoiding personal attacks or defensive posturing.
- The AO actively monitors the attitudes of crewmembers and offers feedback when necessary. Each crewmember displays the proper concern for balancing safety with mission accomplishment.

4-5. **Pre-mission Planning and Rehearsal Are Accomplished**. Pre-mission planning includes all preparatory tasks associated with planning the mission. They also include assigning crewmember responsibilities and conducting all required briefings and brief backs. Pre-mission rehearsal involves the crew collectively visualizing and discussing expected and potentially unexpected events for the entire mission. Through this process, all crewmembers think through contingencies and actions for difficult segments or unusual events associated with the mission and develop strategies to cope with contingencies. Specific goals include the following:

- The MC ensures that all actions, duties, and mission responsibilities are partitioned and clearly assigned to specific crewmembers. Each crewmember actively participates in the mission planning process to ensure a common understanding of mission intent and operational sequence. The MC prioritizes planning activities so that critical items are addressed within the available planning time.
- The crew identifies alternate courses of action in anticipation of potential changes in mission, enemy, terrain and weather, troops and support available, time available, and civilian considerations (METT-TC) and is fully prepared to implement contingency plans as necessary. Crewmembers mentally rehearse the entire mission by visualizing and discussing potential problems, contingencies, and responsibilities.
- The MC ensures that crewmembers take advantage of periods of low workload to rehearse upcoming flight segments. Crewmembers continuously review remaining flight segments to identify required adjustments. Their planning is consistently ahead of critical lead times.

4-6. **Appropriate Decision-making Techniques Are Applied**. Decision making is the act of rendering a solution to a problem and defining a plan of action. It must involve risk assessment. The quality of decision making and problem solving throughout the planning and execution phases of the mission depends on the information available, time constraints, and level of involvement and information exchanged among crewmembers. The crew's ability to apply appropriate decision-making techniques based on these criteria has a major impact on the choice and quality of their resultant actions. Although the entire crew should be involved in the decision making and problem-solving process, the mission commander (MC) is the key decision maker. Specific goals include the following:

- Under high-time stress, crewmembers rely on a pattern-recognition decision process to produce timely responses. They minimize deliberation consistent with the available decision time.

Crewmembers focus on the most critical factors influencing their choice of responses. They efficiently prioritize their specific information needs within the available decision time.

- Under moderate- to low-time stress, crewmembers rely on an analytical decision process to produce high-quality decisions. They encourage deliberation when time permits. To arrive at the most unbiased decision possible, crewmembers consider all important factors influencing their choice of action. They consistently seek all available information relative to the factors being considered.

4-7. **Actions Are Prioritized and Workload Is Equitably Distributed**. This quality addresses the effectiveness of time and workload management. It assesses the extent to which the crew—as a team—avoids distractions from essential activities, distributes and manages workload, and avoids individual task overload. Specific goals include the following:

- Crewmembers are always able to identify and prioritize competing mission tasks. They never ignore flight safety and other high-priority tasks. They appropriately delay low-priority tasks until those tasks do not compete with more critical tasks. Crewmembers consistently avoid nonessential distractions so that these distractions do not impact on task performance.
- The MC distributes mission tasks to prevent overloading of any crewmember, especially during critical phases of flight. Crewmembers watch for workload buildup on others and react quickly to adjust the distribution of task responsibilities.

4-8. **Unexpected Events Are Managed Effectively**. This quality addresses the crew's performance under unusual circumstances that may involve high levels of stress. Both the technical and managerial aspects of coping with the situation are important. Specific goals include the following:

- Crew actions reflect extensive rehearsal of emergency procedures in prior training and pre-mission planning and rehearsal. Crewmembers coordinate their actions and exchange information with minimal verbal direction from the MC. They respond to the unexpected event in a composed, professional manner.
- Each crewmember appropriately or voluntarily adjusts individual workload and task priorities with minimal verbal direction from the MC. The MC ensures that each crewmember is used effectively when responding to the emergency and that the workload is efficiently distributed.

4-9. **Statements and Directives Are Clear, Timely, Relevant, Complete, and Verified**. This quality refers to the completeness, timeliness, and quality of information transfer. It includes the crew using standard terminology and feedback techniques to verify information transfer. Emphasis is on the quality of instructions and statements associated with navigation, obstacle clearance, and instrument readouts. Specific goals include the following:

- Crewmembers consistently make the required call outs. Their statements and directives are always timely.
- Crewmembers use standard terminology in all communications. Their statements and directives are clear and concise.
- Crewmembers actively seek feedback when they do not receive acknowledgment from another crewmember. They always acknowledge understanding of intent and request clarification when necessary.

4-10. **Mission Situational Awareness Is Maintained**. This quality considers the extent to which crewmembers keep each other informed about the status of the aircraft and the mission. Information reporting helps the aircrew maintain a high level of situational awareness. The information reported includes aircraft position and orientation, equipment and personnel status, environmental and battlefield conditions, and changes to mission objectives. Awareness of the situation by the entire crew is essential for a safe flight and effective crew performance. Specific goals include the following:

- Crewmembers routinely update each other and highlight and acknowledge changes. They take personal responsibility for scanning the entire flight environment, considering their assigned workload and areas of scanning.
- Crewmembers actively discuss conditions and situations that can compromise situational awareness. These include, but are not limited to, stress, boredom, fatigue, and anger.

4-11. **Decisions and Actions Are Communicated and Acknowledged**. This quality addresses the extent to which crewmembers are kept informed of decisions made and actions taken by another crewmember. Crewmembers should respond verbally or by appropriately adjusting their behaviors, actions, or control inputs to clearly indicate that they understand when a decision has been made and what it is. Failure to do so may confuse crews and lead to uncoordinated operations. Specific goals include the following:

- Crewmembers announce decisions and actions, stating their rationale and intentions as time permits. The UAC verbally coordinates the transfer of or inputs to controls before action.
- Crewmembers always acknowledge announced decisions or actions and provide feedback on how these decisions or actions will affect other crew tasks. If necessary, they promptly request clarification of decisions or actions.

4-12. **Supporting Information and Actions Are Sought**. This quality addresses the extent to which supporting information and actions are sought from the crew by another crewmember. Crewmembers should feel free to raise questions during the flight regarding plans, revisions to plans, actions to be taken, and the status of key mission information. Specific goals include the following:

- The MC encourages crewmembers to raise issues or offer information about safety or the mission. Crewmembers anticipate impending decisions and actions and offer information as appropriate.
- Crewmembers always request assistance from others before they become overloaded with tasks or before they must divert their attention from a critical task.

4-13. **Crewmember Actions Are Mutually Cross Monitored**. This quality addresses the extent to which a crew uses cross monitoring as a mechanism for breaking error chains that lead to accidents or degraded mission performance. Crewmembers must be capable of detecting each other's errors. Such redundancy is particularly important when crews are tired or overly focused on critical task elements and thus more prone to make errors. Specific goals include the following:

- Crewmembers acknowledge that crew error is a common occurrence and the active involvement of the entire crew is required to detect and break the error chains that lead to accidents. They constantly watch for crew errors affecting flight safety or mission performance. They monitor their own performance as well as that of others. When they note an error, they quickly and professionally inform and assist the crewmember committing the error.
- The crew thoroughly discusses the two-challenge rule before executing the mission. When required, they effectively implement the two-challenge rule with minimal compromise to flight safety.

Note. The two-challenge rule allows one crewmember to automatically assume the duties of another crewmember who fails to respond to two consecutive challenges. For example, the AO becomes fixated, confused, task overloaded, or otherwise allows the aircraft to enter an unsafe position or attitude. The PO first asks the AO if the AO is aware of the aircraft position or attitude. If the AO does not acknowledge this challenge, the PO issues a second challenge. If the AO fails to acknowledge the second challenge, the PO takes corrective action.

4-14. **Supporting Information and Actions Are Offered**. This quality addresses the extent to which crewmembers anticipate and offer supporting information and actions to the decision maker (usually the MC) when apparently a decision must be made or an action taken. Specific goals include the following:

- Crewmembers anticipate the need to provide information or warnings during critical phases of the flight. They provide the required information and warnings in a timely manner.
- Crewmembers anticipate the need to assist during the critical phases of flight. They provide the required assistance when needed.

4-15. **Advocacy and Assertion Are Practiced**. This quality concerns the extent to which crewmembers are proactive in advocating a course of action they consider best, even when others may disagree. Specific goals include the following:

- While maintaining a professional atmosphere, crewmembers state the rationale for their recommended plans and courses of action when time permits. They request feedback to make sure others have correctly understood their statements or rationale. Time permitting, other crewmembers practice good listening habits; they wait for the rationale before commenting on the recommended plans or courses of action.
- The MC actively promotes objectivity by encouraging other crewmembers to speak up despite their rank or experience. Junior crewmembers do not hesitate to speak up when they disagree with senior members; they understand that more experienced crewmembers can sometimes commit errors or lose situational awareness. Every member of the crew displays a sense of responsibility for adhering to flight regulations, operating procedures, and safety standards.

4-16. **Crew Level After-Action Reviews Are Conducted.** This quality addresses the extent to which crewmembers review and critique their actions during or after a mission segment, during periods of low workload, or during the mission debriefing. Specific goals include the following:

- The crew critiques major decisions and actions. They identify options and factors that should have been discussed and outline ways to improve crew performance in future missions.
- The critique of crew decisions and actions is professional. "Finger-pointing" is avoided; the emphasis is on education and improvement of crew performance.

OBJECTIVES

4-17. The crew coordination elements and basic qualities are measured to determine if the objectives of the crew coordination program have been met. The objectives of the program have been defined by the following five crew coordination objectives:

- **Establish and maintain team relationships.** Establish a positive working relationship that allows the crew to communicate openly and freely and to operate in a concerted manner.
- **Plan the mission and rehearse**. Explore, in concert, all aspects of the assigned mission and analyze each segment for potential difficulties and possible reactions in terms of the commander's intent.
- **Establish and maintain workloads.** Manage and execute the mission workload in an effective and efficient manner with the redistribution of task responsibilities as the mission situation changes.
- **Exchange mission information.** Establish intracrew communications using effective patterns and techniques that allow the flow of essential data between crewmembers.
- **Cross monitor performance.** Cross monitor each other's actions and decisions to reduce the likelihood of errors impacting mission performance and safety.

STANDARD CREW TERMINOLOGY

4-18. 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. (See figure 4-1 for a list of standard words and phrases that crewmembers may use.)

Standard Word or Phrase	*Meaning of Standard Word or Phrase*
Abort	Terminate a preplanned aircraft maneuver.
Air target	Detected fast mover or helicopter.
Bandit	An identified enemy aircraft.
Bogey	An unidentified aircraft assumed to be an enemy.
Break	Immediate action command to perform an emergency maneuver to deviate from the present ground track; will be followed by the word “right,” “left,” “up,” or “down.”
Call out	Command by the pilot on the controls for a specified procedure to be read from the checklist by the other crewmember.
Cease fire	Command to stop firing but continue to track.
Clear	No obstacle is present to impede aircraft movement along the intended ground track. Will be preceded by the word “nose,” “tail,” or “aircraft” and followed by the direction (for example, “left,” “right,” “slide left,” or “slide right”). Also indicates that ground personnel are authorized to approach the aircraft.
Climb	Command to change altitude up.
Correct	Confirms a statement as being accurate or right. Do not use the word “right” to indicate correct.
Descend	Command to decrease altitude.
Drifting	An alert of the unannounced movement of the aircraft; will be followed by directions.
Execute	Initiate an action.
Expect	Anticipate further instructions or guidance.
Firing	Announcement that a specific weapon is to be fired.
Go plain/red	Command to discontinue secure operations.
Go secure/green	Command to activate secure communications.
Hold	Command to maintain present position.
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 continue or keep the same.
Report	Command to notify.
Right	Used to indicate a direction only, not to be used in place of “correct.”
Slow down	Command to decrease ground speed.
Speed up	Command to increase ground speed.
Target	An alert that a ground threat has been spotted.
Traffic	Refers to friendly aircraft that present a potential hazard to the current route of flight; will be followed by an approximate clock position and the distance from your aircraft with a reference to altitude (high or low).
Turn	Command to deviate from the current heading; will be followed by the word "right" or "left," and a specific heading or rally term.
Weapons hot/cold/off	Indicates weapon switches are in the ARMED, SAFE, or OFF position.

Figure 4-1. Examples of standard words and phrases

Chapter 5

Individual Aircrew Training Folder

The ATP records system provides commanders with a comprehensive performance record on each crewmember in their unit. Examples of completed ATP forms with instructions are provided; however, the examples are not intended to be all inclusive of required entries on the forms.

RESPONSIBILITIES

5-1. Commanders must ensure that an IATF is prepared and maintained for each crewmember in an operational/designated crewmember position assigned or attached to their unit (see figure 5-1).

- DA Form 3513 (*Individual Flight Record Folder, United States Army*) will be used. It is prepared by modifying the words "flight records" on the front cover to read "aircrew training."
- Crewmembers assigned or attached for flight duty will present their IATF to the commander or the commander's designated representative on arrival in the unit. Units will process crewmembers that are not assigned to operational flying positions according to Department of the Army regulations, Army command directives, and installation guidance.

5-2. After an individual's release from active duty, retirement, discharge, resignation, assignment to the USAR control group, or death, the unit will process the IATF according to AR 95-23.

LEFT SIDE OF FOLDER
(File items in the order listed.)

1. Current DA Form 7120-R (*Commander's Task List*).
2. Current DA Form 7120-1-R (*Crewmember Task Performance and Evaluation Requirements*).
3. Current DA Form 7120-2-R (*Crewmember Task Performance and Evaluation Requirements Continuation Sheet*) (if used).
4. Current DA Form 7120-3-R *(Crewmember Task Performance and Evaluation Requirements, Remarks, and Certification*).
5. The preceding DA Form 7120-R, DA Form 7120-1-R, DA Form 7120-2-R, and DA Form 7120-3-R.

RIGHT SIDE OF FOLDER
(File items in the order listed.)

1. DA Form 7122-R (*Crewmember Training Record*).
2. Grade slips for qualification, refresher, or mission training. (Remove these grade slips when a summary is posted to the DA Form 7122-R.)
3. Miscellaneous.

Figure 5-1. Contents of an individual aircrew training folder

DA FORM 7120-R

5-3. Commanders use DA Form 7120-R, DA Form 7120-1-R (*Crew Member Task Performance and Evaluation Requirements)*, DA Form 7120-2-R (*Crew Member Task Performance and Evaluation Requirements Continuation Sheet)*, and DA Form 7120-3-R (*Crew Member Task Performance and Evaluation Requirements Remarks and Certification)* to inform crewmembers of ATP flying hour, task, and evaluation requirements. They also use these forms to designate the crewmember's authorized flight duties/stations. Individual crewmembers remain responsible for complying with any additional training requirements in the unit SOP or this ATM.

5-4. Commanders may amend the DA Form 7120-R and associated enclosures throughout the crewmember's ATP training year. They must, however, initial and date all changes to the form and its enclosures to certify their approval. Units will initiate a new DA Form 7120-R when—

- The crewmember is integrated into a new ATP. (ARNG personnel should refer to National Guard Regulation [NGR] 95-210.)
- The crewmember begins a new ATP training year.
- The crewmember's primary, additional, or alternate aircraft changes. (A separate DA Form 7120-R is required for each primary, additional, or alternate aircraft in which the crewmember performs duties.)
- Amending the existing DA Form 7120-R is impractical.

Note. If a change in commanders occurs during the ATP year, the existing DA Form 7120-R remains in effect until a new form is initiated.

5-5. An electronically generated DA Form 7120-R may be used. A sample of a completed DA Form 7120-R is in figure 5-2. Instructions for completing the form are given below.

Note. Commanders may modify DA Form 7120-R to include UAC duty positions as listed in AR 95-23.

COMMANDER'S TASK LIST

For use of this form, see TC 1-210; the proponent agency is TRADOC.

USE A SEPARATE FORM FOR EACH TYPE OF AIRCRAFT.

PART I. BIOGRAPHICAL

Name: Moody, Dwight L.	Rank: SPC	SSN: 123-45-6789
Birth Month: Oct	FAC: 1	Duty Title: IO
NVG Position: ☐ Yes ☐ No	Aircraft Type: RQ-7B	☒ Primary ☐ Additional ☐ Alternate

PART II. AUTHORIZED FLIGHT DUTIES/STATIONS

	PI	PC	UT	IP	SP	IE	MP	ME	XP	CE	FE	FI	SI	AO	MO	TO	OR	Remarks
Right/Back Seat		X		X														
Left/Front Seat	X			X														
Other Station				X		X												
NVD																		

PART III. FLYING-HOUR REQUIREMENTS

	Annual	First Period	Second Period	Remarks/Adjustment
Dates	Nov 05 -Oct 06	1 Nov 05 - 30 Apr 06	1 May 06 - 31 Oct 06	
Total Aircraft Hours		4	24	Prorated - RL as of 15 Mar 06
Total Simulator Hours		1.3	8	
Night Unaided Hours				
NVD Hours				
Hood/Weather Hours				
Emergency Handling Hours				
Other Hours (Specify)				

PART IV. EVALUATION REQUIREMENTS

	Designated Period (AC/USAR) or Qtr (ARNG)	Remarks/Date Completed
Standardization Flight Evaluation	1 Aug - 31 Oct 06	
Instrument Flight Evaluation		
Operator's Manual Written Examination	1 Aug - 31 Oct 06	
NVD Flight Evaluation		
Maintenance Test Flight Evaluation		
Other (Specify) NBC Eval	1 Aug - 31 Oct 06	
Other (Specify)		

PART V. ENCLOSURES

1. DA Form 7120-1-R (Crew Member Task Performance and Evaluation Requirements)
2. DA Form 7120-2-R (Crew Member Task Performance and Evaluation Requirements Continuation Sheet) ☐ Yes ☐ No
3. DA Form 7120-3-R (Crew Member Task Performance and Evaluation Requirements Remarks and Certification)
4. Other (Specify)
5. Other (Specify)

PART VI. CERTIFICATION

This form, its enclosure(s), and the aircrew training manual establish your Aircrew Training Program requirements.

Commander:	Signature:	Date:
Adrian Rogers, CPT, AV	*Adrian Rogers*	15 MAR 06

I certify that I have read and understand my ATP requirements contained on this form, its enclosure(s), and the aircrew training manual.

Crew Member's Signature:	Date:
Dwight L Moody	15 MAR 06

DA FORM 7120-R, AUG 95 EDITION OF MAR 92 IS OBSOLETE USAPPC V2.10

Figure 5-2. Example of a completed DA Form 7120-R

PART I. BIOGRAPHICAL

- **Name, Rank, and SSN**. Enter the crewmember's name (last, first, middle initial), rank, and social security number (SSN).
- **Birth Month**. Enter the crewmember's birth month.
- **FAC**. Enter the crewmember's flight activity category.
- **Duty Title**. Enter the crewmember's primary duty title (for example, instructor operator).
- **NVG Position**. Leave blank if it does not apply.
- **Aircraft Type**. Enter the aircraft designation to which the DA Form 7120-R applies. Place an "X" in the appropriate box to show that this is the crewmember's primary, additional, or alternate aircraft.

PART II. AUTHORIZED FLIGHT DUTIES/STATIONS

5-6. Place an "X" in the appropriate blocks to show the duties the crewmember is authorized to perform.

- **Right/Back Seat**. Mark the duties authorized at the right seat or the back seat.
- **Left/Front Seat**. Mark the duties authorized at the left seat or the front seat.
- **Other Station**. Mark the duties authorized from other appropriate crewmember stations.
- **Night Vision Devise [NVD]**. Leave blank if it does not apply.

Note. If the crewmember's authorized flight duties/stations change during the ATP training year, enter the change in part II of the DA Form 7120-R and explain it in the Remarks column. If more space is needed, use the Remarks section of DA Form 7120-3-R.

PART III. FLYING-HOUR REQUIREMENTS

- **Dates**. Enter the first and last months and year of the ATP training cycle in the Annual column. Enter the day, month, and year for each semiannual ATP period in the First Period and Second Period columns, respectively.
- **Total Aircraft Hours, Total Simulator Hours, Night Unaided Hours, NVD Hours, Hood/Weather Hours, Emergency Handling Hours, and Other Hours**. Enter the flying hours required annually and/or the flying hours required for each semiannual period as applicable. List unit specific flying-hour requirements, such as CBRN training, on the Other Hours line.

Note. If the crewmember's flying-hour requirements change during the ATP training year, enter the change in part III of the DA Form 7120-R and explain it in the Remarks/Adjustment column. If more space is needed, use the Remarks section of DA Form 7120-3-R.

PART IV. EVALUATION REQUIREMENTS

5-7. Enter the designated 3-month period (Active Army/USAR) or the designated fiscal quarter (ARNG) in which the crewmember must complete each listed evaluation. Enter unit-specific evaluation requirements on the Other lines.

Note. If the crewmember's evaluation requirements change during the ATP training year, enter the change in part IV of the DA Form 7120-R and explain it in the Remarks/Date Completed column. The dates that the evaluations were completed also may be annotated in this column. If more space is needed, use the Remarks section of DA Form 7120-3-R.

PART V. ENCLOSURES

5-8. DA Form 7120-1-R, DA Form 7120-2-R, and DA Form 7120-3-R will be enclosures 1, 2, and 3, respectively. Check yes or no to indicate if DA Form 7120-2 is used. The commander may include additional enclosures as required. Enter the form number or title of these enclosures on the Other lines.

PART VI. CERTIFICATION

5-9. Enter the commander's name, rank, and branch. After the commander signs and dates the form, have the crewmember sign and date it.

DA FORM 7120-1-R

5-10. The ATM specifies the minimum base task performance and evaluation requirements for the individual crewmember. It also details other mandatory base and mission task requirements for crewmembers depending on circumstances such as their duty position, FAC, aircraft, and authorized flight duties. DA Form 7120-1-R (figure 5-3) details the base, mission, and additional task performance and evaluation requirements for each crewmember; therefore, commanders must ensure that all mandatory requirements for the crewmember are included.

CREW MEMBER TASK PERFORMANCE AND EVALUATION REQUIREMENTS
For use of this form, see TC 1-210; the proponent agency is TRADOC.

Name: Moody, Dwight L.	Rank: SPC	SSN: 123-45-6789	Aircraft Type: RQ-7B
Base Task Requirements Per ATM ☐		Base Task Requirements Detailed Below ☒	

Instrument Base Tasks for Additional Aircraft	NBC Tasks Per ATM	NVD Tasks Per ATM	MTF Tasks Per ATM
☐ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Tasks	Day	Night	NVD	NBC	Sim	Remarks
1000 Participate In A Crew Mission	4	2				
1013 Operate Mission Planning System	2				2	
1022 Perform Preflight Inspection.	4					
1024 Perform Start Eng / Sys Checks	4					
1032 Perform Radio Communication	4					
1040 Perform Launch Procedures	4					
Mission Tasks						
2005 Perform Desert / Hot Wx Ops	2					
2066 Perform Zone Reconnaissance	1	1				
2162 Call for and adjust indirect fire	2	1E			2	

DA FORM 7120-1-R, AUG 95 USAPPC V1.00

Figure 5-3. Example of a completed DA Form 7120-1-R

5-11. An electronically generated DA Form 7120-1-R may be used. Instructions for completing this form are given below.

- **Name, Rank, and SSN**. Enter the crewmember's name (last, first, middle initial), rank, and social security number.
- **Aircraft Type**. Enter the aircraft designation for which the DA Form 7120-1-R applies.
- **Base Task Requirements per ATM**. Place an "X" in this box to show that the crewmember must comply with the minimum applicable base task performance and evaluation requirements

specified in the appropriate ATM. If you mark this block, you do not need to list base tasks or iteration requirements on the form.

- **Base Task Requirements Detailed Below**. Place an "X" in this box if base task requirements are listed on the form. When using this method, you have two options for listing base task requirements:
  - You may list all base tasks along with the appropriate iteration and evaluation requirements.
  - You may list only those base tasks for which additional iteration or evaluation requirements have been established. In this case, you must include a statement in the Remarks section that the remaining base task requirements are as specified in the appropriate ATM.
- **Instrument Base Tasks for Additional Aircraft**. Leave blank if it does not apply.
- **Chemical, biological, Radiological, Nuclear (CBRN) Tasks per ATM**. Place an "X" in the appropriate box to show whether the crewmember must comply with the NBC task performance requirements specified in the appropriate ATM. If you mark "No," you may use the options outlined in the fourth bullet above to list NBC task requirements.
- **NVD Tasks per ATM**. Leave blank if it does not apply.
- **Maintenance Test Flight (MTF) Tasks per ATM**. Place an "X" in the appropriate box to show whether the crewmember must comply with the MTF task performance and evaluation requirements specified in the appropriate ATM. If you mark "No," you may use the options outlined in the fourth bullet above to list MTF task requirements:
- **Tasks**
  - Enter base, mission, and additional tasks on the blank lines provided, if applicable.
  - Enter unit-specific requirements such as STXs after the last task. If more space is needed, use DA Form 7120-2-R. Attach the sheet as an enclosure.
- **Day, Night, NVD, CBRN, and Simulation:**

  If you elect to list task requirements, enter the number of times the crewmember must perform the task in the appropriate flight mode/condition column.
  - If the task is mandatory for annual evaluations, place an "E" next to the number (for example, 3E) in the appropriate column. The commander may elect to require evaluation of a minimum number of mission/additional tasks and delegate the authority for selection of specific tasks to the evaluator. This requirement and authority must be annotated in the Remarks section.

Note. If the crewmember's task performance or evaluation requirements change during the ATP training year, enter the change on DA Form 7120-1-R and explain it in the Remarks column. If more space is needed, use the Remarks section on DA Form 7120-3-R.

DA FORM 7120-2-R

5-12. This form is used to continue the task list from DA Form 7120-1-R. Its use is optional.

5-13. An electronically generated DA Form 7120-2-R may be used. Instructions for completing DA Form 7120-2-R are given below.

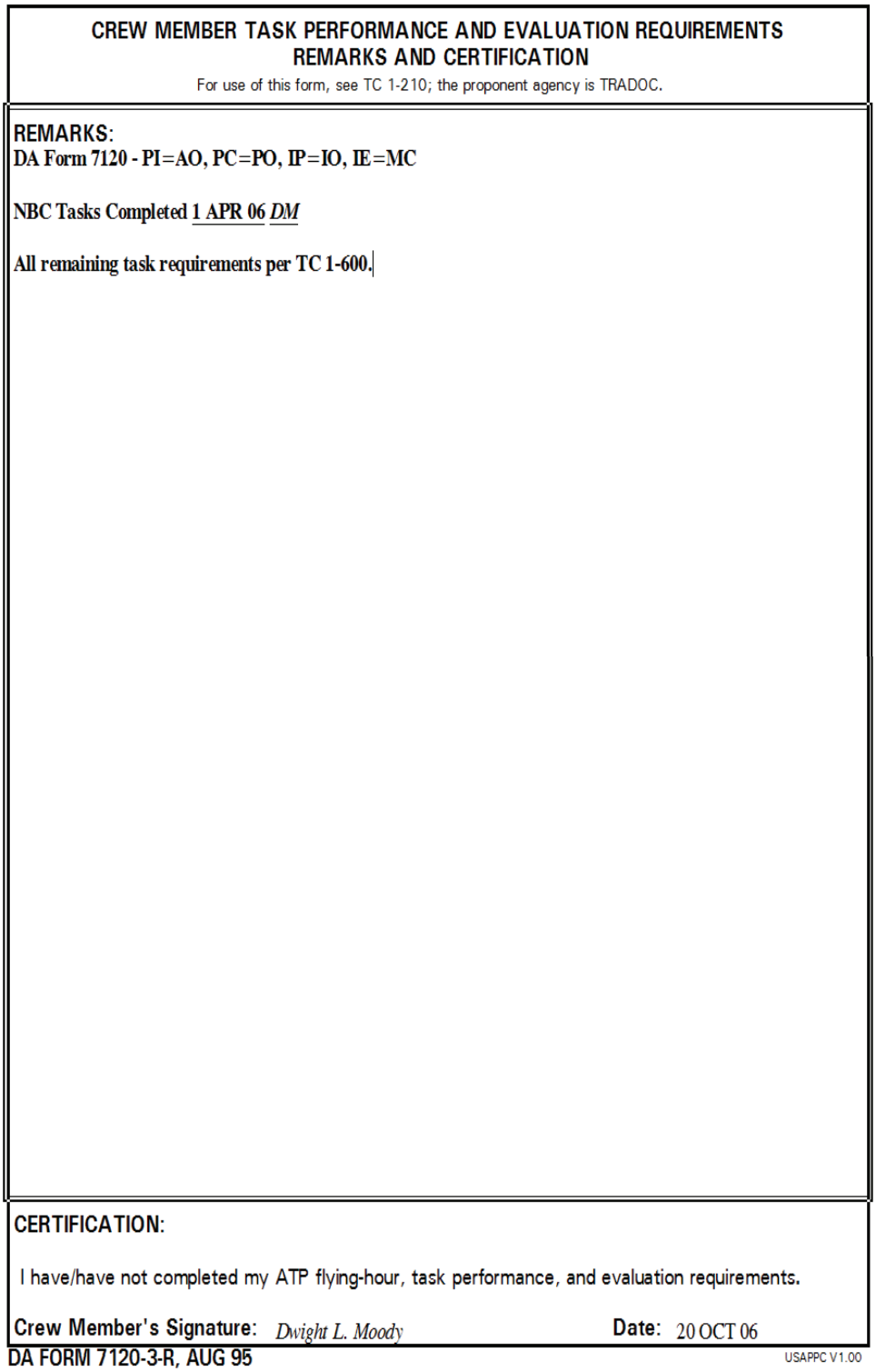
- **Name**. Enter the crewmember's name (last, first, middle initial).
- **Page No**. Enter the page number of this form.
- **No. of Pages**. Enter the total number of DA Forms 7120-2-R used.
- **Tasks**. Enter the tasks as follows:
  - Enter base, mission, and additional tasks on the blank lines provided, if applicable.
  - Enter unit-specific requirements such as STX after the last task. Attach the sheet as an enclosure.
- **Day, Night and Sim**. Complete as follows:
  - If you elect to list task requirements, enter the number of times the crewmember must perform the task in the appropriate flight mode/condition column.
  - If the task is mandatory for annual evaluations, place an "E" next to the number (for example, 3E) in the appropriate column. The commander may elect to require evaluation of a minimum number of mission/additional tasks and delegate the authority for selection of specific tasks to the evaluator. This requirement and authority must be annotated in the Remarks section.

DA FORM 7120-3-R

5-14. This form normally is the last page of the CTL. An electronically generated DA Form 7120-3-R may be used.

5-15. An example of a completed DA Form 7120-3-R is in figure 5-4. Instructions for completing DA Form 7120-3-R are given below.

- **Remarks**. Enter pertinent remarks or any additional requirements such as NBC or environmental training.
- **Certification**. At the end of the ATP training year, crewmembers must certify that they have or have not completed their ATP requirements. Have the crewmember sign and date the form.



CREW MEMBER TASK PERFORMANCE AND EVALUATION REQUIREMENTS
REMARKS AND CERTIFICATION

For use of this form, see TC 1-210; the proponent agency is TRADOC.

REMARKS:
DA Form 7120 - PI=AO, PC=PO, IP=IO, IE=MC

NBC Tasks Completed 1 APR 06 *DM*

All remaining task requirements per TC 1-600.

CERTIFICATION:

I have/have not completed my ATP flying-hour, task performance, and evaluation requirements.

Crew Member's Signature: *Dwight L. Moody* Date: 20 OCT 06

DA FORM 7120-3-R, AUG 95 USAPPC V1.00

Figure 5-4. Example of a completed DA Form 7120-3-R

DA FORM 7122-R

5-16. DA Form 7122-R (figure 5-5 and figure 5-6) is used to permanently record all individual crewmember evaluations and summaries of DA Form 4507-R (*Crew Member Grade Slip*). It also is used to record any change in crewmember status or other significant events.

5-17. To make minor changes, use correction fluid or line through the incorrect information and add the correct information.

5-18. Corrections to the DA Form 7122-R may be needed for several reasons. Careful and timely entry of events as they occur will eliminate most major errors. If an event is not entered at the proper time and several other events have been recorded, enter the date of the out-of-sequence event in red ink. If enough mistakes accrue to make the form unusable, transcribe the data to a new form. Place a diagonal across the front of the unusable form, label it "transcribed," and retain this copy of the form under the current form. DO NOT destroy or discard any DA Form 7122-R that contains an entry.

5-19. The DA Form 7122-R will be used to collect data during the year for input to the DA Form 759.

CREW MEMBER TRAINING RECORD

For use of this form, see TC 1-210; the proponent agency is TRADOC.

Sheet No: 1

Name: Moody, Dwight L. **SSN:** 123-45-6789 **Rank:** SPC **Birth Month:** Oct

Date	Acft	Event	Duty	D	N	NG	NS	W	H	Sim	Seat	Recorded By	GR	CM Init	Rmk
6 Jan 06	RQ-7B	Assignment	-	-	-	-	-	-	-	-	-	F. Franks,CW4, Plt Ldr	-	DM	Yes
11 Jan 06	-	4186 Rcvd - FFD	-	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	No
26 Jan 06	RQ-7B	Cdrs Eval/Local Area	VO/PO	1.0	1.0	-	-	-	-	-	Both	C.Spurgeon, SGT, IO	S	DM	Yes
23 Feb 06	RQ-7B	RL2 Progression	VO/PO	4.5	3.0	-	-	-	-	4.0	Both	B. Sunday,SGT SO	S	DM	Yes
15 Mar 06	RQ-7B	RL1 Progression	VO/PO	2.0	2.0	1.5	-	-	-	4.0	Both	C.Spurgeon, SGT, IO	S	DM	Yes
19 Apr 06	RQ-7B	No-Notice Eval	VO/PO	-	-	-	-	-	-	2.0	Both	B. Sunday,SGT SO	S	DM	Yes
7 Jul 06	RQ-7B	MC Eval	MC	1.3	1.6	-	-	-	-	1.0	L/R/O	B. Sunday,SGT SO	S	DM	Yes
11 Aug 06	RQ-7B	APART-Stands Eval	VO/PO	1.0	1.7	-	-	-	-	-	Both	C.Spurgeon, SGT, IO	S	DM	No
22 Sep 06	RQ-7B	-10 EXAM	VO/PO	-	-	-	-	-	-	-	Both	J. Edwards, SGT IO	S	DM	No
22 Sep 06	RQ-7B	APART Complete	VO/PO	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	No
25 Oct 06	-	Events Posted to 759	-	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	No
8 Nov 06	-	TDY Instructor Operator Course	-	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	No
24 Nov 06	RQ-7B	Completed IO Course	-	-	-	-	-	-	-	16.0	-	J. Edwards, SGT IO	-	DM	No
30 Nov 06	RQ-7B	IO Evaluation	IO	1.2	2.3	-	-	-	-	1.0	L/R/O	B. Sunday,SGT SO	S	DM	Yes
8 Mar 07	-	Medical Suspension	-	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	No
14 Apr 07	-	4186 Rcvd - FFD	-	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	No
30 Apr 07	RQ-7B	Waiver Requested	VO/PO	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	Yes
1 May 07	RQ-7B	Waiver Approved	VO/PO	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	Yes
2 Jun 07	RQ-7B	Class B Mishap	VO	-		-	-	-	-	-	L	B. Sunday,SGT SO	-	DM	Yes
6 Jun07	RQ-7B	Post Mishap Eval	VO	-	-	-	-	-	-	1.0	L	B. Sunday,SGT SO	S	DM	Yes
23 Jul 07	-	PCS to Ft. Hood	-	-	-	-	-	-	-	-	-	C.Spurgeon, SGT, IO	-	DM	No

DA FORM 7122-R, AUG 95 EDITION OF MAR 92 IS OBSOLETE APD V3.00

Figure 5-5. Example of a completed DA Form 7122-R (front)

Date	Remarks	Commander's Signature
6 Jan 06	Assigned to C trp 4-7 Cavalry, Budingen, Germany as RQ-7 Operator	
26 Jan 06	Commanders Eval / LAO completed this date. AVC designated FAC 1 RL3 for refersher	
	training	
23 Feb 06	AVC desinated RL2. Needs 5-6 hours for RL1	
15 Mar 06	AVC designated RL1. Excellent proficiency	
19 Apr 06	Excellent proficiency. AVC should be trained for MC duties	
7 Jul 06	AVC evaluated and designated as MC IAW Bn SOP	Adrian Rogers, CPT, AV
30 Nov 06	Excellent system knowledge and strong instructor fundamentals. Designate as IO	
30 Apr 07	Waiver requested due to failure to me semi-annual flt hour minimums	
1 May 07	Waiver of flt hour minimums approved by Bde Cdr	
2 Jun 07	AVC involved in Class B mishap. Suspectedgenerator failure	
6 Jun 07	AVC demonstrated proficiency in emergency procedures. Return to duty.	Adrian Rogers, CPT, AV

PAGE 2, DA FORM 7122-R, AUG 95 APD V3.00

Figure 5-6. Example of a completed DA Form 7122-R (back)

GENERAL INSTRUCTIONS

- Type all entries or clearly print them by hand in black or dark blue ink (preferably with a fine-point pen).
- For blocks that do not require an entry, enter any commonly understood letters or symbols; for example, NA for "not applicable" or a dash (—).
- To make minor corrections, use correction fluid or line through the incorrect information and add the correct information. To make major corrections, see CORRECTIONS, page 5-14
- Keep entries to the form as clear and concise as possible. Use standard abbreviations and acronyms.
- Every possible event or occurrence cannot be anticipated. If situations arise that are not covered by these instructions, use sound judgment and enter the event in the most logical manner.

ADMINISTRATIVE AND DEMOGRAPHIC DATA

- **Sheet number**. Number each sheet in numerical order.
- **Name**. Enter the crewmember's full name (last, first, and middle initial).
- **SSN**. Enter the crewmember's social security number.
- **Rank**. Enter the crewmember's current rank.
- **Birth month**. Enter the crewmember's birth month.

TRAINING EVENT DATA

- **Date**. Enter the day, month, and year of the event. After the first entry, the year may be omitted until entry of the first event of a new year.
- **Aircraft (Acft) Type**. Enter the alphanumeric designation of the appropriate aircraft (for example, RQ-5A, RQ-7A or RQ-7B). If a flight simulator was used, enter the simulator designation.

- **Event**. Enter a short description of the event. The following are defined as events and must be recorded accurately and timely:
  - Unit assignments and reassignments.
  - Placement on or removal from flight status.
  - Change of duty position or FAC.
  - Start of time-limited training programs. (These programs include, but are not limited to, RL progressions and aircraft qualification.)
  - Completion of training programs that involve more than one flight or training period. (Summarize the event on one line. After recording the event, remove all grade slips pertaining to the training program from the IATF.)
  - Start and completion of Department of the Army qualification courses, both flying and nonflying.
  - Completion of significant training or retraining programs, to include crew coordination qualification or environmental qualification. (Summarize the event on one line.)
  - All evaluations, to include those for MC, IO, SO, and APART.
  - Completion of the aircraft operator's manual examination.
  - All proficiency flight (oral or written) evaluations. (Specify the type of evaluation; for example, a no-notice evaluation, the flight portion of a commander's evaluation, or an aircraft currency evaluation.)
  - Designation or removal of alternate or additional aircraft.
  - Completion of all APART requirements.
  - Transcription of data from the DA Form 7122-R to the DA Form 759.
  - Medical suspensions (30 days or longer) and the return to full flying duty.
  - Any nonmedical suspensions and their disposition.
  - All requests for waivers or extensions and their disposition.
  - Involvement in any class A, B, C, or D accident or incident and the results of any postaccident evaluation (if given).
  - Completion of the flying duty medical evaluation on receipt of DA Form 4186.
  - Receipt of safety and Broken Wing awards.
  - Completion of gunnery training on the tasks as required.

Note. Do not record as events on the DA Form 7122-R those flights conducted solely to accomplish task, iteration, flying-hour, or MOPP requirements. Do not record attendance at recurring briefings such as safety meetings and weather briefings. Also do not record participation in ARTEP exercises, emergency deployment readiness exercises, or other unit-level exercises.

- **Duty**. If applicable, enter the appropriate duty symbol. This duty symbol normally will correspond with the duty symbol entered on DA Form 2408-12 (*Army Aviator's Flight Record*). However, it may reflect the purpose of the flight or event, not necessarily the DA Form 2408-12 duty. For example, an MC flight evaluation does not require entry of the duty symbol on DA Form 2408-12.
- **D, N, and Sim**. For the event being recorded, enter the time flown, in hours and tenths of hours, under the appropriate flight modes/conditions. The flight time entered will be the time flown on any single flight event (such as an evaluation) or the total hours flown in multiflight training programs. The flight modes/conditions indicated normally will agree with the DA Form 2408-12 entry.
- **Seat**. Enter the crewmember's seat position, if appropriate, for the event (front, back, left, right, both, or other).

- **Recorded By**. Evaluators, trainers, operations personnel, and others (when required) will enter their first initial, last name, rank, and duty position.
- **GR**. If the event was graded, enter an S for satisfactory or a U for unsatisfactory.
- **CM Init**. Crewmembers will initial this block to show that they are aware of the entry on the form and any remarks. Their initials signify that they have been advised of and understand any change in status. Crewmembers must immediately initial any entry resulting in a change of status such as an unsatisfactory evaluation or a MC designation. They will initial routine entries such as assignment to a unit or completion of the aircraft operator's manual examination as soon as practical.

5-20. **Rmk**. Enter Yes or No in this column to show whether comments are entered in the Remarks section regarding the entry. Do not enter NA in this column or leave it blank.

REMARKS

5-21. Record pertinent information not shown on the front of the form in this section. Do not restate information entered on the front of the form; for example, "This was a satisfactory MC evaluation." Keep all remarks clear, concise, and specific. Use standard abbreviations and acronyms or logical shortened word forms.

- Enter the date in the same format as on the front of the form. After the date, enter pertinent remarks. If the remarks require more than one line, do not repeat the date on the second or subsequent lines. Remarks that could be entered include the issuance of a MC qualification by an evaluator and an explanation of nonmedical suspensions from flight.
- Certain events on the DA Form 7122-R require the commander's approval and signature. These events are nonmedical suspensions, flight (or other proficiency) suspensions, the crewmember's return to duty after these two events, and extensions or waivers. If the commander has certified another document for the event and the entry on the DA Form 7122-R is a summary of the event, the commander does not need to sign the DA Form 7122-R. Events that produce a new or revised CTL do not require the commander's signature on the DA Form 7122-R.

5-22. Corrections to the DA Form 7122-R may be needed for several reasons. Careful and timely entry of events as they occur will eliminate most major errors. If an event is not entered at the proper time and several other events have been recorded, enter the date of the out-of-sequence event in red ink. If enough mistakes accrue to make the form unusable, transcribe the data to a new form. Place a diagonal across the front of the unusable form, label it "transcribed," and retain this copy of the form under the current form. Do not destroy or discard any DA Form 7122-R that contains an entry.

FILES MAINTENANCE

5-23. The DA Form 7122-R is a permanent record. Units will file this form on the right side of the crewmember's IATF. On PCS of the crewmember, the unit will forward all DA Forms 7122-R with the IATF. The losing unit is encouraged, but not required, to retain a photocopy of the DA Forms 7122-R for one year after the crewmember departs. This form is a valuable record, and retaining a copy will permit replacement of a form lost in transit.

DA FORM 4507-R

5-24. This form, along with the maneuver/procedure grade slip, is for use with training programs that require a series of flights. These training programs include, but are not limited to, RL progressions, MC qualification, and aircraft qualifications. The DA Form 4507-R is not for use as a permanent record of a single flight such as a no-notice evaluation. (Such flights will be recorded directly on DA Form 7122-R according to the instructions under Training Events Data, page 5-12.) The DA Form 4507-R is a temporary document. Units will maintain this grade slip on the right side of the IATF until the training program is completed or terminated. The data on the grade slip will then be summarized and entered on the DA Form 7122-R and the grade slip will be removed from the IATF. Instructions for completing DA Form 4507-R are given below.

- **Name, Rank, and SSN**. Enter the crewmember's name (last, first, middle initial), rank, and social security number.
- **Unit**. Enter the unit to which the crewmember is assigned.
- **Purpose**. Enter the purpose of the flight using standard phraseology. The purpose should indicate the specific goal of the flight.
- **Aircraft Type**. Enter the alphanumeric designation of the appropriate aircraft. If a flight simulator was used, enter the simulator designation.
- **Date Started**. Enter the date on which the flight training program started.
- **Must Complete By**. Enter the date on which the crewmember must complete the training program. If the crewmember is granted an extension during a time-limited training program, line through the original date and enter the new date above it. Explain the change in the Comments section.
- **Date**. Enter the day, month, and year of the flight.
- **Flight Data**. This form provides a cumulative record of the time flown under those flight modes/conditions normally requiring minimum amounts. Record all flight time in hours and tenths of hours.
  - **Time Today**. Enter the total time flown today.
  - **Cumulative Time**. Record the total flight time accrued to date.
  - **Day Flight–Today**. Enter the time flown today under day flight conditions. For flights conducted under other than day flight conditions, enter the applicable flight mode or condition in the space provided. Then record the time flown today for that flight mode or condition.
  - **Day Flight–Cumulative**. Record the total time accrued under day flight conditions. For flights conducted under other than day flight conditions, enter the applicable flight mode or condition in the space provided. Then record the total flight time accrued to date for that flight mode or condition.
  - **Duty Position**. Enter the crewmember's duty position for the flight.
  - **Seat Position**. Enter the crewmember's seat position for the flight.
  - **Overall Grade**. Enter either S or U in the overall grade block after the crewmember completes the flight.
  - **Crewmember Initials**. Have the crewmember initial the grade slip to certify that the crewmember has been debriefed. The initials do not mean that the crewmember agrees with the results.
  - **Trainer or Evaluator Name, Rank, and Duty Position**. Enter the trainer or evaluator's last name and first initial, rank, and duty position.
- **Comments**. The trainer/evaluator may enter pertinent comments on DA Form 4507-R. If more space is required, use DA Form 4507-2-R (*Continuation Comment Slip*). Enter the date of the flight and sound, objective comments. These comments are important for reference by other trainers or evaluators during future training or evaluation.

DA FORM 4507-1-R

5-25. This form is used to list the tasks required for the training program underway. To save time in preparing DA Form 4507-1-R (*Maneuver/Procedure Grade Slip)* for specific training programs, units may list on the form all base and mission tasks in the applicable ATM and those additional tasks designated by the commander. Instructions for completing this form are given below.

- **Trainee's/Examinee's Name**. Enter the trainee's or examinee's name (last, first, middle initial). This entry is not required on subsequent pages.
- **Page No**. Enter the page number of this page.
- **No. Pages**. Enter the total number of DA Form 4507-1-R used.

- **Date**. Enter the day, month, and year of the flight. In the blocks under the date, enter a grade of S or U. Enter DM if the task is demonstrated only and the trainee does not have an opportunity to execute it during that flight period. A grade of unsatisfactory requires a brief description of the deficiency in the comments section of DA Form 4507-R or, if additional space is needed, on DA Form 4507-2-R (*Continuation Comment Slip)*. Place a diagonal (/) in the grade blocks for all maneuvers or procedures not evaluated. (An acceptable alternative method is to place a diagonal in the first and last unused blocks and draw a straight vertical line connecting the two diagonals. This method may be used when three or more consecutive maneuvers or procedures are not graded.) To preclude inadvertent accomplishment or grading of these tasks, trainers and evaluators may wish to simply line out the tasks that do not apply.
- **Maneuver/Procedure**. Enter the maneuvers required for the training program underway.
- **Select**. On the basis of the guidance in the applicable ATM, this training circular, the CTL, the unit SOP, and other documents, place an X in the selection column by each task that is mandatory for the training program underway.

DA FORM 4507-2-R

5-26. This form is used to continue comments from the back of DA Form 4507-R and from DA Form 4507-1-R. It consists of two pages and is identical for all Army aircraft or simulation devices.

Chapter 6

Risk Management

Tough, realistic training, conducted to standard, is the cornerstone of Army warfighting skills. The battle-focused training environment places stress upon both the Soldiers and their equipment, creating a high potential for accidents. As training realism increases, so does the potential for accidents. If risk is not reduced, personnel and equipment losses, caused by training mishaps, pose a serious drain on warfighting assets. Accidental losses in training are no different from combat losses—the assets are gone. Commanders must find ways to protect individuals and equipment from accidents during realistic training to prepare for war. How well commanders assess risk could be the decisive factor between winning and losing. Guidance on risk management is contained in FM 101-5, FM 100-14, and AR 385-10.

CONCEPT

6-1. Risk management is the process of identifying and controlling hazards to protect the force. This process represents a logical and systematic thought process from which users develop tools, techniques, and procedures for applying risk management in their areas of responsibility. It is a continuous process applicable to any situation and any environment. Risk management is a tool leaders use to make informed risk decisions. It is a common sense way of accomplishing the mission with the least possible risk. Risk management follows a process, which personnel of all ranks must continually use. The risk assessment process is as follows:

- Identify the hazards.
- Assess the hazards.
- Develop controls and make decisions.
- Implement the controls.
- Supervise and evaluate.

6-2. Using this process, leaders identify the hazards that may cause a mission failure. These include those hazards that may cause injury and/or death to personnel or damage to and/or destruction of equipment. A commander should then determine the possible impact of each hazard on the mission, take action to minimize or eliminate the hazards, then execute the mission or modify the mission to reduce further risk. Risk management is not a restrictive measure. It is a conscious analysis of the mission itself, possible courses of action, and implementing appropriate controls to ensure any risk is reduced or eliminated.

6-3. The risk management process includes several terms all leaders should know. These terms are—

- Risk management—Risk management is the process of identifying and controlling hazards to protect the force.
- Control—Control is any action taken to eliminate hazards or reduce their risk.
- Hazard—Hazards are any real or potential condition that can cause the loss of an asset. These losses include injury, illness, and death of personnel; damage to or loss of equipment or property; and mission degradation.
- Risk—Risk is the chance of hazard or bad consequences or exposure to a chance of injury or loss. Risk level is expressed in terms of hazard probability and severity.
- Exposure—Exposure is the frequency and length of time subjected to a hazard.

- Probability—Probability is the likelihood that an event will occur.
- Severity—Severity is the expected consequence of an event, in terms of degree of injury, property damage, or other mission impairing factors that could occur.
- Risk assessment—Risk assessment is the identification and assessment of hazards.
- Residual risk—Residual risk is any anticipated level of risk remaining after controls have been identified and selected for hazards that may result in loss of combat power.
- Risk decision—Risk decision is the decision to accept or not accept the risk(s) associated with an action made by the commander, leader, manager, or individual responsible for performing that action.

6-4. The standard for risk management is leadership at the appropriate level of authority making informed decisions to control hazards or accept risks. Leaders are responsible and accountable for assessing their operation as a total system.

6-5. The degree of risk determines the level of decision authority. When resources to control a high risk are not available, the risk issue must be elevated to the next higher command. This process continues until the information is presented to the level of command that has the resources and authority to eliminate the hazard or control the risk to an acceptable level. In this manner, a conscious and informed decision is made to either commit the resources to control the hazards or to accept the risk.

RESPONSIBILITIES

6-6. Risk management is not complex, technical, or difficult, and it is not limited to the brigade and battalion commanders. It is a simple decision-making process and a way of "thinking through a mission" to balance mission demands against known risks. Trainers/evaluators can maintain realism in training while accomplishing thorough risk management. In peacetime, the process must be deliberate, continuous, and must become second nature to those responsible for planning, approving, or leading activities. In combat, the process is no less deliberate, though risks may be accepted as dictated by the mission priority.

6-7. **Leaders.** Managing risk is a leadership responsibility. At the crewmember level, MCs and instructors/evaluators are the principal risk managers. Planning must incorporate consideration for known hazards and must address appropriate control measures to minimize exposure to these hazards. While risk management is introduced in the planning phase of a mission, for MCs, risk management responsibilities are not complete until the mission debriefing is complete. To meet these responsibilities, leaders—

- Do not accept unnecessary risk. If the risk can be eliminated or reduced and the mission still accomplished, the risk is mitigated and acceptable. Find ways to mitigate the risk (for example, change the crew mix, change the mission execution time, provide additional preparation and training, add additional supervision, and so forth.) that will still allow completing the mission. Once hazards are identified and controls recommended, compare and balance the residual risk against the mission expectation.
  - Pre-mission. The commander or other designated risk approval authority decides if the controls are sufficient to accept the risk. If the risk is excessive, the commander can direct additional control measures, modify controls, request the next higher commander's involvement, or reject the mission.
  - During the mission. While the commander retains the position as the primary risk manager, circumstances will always arise when the commander is not available to make every risk decision. When the situation, time, or other factors do not allow for the commander's decision, the MC, instructors/evaluators, or other unit leaders become the primary risk managers. In such cases, they should use the commander's guidance, their professional experience, unit SOP, ATM, regulations, current situation, developing conditions, and so forth as the basis on which they formulate control measures. They should evaluate unexpected risks that could occur during the course of the mission and be ready to apply the appropriate control measures. When these control measures cannot mitigate an unexpected hazard or a control measure dictates (for example, exceeding crew endurance policy), they should request assistance from the risk approval authority.

- Make risk decisions at the proper level. This action results in timely decisions. Decisions made at the proper level eliminate involving commanders not normally involved in the mission or commanders not authorized to accept the level of risk. MCs must know the appropriate level of approval authority based on the level of risk. The risk approval authority will vary between units and risk levels but should be at a level that is accountable for the mission's success or failure.
- Weigh the risks against the rewards. The benefits gained by accepting a residual risk must clearly outweigh the potential cost in terms of life, limb, or equipment loss if an accident or incident occurs.
- Identify controls. The commander will issue guidance regarding the appropriate control measures. Once the controls are identified, MCs must ensure these controls are understood and implemented during the mission.
  - The crew mission briefing is where the MC presents these controls to the crew. The delineation of duties (for example, airspace surveillance responsibilities), is an example of a hazard control established before flight.
  - The unit SOP is a formal document of risk management controls. These controls are only effective when followed. "Per the SOP" is a valid control measure only when all crewmembers are knowledgeable of the unit SOP's contents. Flight weather minimums are a good example. The commander must reinforce and support the MC's decision to abort a mission or to divert or land the aircraft when conditions fall below these standards. Pre-mission planning should include options/controls for this example.
  - Crew coordination is a method of "on-the-fly" risk management by identifying unexpected hazards, establishing control measures, and supervising these hazard controls continuously during the conduct of a mission.
- Integrate risk management into all stages of all operations. Integration begins with the pre-mission planning and continues through the completion of the mission debriefing. Consider risk management as contingency planning. The commander and staff should look at factors that could cause the mission to fail (cause loss of life, limb, or equipment) and implement controls to minimize that probability. During the debriefing, unexpected hazards for a completed mission then become expected hazards for follow-on missions.

6-8. **Staff.** While crewmembers are not specifically members of the unit staff, they normally provide input to the staff. During operations, the staff normally does not occupy a crew station, but through their work, a significant portion of risk management does occur before any start switch is pressed. Some functions that the staff performs, relative to risk management, are as follows:

- Assist in planning and identifying hazards for operations.
- Integrate risk management into operations plans and orders. In developing plans, the staff evaluates the risks, recommends controls to minimize the risks, and provides the commander with an assessment of the effectiveness of the imposed controls. In training situations, the staff—
  - Advises the commander of the controls impacting on training realism so the commander can make the risk acceptance decision.
  - Evaluates imposed safety restrictions to ensure optimal training benefit is achieved without applying unnecessary restrictive measures.
- Assess the operational risk. Using METT-TC to identify the risk-to-mission accomplishment, the staff begins to assess operational risks. The most important consideration is the outcome of the operation for the unit, higher headquarters, and adjacent units. Risk analysis is formulated using a course of action that is developed along the spectrum of frequent to unlikely event occurrence. The staff reviews and expands or refines the list throughout the planning and execution of the exercise. The staff then evaluates the possible consequences of those risks from catastrophic to negligible.

6-9. **Safety Officer/NCO.** The safety officer/NCO—

- Is an integral part of the risk management planning process.
- Advises the commander and staff on safety requirements and recommends controls to minimize risks.
- Assists all staffs in integrating the risk management process into other staff functions.
- Assists the command in supervising operations to ensure application and adherence to imposed controls.
- Must provide feedback on the effectiveness of the program.

6-10. **Crews**. Crewmembers are a critical part of the risk management process. They perform the mission, and their involvement in the planning phase is crucial to identifying hazards and controls. Crewmembers must clearly understand the controls implemented to mitigate risks. During mission execution, crewmembers must perform tasks and control measures to standard. Employing good crew coordination is paramount to identifying unexpected hazards (enemy situation, wires, weather, and so forth.) and to continuously refine controls during the mission.

6-11. **Individuals**. Self-discipline is critical to mission accomplishment and to an effective risk management program. The best risk management plan is worthless if the individuals performing the mission do not adhere to the controls or do not perform the tasks to standard. Individuals performing a mission are also responsible for performing risk management. While performing the mission, conditions change; therefore, hazards change, risks change and, by necessity, risk management controls may change. The individual must constantly assess the conditions and must continuously apply the principles of risk management to ensure minimum risk to themselves, fellow Soldiers, the aircraft, and the mission.

TRAINING

6-12. Commanders must conduct risk management training for their units. It should emphasize the process and must reinforce the philosophy that Soldiers (crewmembers and ground personnel) are responsible for performing risk management, not just the commanders.

PROCESS

6-13. The following steps clarify the risk assessment process:

Step 1. Identify Hazards

- Identify the major events in the mission and list chronologically. This will help identify all hazards associated with the specified as well as implied tasks.
- Complete a preliminary hazard analysis of operational events. This identifies, as early as possible, the obvious hazards expected during the mission. Early identification provides more flexibility in addressing the hazards and allows more options for controls, which maximizes a leader's ability to complete the mission.

Step 2. Assess Risks. Determine the level of risk associated with each hazard. Commanders should ask, "Can the hazard result in a fatality, damage to equipment, or mission failure?" The degree of risk associated with each particular hazard will help define the level of controls necessary.

Step 3. Develop Controls and Make Risk Decision. All hazards cannot be eliminated; therefore, there is a point at which the command must accept the risks and direct the mission to continue, modify the mission, or abort the mission. This is not to say; however, that the risk management process stops. The risk management process is a continual process. There may come a time during a mission when an opportunity exists to eliminate a particular risk. That opportunity might not be apparent if the risk management process is not continual. The intent is to mitigate the probability of an accident or the severity of the consequences with prudent controls whenever the risk is evident. The command has identified the controls but cannot eliminate all the risks; therefore, it accepts the residual risks, in this case, as necessary and unavoidable. In identifying and implementing controls, commanders should—

- Eliminate the hazard. This may include changing the crew, mission time (day versus night), route, or aircraft type.

- Guard or control the hazard. For flight operations, this might include crew mix.
- Change operational procedures to limit exposure to hazards (for example, minimize the number of systems or personnel or limit exposure to a particular hazard).
- Train and educate personnel in hazard recognition and avoidance. Some good examples include the known performance and operational limits of the aircraft.
- Provide protective clothing or equipment that will minimize injury and damage potential.
- Use color coding and signs to alert personnel of hazards (for example, safety lanes in hangers, stairs, curbs, marking on aircraft for propellers, and so forth).

Step 4. Implement Controls. Integrate controls into the planning. Awareness of the hazards and controls, from the commander through the individual(s) performing the task, is essential to success.

Step 5. Supervise. Leaders—

- Must enforce the controls and standards. The best risk management program is ineffective if the command does not enforce the controls. Obviously, the leadership cannot be present for every mission; therefore, maintaining discipline must be a high priority. The most common cause of accidents is the failure of an individual to adhere to controls or a failure of the command to enforce a known standard.
- Must supervise activities of subordinate units. The battalion will supervise company operations; the company will supervise platoon operations, and so forth. Supervising a subordinate unit does not imply interference. Only by seeing the character of operations will leaders fully appreciate risk implications or the effectiveness of the risk management program.
- At all levels are responsible for supervising operations. From private to general, all Soldiers can, and must, share in the responsibility for supervising. Supervision ensures that the hazard is identified and the controls are followed. Additionally, as conditions change, the supervisor continually applies the risk management process to ensure successful completion of the mission.

TOOLS

6-14. Using risk assessment tools, such as matrixes and diagrams, are valuable during the planning stage of a mission. These tools do not internalize the entire risk management process, but they do provide a systematic approach to identifying and reducing risk. However, do not allow the risk assessment tools to become the overriding concern of the risk management process. Risk assessment tools do not make decisions. Leaders make decisions. Tools merely provide a measurement for leaders to gauge risk and control effectiveness.

6-15. The risk assessment gauge includes four levels of risk: low, moderate, high, and extremely high. Figure 6-1 shows an example of a standard risk assessment gauge.

<table>
<tr><td colspan="2" rowspan="3"></td><td colspan="5">Hazard Probability</td></tr>
<tr><td>Frequent</td><td>Likely</td><td>Occasional</td><td>Seldom</td><td>Unlikely</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr>
<tr><td rowspan="4">EFFECT</td><td>Catastrophic (I)</td><td colspan="2" rowspan="2">Extremely High</td><td rowspan="2">High</td><td rowspan="2"></td><td>Moderate</td></tr>
<tr><td>Critical (II)</td><td rowspan="2"></td><td>Moderate</td><td rowspan="3">Low</td></tr>
<tr><td>Moderate (III)</td><td>High</td><td colspan="2">Moderate</td></tr>
<tr><td>Negligible (IV)</td><td>Moderate</td><td colspan="3"></td></tr>
</table>

Figure 6-1. An example of a standard risk assessment gauge

6-16. The following is a list of hazard effects associated with figure 6-1.

- Catastrophic (I).
  - Loss of the ability to accomplish the mission or mission failure.
  - Death or permanent total disability (accident risk) of personnel.
  - Loss of major or mission-critical system or equipment.
  - Major property (facility) damage.
  - Severe environmental damage.
  - Mission-critical security failure.
  - Unacceptable collateral damage.
- Critical (II).
  - Significantly (severely) degraded mission capability or unit readiness.
  - Permanent partial disability, temporary total disability exceeding 3 months time (accident risk).
  - Extensive (major) damage to equipment or systems.
  - Significant damage to property or the environment.
  - Security failure.
  - Significant collateral damage.
- Moderate (III).
  - Degraded mission capability or unit readiness.
  - Minor damage to equipment or systems, property, or the environment.
  - Lost day due to injury or illness not exceeding 3 months (accident risk).
  - Minor damage to property or the environment.
- Negligible (IV).
  - Little or no adverse impact on mission capability.
  - First aid or minor medical treatment (accident risk).
  - Slight equipment or system damage but fully functional and serviceable.
  - Little or no property or environmental damage.

6-17. Figure 6-2 defines the probability of occurrence.

PROBABILITY – FREQUENT	
Individual Soldier/item	Occurs often in career or equipment service life.
All Soldiers or item inventory exposed	Continuously experienced.
PROBABILITY – LIKELY	
Individual Soldier/item	Occurs several times in career/equipment service life.
All Soldiers or item inventory exposed	Occurs frequently.
PROBABILITY – OCCASIONAL	
Individual Soldier/item	Occurs sometime in career/equipment service life.
All Soldiers or item inventory exposed	Occurs sporadically or several times in inventory service life.
PROBABILITY – SELDOM	
Individual Soldier/item	Possibility of occurrence in career/equipment life.
All Soldiers or item inventory exposed	Remote chances of occurrence; expected to occur sometime in inventory service life.
PROBABILITY – UNLIKELY	
Individual Soldier/item	Assume no occurrence in career/equipment service life.

Figure 6-2. Probability of occurrence

6-18. A matrix cannot include all of the hazards of every mission nor can a single matrix apply to all units. Commanders must determine the usefulness and content of any risk assessment tool. Commanders must consider a number of basic principles when they use these tools.

- Simply adding the numbers up and finding the right level of command to accept the risk is not risk management.
- The risk assessment matrix is most valuable during mission planning.
- Each element of the matrix represents a specific hazard, which in the risk assessment process translates into risk.
- Commanders should review the unit METL as they develop their risk assessment matrixes. They should assess each METL task from the highest risk to the lowest risk. Commanders should then select the task(s) or task elements on which they personally want to initiate risk reduction action and approval. Their risk assessment matrixes should clearly show these critical elements.
- Commanders should include additional items in the development of the risk assessment matrix, when applicable.

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Appendix A

RQ/MQ-5 ATP Requirements

FLIGHT HOUR MINIMUMS

A-1. Semiannual aircraft flying-hour requirements.

- FAC 1—24 hours, of which 8 hours must be flown in each crew station.
- FAC 2—12 hours, of which 4 hours must be flown in each crew station.
- FAC 3—No crew duties authorized with Army UASs.

A-2. Semiannual simulation device flying-hour requirements. Trainers and evaluators may credit IO hours toward their semiannual simulation device flying-hour requirements. FAC 1 UACs may apply a maximum of 12 simulation hours flown in a semiannual period toward that period's semiannual flying-hour requirements. FAC 2 UACs may apply a maximum of 6 simulation hours flown in a semiannual period toward that period's semiannual flying-hour requirements.

- FAC 1—8 hours, of which 3 hours must be flown in each crew station.
- FAC 2—4 hours, of which 1 hour must be flown in each crew station.
- FAC 3—3 hours, which may be flown in either crew station.

A-3. Semiannual aircraft flying-hour requirements (EO): FAC 1—12 hours, of which 1.5 hours must be flown at night.

Note. UTs, IOs, and SOs may credit those hours they fly while performing assigned duties at any crew position toward their semiannual flying-hour requirement.

CURRENCY REQUIREMENTS

A-4. To be considered current, a UAC must—

- Perform every 60 consecutive days a 1 hour flight in the UAS or a compatible simulator.
- Perform every 120 consecutive days a 1 hour flight in the UAS.

A-5. To be considered current, an EO must conduct one takeoff and landing and 30 minutes of local flight time, encompassing touch-and-go landings and simulated emergencies every 60 consecutive days.

A-6. To be considered current, an EO must conduct one takeoff and landing and 30 minutes of local flight time, encompassing touch-and-go landings and simulated emergencies every "30" consecutive days.

RQ/MQ-5 TASK LIST

A-7. **Task Number.** Each ATM task is identified by a 10-digit systems approach to training (SAT) number. For convenience, only the last four digits are listed in this training circular. The last four digits of—

- Base tasks are assigned 1000-series numbers (table A-1 and table A-4).
- Mission tasks are assigned 2000-series numbers (table A-2, table A-3, and table A-4).
- Additional tasks are assigned 3000-series numbers.

Note. Additional tasks are 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.

A-8. **Task Title**. The task title identifies a clearly defined and measurable activity.

A-9. **Conditions.** The conditions specify the situation (normal operation, wartime, training, or evaluations) under which the task will be performed. They describe important aspects of the performance environment. All conditions must be met before task iterations can be credited.

A-10. **IO/SO.** The following tasks require an IO or SO for training/evaluation with the aircraft:

- Task 1070, Describe or Perform Emergency Procedure.
- Task 1325, Perform Simulated Emergency Procedures for Single-Engine Failure During Takeoff
- Task 1320, Perform Simulated Single-Engine Go-Around.
- Task 1163, Perform Simulated Emergency Procedures for Dual-Engine Failure Landing
- Task 1075, Perform Simulated Emergency Procedures for Single-Engine Failure During Landing.

A-11. **Annual Task and Iteration Requirements.** The required annual task and iterations are specified in paragraph 2-26.

Table A-1. UAC base task list

Task	*Title*	*EO*	*AO*	*PO*	*N*	*EVAL*
1000	Participate in a Crew Mission Briefing	X	X	X		S
1013	Operate Mission Planning System		X	X		S
1022	Perform Preflight Inspection	X	X	X	X	S
1024	Perform Engine Start/Systems Check	X	X		X	S
1032	Perform Radio Communication Procedures	X	X	X		S
1034	Perform Unmanned Aircraft System Taxi	X	X		X	S
1040	Perform Normal Takeoff and Climb	X	X		X	S
1041	Perform Unmanned Aircraft System Flight In Position Sticks	X	X		X	S
1044	Navigate By Pilotage and Dead Reckoning		X	X	X	S
1045	Perform Flight in Knob Control		X	X	X	S
1048	Perform Fuel Management Procedures		X	X		S
1050	Perform Flight Utilizing Automatic Flight Mode	X	X			S
1070	Describe or Perform Emergency Procedure	X	X	X	X	S
1075	Perform Simulated Emergency Procedures for Single-Engine Failure During Landing	X	X			
1099	Operate Identification Friend or Foe System		X			S
1110	Track a Static Target		X	X	X	S
1115	Track a Moving Target		X	X	X	S
1144	Perform Touch-and-Go Landing	X	X		X	
1145	Perform Normal Landing	X	X		X	S
1163	Perform Simulated Emergency Procedures for Dual-Engine Failure Landing	X	X			
1175	Perform Transfer Procedures	X	X			S
1177	Perform Go-Around	X	X		X	
1184	Perform or Describe Inadvertent Instrument Meteorological Condition	X	X	X	X	S

Table A-1. UAC base task list

Task	*Title*	*EO*	*AO*	*PO*	*N*	*EVAL*
1302	Perform Procedures for Two-Way Radio Failure	X	X	X		
1320	Perform Simulated Single-Engine Go-Around	X	X			S
1325	Perform Simulated Emergency Procedures for Single-Engine Failure During Takeoff	X	X			S
1402	Perform Flight Mission Planning		X	X		S
1472	Perform Aerial Observation		X	X	X	S
1800	Perform After-Landing Checks	X	X	X	X	S

Legend:

EO—External operator
AO—Unmanned aircraft operator
PO—Mission payload operator
N—Night
EVAL—Mandatory annual proficiency and readiness test (APART)
X—Mandatory annual task iteration requirement
S—Standardization flight evaluation
SM—Simulator

Note. Tasks evaluated in a more demanding mode may be credited toward completion of annual evaluation requirements. "N" is considered the most demanding mode, followed by "D," and "SM."
Note. Tasks identified with "SM" only in the EVAL column will be evaluated on the simulator.

Table A-2. UAC mission task list

Task	*Title*
2000	Perform Cold Weather Operations
2005	Perform Desert and Hot Weather Operations
2010	Discuss Turbulence and Thunderstorm Operations
2015	Perform Mountain Operations
2018	Recommend/Reconnoiter Landing Zone/Pickup Zone
2019	Perform Route Reconnaissance
2025	Conduct Digital Communications
2054	Perform Target Hand Over to an Attack Helicopter
2066	Perform Zone Reconnaissance
2067	Perform Area Reconnaissance
2092	Transmit a Tactical Report
2162	Call for and Adjust Indirect Fire
2472	Perform Airborne Data Relay Mission

Table A-3. UAC maintenance task list

Task	*Title*
2601	Perform Maintenance Preflight Inspection
2602	Perform Limited Maintenance Test Flight
2603	Perform Limited Maintenance Test Flight–External
2604	Perform General Maintenance Test Flight
2605	Perform General Maintenance Test Flight–External
2606	Perform Maintenance Postflight Inspection

Table A-4. UAS ground crewmember task list

Task	*Title*	*D*	*N*	*EVAL*
1000	Participate in a Crew Mission Briefing	X	X	X
1022	Perform Preflight Inspection	X	X	X
1024	Perform Engine Start/Systems Checks	X	X	X
1040	Perform Normal Takeoff and Climb	X	X	X
1070	Describe or Perform Emergency Procedure	X		X
1099	Operate Identification Friend or Foe System	X		X
1800	Perform After-Landing Checks	X		X
2000	Perform Cold Weather Operations	X		
2005	Perform Desert and Hot Weather Operations	X		
Note. Tasks evaluated in a more demanding mode may be credited toward completion of annual evaluation requirements. "N" is considered the most demanding mode, followed by "D."				

TASK 1000

Participate in a Crew Mission Briefing

CONDITIONS: Prior to ground or flight operations with a Hunter unmanned aircraft system (UAS) or simulator and given DA Form 7525 (*UAS Mission Schedule/Brief*) and a unit-approved crew briefing checklist.

STANDARDS:

1. Without error, brief the mandatory and mission-related items detailed on DA Form 7525.

2. Assign crewmember mission duties and responsibilities.

3. Assign crewmember duties and responsibilities per the crew briefing checklist.

4. Have the crewmembers acknowledge that they fully understand the assignment of duties and responsibilities.

DESCRIPTION:

1. Crew Actions

   a. A designated briefing officer/noncommissioned officer (NCO) will evaluate and brief key areas of the mission to the mission commander (MC) per AR 95-23. The MC will acknowledge a complete understanding of the mission brief and initial DA Form 7525.

   b. The MC has overall responsibility for the crew mission briefing. The MC will ensure that the crew is current and qualified to perform the mission. The MC may direct the other crewmembers to perform all or part of the crew briefing.

   c. The crewmembers being briefed will address any questions to the briefer and will acknowledge that they understand the assigned actions, duties, and responsibilities. Lessons learned from previous debriefings should be addressed as applicable during the crew briefing.

2. Procedures. Brief the mission using a unit-approved crew mission briefing checklist. Figure A-1 shows a suggested format for a Hunter UAS crew briefing checklist. Identify mission and flight requirements that will demand effective communication and proper sequencing and timing of actions by the crewmembers.

REFERENCES: Appropriate common references.

HUNTER UAS MISSION BRIEFING	
☐OPORD ☐WARNO ☐FRAGO No. ( ) DATE/TIME: OPERATION NAME: OPERATION ORDER #.	
TASK ORGANIZATION:	
SITUATION:	
ENEMY FORCES/ FRIENDLY FORCES:	
WEATHER:	
MISSION:	
EXECUTION:	
SCHEME OF SUPPORT:	
INGRESS/EGRESS:	
SPECIFIC INSTRUCTIONS TO SUBORDINATE UNITS	
Launch Aircrew/Ground Crew: Preflight Acft #	*TIMELINE* Wx Decision: Commo Check: Shelter Power Up:
Mission Aircrew:	Presets: Preflight: Armaments Installed: Engine Start:
Recovery Aircrew/ Ground Crew : Postflight Acft# Preflight Acft #	Takeoff: Control Transfer: On Station: 1st TOT:
	Relief on Station: End of Mission: Debrief Time/Location:
DATA REPORTING/RECORDING:	
TYPE OF LAUNCH:	
COORDINATING INSTRUCTIONS	
AIRSPACE CONTROL MEASURES/SPINS/TAP:	
RELEASE AUTHORITY FOR LETHAL PAYLOAD:	
ABORT CRITERIA/WARNINGS: IAS: Altitude: Fuel: Weather: <2000/3 Aircraft: Msn: Jettison Point: RH Point:	
RELIEF ON STATION:	
RETURN-HOME/LOSS OF LINK PLAN: RH Altitude: RH Airspeed: RH Holding Altitude:	
IMC RECOVERY:	

SERVICE AND SUPPORT	
DART Team Ldr:	DART: Primary Recovery
DART: Alternate Recovery	DART Location/FREQ:
Refuel Location:	Bingo Fuel:
MEDEVAC Freq:	
COMMAND AND SIGNAL	
Succession of Command:	
Signal:	
Primary Internal Freq:	Alternate Internal Freq:
Control Tower Freq:	HF Freq:
Command Freq:	UHF Freq:
Uplink Freq:	Downlink Freq:
RVT Freq:	GCS/RVT Location
IFF Codes	LASER Codes
Elev/MagDec/Incl:	
Supported Unit Freqs:	Net ID/Hop/Key:
CREW ACTIONS, DUTIES, AND RESPONSIBILITIES: (ELEMENTS OF CREW COORDINATION)	
Communicate positively.	Acknowledge actions.
Direct assistance.	Be explicit.
Announce actions.	Provide UA control and obstacle advisories
Offer assistance.	Coordinate action sequence and timing.
Risk Assessment and Mitigation:	
Additional Instructions:	

Figure A-1. Example of a Hunter UAS mission briefing

TASK 1013

Operate Mission Planning System

CONDITIONS: Given a Hunter system or simulator and operator's manual/checklist.

STANDARDS:

1. Without error, build a mission plan to accomplish mission objectives while maintaining operational parameters.

2. Correctly perform crew coordination procedures.

DESCRIPTION:

1. Open the mission planner software from the air vehicle location display (AVLD), enhanced mission planner/main map display. (MQ-5B)

2. Build the mission plan by adding, inserting, and editing waypoints.

3. For each waypoint, the aircraft operator (AO) or the payload operator (PO) sets the location, altitude, airspeed, and payload options.

4. Upon completion, the AO or PO checks the visibility to ensure data link line of sight throughout the mission.

5. Verify the mission duration, fuel required, and minimum clearance.

6. Save the mission plan to the hard drive.

7. Correctly transfer the completed mission to the other console (AO/PO) using the X-File Transfer Protocol (XFTP) software.

Note. Many missions will appear similar. Always verify mission load before entering mission mode during flight.

REFERENCES: Appropriate common references.

TASK 1022

Perform Preflight Inspection

CONDITIONS: Given a Hunter system and operator's manual/checklist.

STANDARDS:

1. Without error, perform the preflight checks, air vehicle (AV) preflight inspections in accordance with the operator's manual/checklist.

2. Correctly enter and verify the appropriate information on DA Form 2408-12 (*Army Aviator's Flight Record*) and DA Form 2408-13 (*Aircraft Status Information Record*), DA Form 2408-13-1 *(Aircraft Maintenance and Inspection Record*), and DA Form 2408-18 (*Equipment Inspection List*).

3. Correctly perform preflight inspection [with a minimum of two ground crewmembers] utilizing proper challenge and response crew coordination.

4. Verify the data on the DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*).

5. Correctly perform crew coordination actions.

DESCRIPTION:

1. The aircraft operator (AO) will ensure that the proper preflight checks are verified using the appropriate operator's manual/checklist.

2. The AO will ensure the appropriate information is entered on DA Form 2408-12, DA Form 2408-13, DA Form 2408-13-1, DA Form 2408-18, and DD Form 365-4.

3. The crewmember(s) will complete the preflight checks and AV preflight as directed and will ensure the preflight of the aircraft meets the required preflight inspection criteria.

4. All crewmembers will use standard challenge and response communications.

NIGHT CONSIDERATIONS: If time permits, accomplish the preflight inspection during daylight hours. During the hours of darkness, ground crewmembers will use a flashlight with an unfettered lens to supplement available lighting. Oil leaks and other defects are difficult to see using a flashlight with a colored lens.

REFERENCES: Appropriate common references.

TASK 1024

Perform Engine Start/Systems Check

CONDITIONS: Given a Hunter system and operator's manual/checklist.

STANDARDS:

1. Without error, perform procedures and checks according to the operator's manual/checklist.

2. Ensure that engine and systems are operating within prescribed tolerances.

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Crewmembers will complete the required checks or procedures pertaining to their crew duties according to the checklist and the preflight briefing.

2. Procedures. Ground Crewmembers will position the unmanned aircraft system (UAS) properly for run-up. The external operator (EO) and aircraft operator (AO) will complete the engine start and systems check and ensure that the engine, related systems, and equipment are operating properly. The checklist will be used to verify that all checks are completed. The AO shall read the checklist and ensure that all of the checklist items are completed.

3. All crewmembers will use the standard challenge and response communications.

WARNING

Exercise extreme caution during limited visibility and night operations.

REFERENCES: Appropriate common references.

TASK 1032

Perform Radio Communication Procedures

CONDITIONS: Given a Hunter system or simulator and established radio communication.

STANDARDS:

1. Without error, tune system radios to the proper frequencies.

2. Establish radio contract with the appropriate air traffic control (ATC) facility.

3. When communicating with ATC facilities, use the correct radio communication procedures and phraseology according to the Department of Defense (DOD) flight information publication (FLIP).

4. Acknowledge each radio communication with ATC by using the correct aircraft call sign.

5. Acknowledge and comply with ATC instructions to change frequencies.

6. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Radio communication is primarily the unmanned aircraft operator's (AO's) responsibility. However, if crewmembers monitor two frequencies simultaneously, they will keep each other informed of any actions or communications conducted on their respective frequency.

2. Procedures

a. The crew will use radio communications procedures and phraseology as appropriate for the area of operations. Standard phrases and terms will be used during all transmissions.

b. The AO will tune the system radios as required and maintain a continuous listening watch on the assigned frequencies. When required, The AO will establish communications with the appropriate ATC facility. The AO will monitor the frequency before transmitting and use the correct radio call sign when acknowledging each communication. The AO will transmit pilot reports, position reports, and flight plan changes (as required).

c. When advised to change frequencies, the AO will acknowledge the transmission before making the change. The AO will select the new frequency as soon as possible unless instructed to do so at a specific time, fix, or altitude.

Note. When performing this task, the AO will coordinate according to the mission briefing.

REFERENCES: Appropriate common references.

TASK 1034

Perform Unmanned Aircraft System Taxi

CONDITIONS: Given a Hunter system and operator's manual or checklist.

STANDARDS:

1. Correctly perform procedures and checks according to the operator's manual/checklist.

2. Comply with taxi clearances.

3. Follow taxi lines with minimum deviation (no more than half of the wingspan).

4. Properly use power to maintain a safe taxi speed.

5. Correctly use controls as required by wind conditions.

6. Maintain proper power settings when the unmanned aircraft system (UAS) is stopped.

7. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Crewmembers will complete the required checks or procedures pertaining to their crew duties according to the appropriate operator's manual/checklist and the preflight briefing.

2. Procedures. The external operator (EO) will perform the following actions:

a. When required to initiate taxi, EO increase power slightly until the unmanned aircraft (UA) starts to move. Maintain a safe taxi speed compatible with airfield and environmental conditions. Apply controls as required by wind conditions. Complete the required taxi checks, and verify the checks with the appropriate operator's manual/checklist. While taxiing the UA, follow taxi areas. When the UA is stopped, maintain power as required to ensure sufficient electrical output and proper engine cooling and to prevent fouling of spark plugs. Use taxi guides when operating in closely restricted areas.

NIGHT CONSIDERATIONS: Because of limited visibility at night, taxi speeds should be reduced to allow a greater margin of safety. Extra care should be used whenever taxiing in areas where obstacles are difficult to see.

REFERENCES: Appropriate common references.

TASK 1040

Perform Normal Takeoff and Climb

CONDITIONS: Given a Hunter system and operator's manual/checklist, with preflight, engine start procedures, taxi, and final walk around complete, air traffic control (ATC) clearance (if required), and launch crew.

STANDARDS:

1. Without error, complete before-takeoff, takeoff, and after-takeoff checks.

2. During the takeoff roll, maintain a predetermined track (normally runway centerline) within half of the wingspan of the runway centerline.

3. Initiate rotation at rotation speed (vr).

4. Perform initial climb after takeoff at the appropriate airspeed.

5. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

a. While initiating power application, the aircraft operator (AO) will monitor engine instruments carefully and be prepared for an abort procedure if aircraft performance is not satisfactory. The AO should maintain a cross-check of the flight instruments. The external operator (EO) will rotate at the correct airspeed and establish the proper takeoff pitch attitude. All crewmembers will acknowledge all emergency calls.

b. The AO will assist by verifying the flight instruments' settings, monitoring the engine instruments, and reading the checklist. The AO will make the required radio transmissions, maintain the flight log, and perform all designated actions requested.

2. Procedures. The crewmembers will perform the following actions:

a. Normal takeoff.

(1). Complete the before-takeoff check. Align the unmanned aircraft (UA) with the runway heading. Verify the before takeoff checks with the checklist. The EO will smoothly apply takeoff power. During the takeoff, the AO will monitor engine instruments to ensure that they show the proper revolutions per minute (RPM) indications. The EO will maintain directional control with the nose-wheel steering and rudder so that the track is within half of the wingspan of the runway centerline. As the UA approaches rotation speed, increase aft pressure on the elevator to establish an attitude that will make the UA leave the ground to attain a positive rate of climb.

(2) The EO will adjust the pitch to attain climb airspeed. At 60 knots, select flight (FLT) mode. Retract flaps at 63 knots, and adjust pitch as required. Use maximum power during the climb.

(3)As cruise-climb airspeed is attained, complete the after-takeoff check and verify the checks with the checklist.

(4)Throughout the maneuver, the AO will assist the EO by monitoring the engine instruments and advising the EO of any abnormal condition. The AO will ensure that the UA and engine limitations are not exceeded. The AO should complete all designated checks and read the checklist.

a. Crosswind takeoff. As the nose-wheel comes off the ground, the EO will use the rudder as necessary to prevent turning (crabbing) into the wind. As the main gear comes off of the ground, use ailerons as necessary to maintain runway centerline. To prevent damage to the landing gear if the UA settles back onto the runway, remain in slipping flight until the UA is well clear of the ground. Then crab into the wind to continue a straight flight path.

b. Perform post-launch procedures per the appropriate operator's manual/checklist.

Note. Single-engine maneuvering altitude is the altitude at which a UA can safely clear all obstacles around the airfield while maneuvering for a landing.

CAUTION

Be aware of visual illusions at night.

REFERENCES: Appropriate common references.

TASK 1041

Perform Unmanned Aircraft System Flight in Position Sticks

CONDITIONS: Given a Hunter system or simulator and operator's manual or checklist.

STANDARDS:

1. Maintain heading ±10 degrees.
2. Maintain airspeed ±5 knots indicated airspeed (KIAS).
3. Maintain power within the prescribed limits.
4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

   a. The unmanned aircraft operator's (AO's) main focus will be on the flight instruments.

   b. The external operator (EO) will keep the area of observation cleared.

2. Procedures. The crewmembers will perform the following actions:

   a. Climbs. Establish the climb by selecting the maximum power and adjusting the pitch attitude to obtain climb airspeed. Monitor instruments to ensure that operating limitations are not exceeded. Trim the unmanned aircraft (UA) as required throughout the maneuver.

   b. Descents. Establish the descent by reducing the power and adjusting the pitch to maintain the desired airspeed and the desired rate of descent. During the descent, control airspeed by adjusting the pitch attitude. The rate of descent will depend on the amount of power reduced. Trim the UA as required throughout the maneuver.

   c. Constant altitude flight. Establish a constant altitude cruise +100 feet by adjusting the power and pitch attitude to maintain airspeed +5 knots. Execute right and left turns 30 degrees or less angle of bank. Trim UA as required throughout the maneuver. Use the pilot's window to verify and cross-check with instruments if necessary.

NIGHT CONSIDERATIONS: The EO may require instrument information more frequently from the AO.

CAUTION

Be aware of visual illusions at night.

REFERENCES: Appropriate common references.

TASK 1044

Navigate By Pilotage and Dead Reckoning

CONDITIONS: Given a Hunter system, appropriate maps, and last known unmanned aircraft system (UAS) range and azimuth.

STANDARDS:

1. Maintain orientation within ±2,000 meters.

2. Arrive over recovery point ±5 minutes of estimated time of arrival (ETA).

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The unmanned aircraft operator's main focus will be on the heading of the aircraft and azimuth of the ground data terminal. The unmanned aircraft operator will monitor flight and engine instruments.

2. Procedures. The crewmember will perform the following actions:

a. After obtaining current weather forecasts, plan the flight by marking the route. The other crewmembers should assist with all planning and computations, if they are available. Compute the time, distance, and heading for each leg of the flight route.

b. During the flight, use ground data terminal azimuth and dead reckoning to maintain UAS position. Adjust estimated times of arrival for subsequent legs of the route using the latest in-flight computed data. The multimission optronic stabilized platform (MOSP) should be used as necessary to maintain the desired course (ground track).

NIGHT CONSIDERATIONS: Periods of darkness or reduced visibility require more detailed flight planning.

REFERENCES: Appropriate common references.

TASK 1045

Perform Flight in Knob Control

CONDITIONS: Given a Hunter system or simulator, operator's manual/checklist.

STANDARDS:

1. Change heading commands to meet mission waypoints.

2. Adjust for winds.

3. Adjust airspeed commands to meet time-over-target (TOT) requirements while staying within the operating parameters.

4. Adjust altitude commands to meet waypoint requirements.

5. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The unmanned aircraft operator's (AO's) focus will be on the flight instruments; ensuring that the unmanned aircraft system (UAS) is responding appropriately. The AO will also coordinate with the mission payload operator (PO), who cross-checks TOT calculations for airspeed.

2. Procedures

a. Determine heading. From the correct UAS location, use the air vehicle location display (AVLD) or the enhanced mission planner (EMP) for MQ-5B; use the main map display, or appropriate map and determine the correct magnetic heading to the next waypoint or target with corrections for wind.

b. Determine airspeed. From the current UAS position, determine the distance to the next waypoint or target. Calculate the proper airspeed to reach the waypoint/target within the specified time and operational parameters. Initiate a new airspeed command on the airspeed knob on the flight control module. Monitor pitch indication and airspeed for the proper response.

c. Determine altitude. Set the altitude command, with the altitude knob on the flight control module, for the correct altitude for the next waypoint/target. Monitor throttles/revolutions per minute (RPM) and engine instruments as well as altitude and rate of climb indicators for proper response.

d. Course corrections. If the next target is too close to fit within TOT specifications, adjust the heading to delay arrival on the waypoint/target.

REFERENCES: Appropriate common references.

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TASK 1048

Perform Fuel Management Procedures

CONDITIONS: Given an appropriate scale map with mission route denoted, altitude, weather conditions, takeoff weight of unmanned aircraft system (UAS), and airspace available.

STANDARDS:

1. Determine total mission flight time within ±5 minutes.

2. Determine fuel consumption within ±10 liters.

3. Correctly perform crew coordination procedures.

DESCRIPTION:

1. The aircraft operator (AO) calculates flight time by totaling the distance from the launch site, to and between all targets, and back to the recovery site. Use the mission planning charts found in the appropriate operator's manual to determine total mission time.

2. The AO calculates maximum amount of flight time by determining number of liters of fuel expended per hour. The AO must take into account fuel necessary for launch and recovery.

3. The AO calculates mission fuel by using mission planning charts found in the appropriate operator's manual for controlling shelter.

REFERENCES: Appropriate common references.

TASK 1050

Perform Flight Utilizing Automatic Flight Mode

CONDITIONS: Given a Hunter system or simulator, operator's manual, and checklist.

STANDARDS:

1. Without error, load a destination/Point Nav/Hold Loiter to the unmanned aircraft (UA).

2. Without error, load a program/flight plan to the UA.

3. Without error, load Camera Guide to UA.

4. Without error, engage the correct flight mode.

5. Without error, verify that the UA enters the selected flight mode.

6. Without error, verify that the airspeed, heading, and altitude are set to briefed or predetermined settings.

7. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

a. The aircraft operator (AO) will announce all flight mode changes. The AO will verify that the unmanned aircraft UA enters the selected flight mode by monitoring the flight mode report on the computer console assembly (CCA)/mission control unit (MCU)/air vehicle (AV) Control Panel and monitoring the heading, airspeed, and that altitude indicators report the program selected values.

2. Procedures

a. Point NAV. (MQ-5B) The AO can enter Point Nav using one of two methods.

(1) The AO can manually input coordinates into the Point Nav file dropdown menu on the AV control panel. Once entered into the system, send coordinates to the UA. Send the UA to Point Nav by pressing the Point Nav flight mode button on the AV control panel. Ensure that Point Nav reports in green or blue above the flight mode reports section of the AV control panel.

(2) The AO can go direct to Point Nav by selecting the Points Nav momentary button from the AV control panel. The AO can then select the desired Point Nav by left clicking on an area on the moving map display. Ensure that Point Nav reports in green or blue above the flight mode reports section of the AV control panel. The UA will hold at the Point Nav waypoint using the Loiter radius set in the systems window Monitor UAS heading to ensure correct UAS response. Set UA airspeed and altitude knob control setting per task 1045 (Perform Flight in Knob Control).

b. Hold Loiter (MQ-5B) – Clicking the Hold Loiter momentary button of the AV Control panel places the UA in Hold mode. Clicking the Hold Loiter button causes the AV to begin loitering about its current location at a predefined radius. The loiter radius is defined in the System dialog in units of meters. The text box in the top right of the AV Control panel reads Flight Mode: Hold. An UA

can be taken out of Hold mode by clicking any of the other Flight Mode buttons on the AV Control panel.

c. Flight Plan (MQ-5B) – This mode cannot be selected (that is, it will be ghosted) until the UA reports that a flight plan has been loaded. Once a valid flight plan has been loaded, depressing the Flight Plan momentary button will place the AV under the control of the flight plan. When the Flight Plan momentary button is selected, the text at the top of the box will read Flight Mode: Flight Plan in green or blue text once the UA is reporting it is in Flight Plan mode. Note: Altitude and airspeed sliders are only active when the operator selects the overrides. The overrides will remain on for the entire mission unless the operator deselects them. If the operator deselects an override on MQ-5B, then the AV will immediately return to the current waypoint actions. The operator may point and click on any valid waypoint on the map when in Flight Plan mode to select that waypoint as the next waypoint to which the AV is to fly. When this is done, the UA takes the altitude and airspeed commands from the new waypoint.

d. Camera Guide (MQ-5B) – When the Camera Guide momentary button is selected the UA will be commanded into a loiter defined by the Camera Guide parameters entered relative to the current AV stare point. Once a valid stare point has been selected, the UA will be commanded towards the orbit location associated with the stare point. The airspeed and altitude remain under knobs control (the operator maintains manual control of the altitude and airspeed). Once the UA has arrived at the defined orbit location it will loiter this point at the radius defined within the Camera Guide window. When the Camera Guide momentary button is selected, the text at the top of the box will read Flight Mode: Camera in green or blue text once the UA is reporting it is in Camera Guide mode.

e. Destination. (RQ-5A) The AO enters the destination coordinates into the system using the air vehicle location display (AVLD)/enhanced mission planner (EMP) or the mission control unit (MCU). Once entered into the system, send coordinates to the UA. Send the UA to the destination by pressing the destination button on the flight control module of the AO workstation. Ensure command/report (CMD/RPT) lights on the destination push button illuminate. Monitor UAS heading to ensure correct UA response. Set UA airspeed and altitude knob control setting per task 1045 (Perform Flight in Knob Control).

f. Hold. (RQ-5A) Engage hold mode by depressing the destination push button two times. (The destination push button is monitored to ensure that CMD/RPT lights on the push button perform per hold mode parameters.) Monitor UA heading to ensure UA response is normal for hold mode. Set UA airspeed and altitude using knob control per task 1045 and the mission briefing.

g. Program. (RQ-5A) The AO sends a validated program to the UA using the AVLD, EMP or computer console assembly (CCA). Verify the mission is loaded by confirming the “no mission plan loaded” warning is extinguished and the scan enable lighted push button blinks or “Load OK” message is displayed on the AVLD when the mission is loaded from the AVLD. Select “continue after loss of link” and/or “continue after loss of Global Positioning System (GPS)” as required by the mission profile. Engage program mode by depressing the program (PGRM) lighted push button on the flight control module of the AO workstation. Verify that the UA airspeed, heading, and altitude correspond to the program setting for the designated waypoint.

REFERENCES: Appropriate common references.

TASK 1070

Describe or Perform Emergency Procedure

CONDITIONS: Given a Hunter unmanned aircraft (UA) system, standardization instructor operator (SO)/instructor operator (IO), simulator or in a classroom, a specific emergency, and operator's manual or checklist.

STANDARDS:

1. Without error, perform, simulate the performance, or describe the appropriate emergency procedure according to the operator's manual, checklist, and the flight information handbook (FIH).

2. Correctly perform crew coordination actions.

DESCRIPTION:

Crew Actions. The crewmembers will perform all emergency procedures described in the operator's manual or checklist. They will also state the actions required in performing those emergency procedures that cannot be practiced or simulated. The discussion will include procedures outlined in the operator's manual, the FIH, and the applicable crew coordination actions.

REFERENCES: Appropriate common references.

TASK 1075

Perform Simulated Emergency Procedures for Single-Engine Failure During Landing

CONDITIONS: Given a Hunter system, standardization instructor operator (SO)/instructor operator (IO), operator's manual, and checklist.

STANDARDS:

1. Perform from the checklist without error.

2. Complete and verify the procedures with the checklist.

3. Maintain airspeed 60 knots indicated airspeed (KIAS) ±3 KIAS.

DESCRIPTION:

1. Crew Actions. The unmanned aircraft operator (AO) will complete the required checks or procedures. The AO will also read the checklist and perform all designated AO actions (for example, monitoring flight and engine instruments) and those actions requested by the external operator (EO).

2. Procedures. Crewmembers will perform the following actions:

a. Continue the approach to land and maintain unmanned aircraft system (UAS) control at the approach speed. The distance to the runway from the point where the engine fails will determine the extent of the corrective procedures. Immediately apply sufficient power to maintain glide slope and airspeed.

b. The AO should assist by monitoring engine instruments while performing normal duties, advising of any abnormal indications, and performing actions requested by the EO.

***Note*.** Final approach is a position from final turn where a landing is assured and when time does not permit a complete engine failure procedure. Maintaining control of the UAS is the prime consideration when engine failure occurs in this area. Once the unmanned aircraft (UA) wheels have touched the ground, landing is committed.

CAUTION

Be aware of visual illusions at night.

TASK 1099

Operate Identification Friend or Foe System

CONDITIONS: In a ground control station (GCS) or orally in a classroom environment and equipped with the identification friend or foe (IFF) system or control head.

STANDARDS:

1. Correctly prepare system for operation.
2. Correctly perform self-test check.
3. Correctly classify IFF/transponder (XPDR) defects relative to the mission.
4. Correctly operate the equipment without assistance.
5. Correctly perform crew coordination actions.

DESCRIPTION:

Crew Actions. The crew will perform or simulate the operational and employment procedures and precautions for the IFF system. These include preflight inspection; turn on, self-test, and operational checks; mission employment doctrine and operating procedures; partial failure alternatives; indication or signal interpretation; and shutdown procedures. If the keyable identification transponder (KIT) 1A or KIT 1C is not available or not installed, simulate IFF operations using the control head.

REFERENCES: Appropriate common references.

TASK 1110

Track a Static Target

CONDITIONS: Given a Hunter unmanned aircraft system (UAS) system or simulator, appropriate maps, an operator's manual/ checklist.

STANDARDS:

1. Position the UAS payload to maintain the optimum depression angle based on the appropriate operator's manual.

2. Maintain crosshairs centered on the target and coordinate with the aircraft operator (AO) to maintain the optimal depression angle.

3. Correctly perform crew coordination actions

4. If required to illuminate/designate target for acquisition when using the UAS payload with a Laser Pointer/Designator.

DESCRIPTION:

1. Crew Actions. For tracking a static target, the aircraft operator's (AO's) main focus will be on the flight instruments to ensure the unmanned aircraft (UA) is responding appropriately to airspeed, altitude and heading inputs to achieve optimal depression angle. The mission payload operator's (PO's) main focus will be to coordinate with the AO on flight parameters to arrive over the target within the time constraints and maintain the proper orbit position, and to identify and maintain the crosshairs on the target. The AO will assist in tracking the static target in the following modes: Knobs mode, destination mode, or program mode. For MQ-5B, the AO will use the following modes: Knobs mode, Points NAV mode or Hold/Loiter Mode. The PO will track the static target using Point-At-Coordinate, AUTO Track, Camera guide or manual control of the payload.

2. Procedures. The crewmembers will perform the following actions:

a. Determine heading to the target. The PO will determine the current location using the air vehicle location display (AVLD), main map display, and /or appropriate maps, the correct heading to the target, and will coordinate the new heading with the AO. The AO will initiate the turn to the desired heading and monitor the flight instruments to ensure rollout occurs on the desired heading.

b. Determine airspeed to target. The PO determines the distance from the UAS to the target and calculates the airspeed required to arrive at the target within the specified time over target (TOT). The AO will confirm the airspeed required, adjust the airspeed control, and monitor the flight instruments for correct response to the speed adjustment.

c. Identify the target. The PO will brief the AO on the target description and general location. **If there is a requirement to provide a laser spot or designation for target acquisition by other sources, ensure the PO observes the principles of beam attenuation and beam divergence.** The PO will provide accurate target illumination/designation. The AO will continue to monitor the flight instruments as well as keeping the laser spot/designator free of obstacles.

(1). Locate target using manual payload control (RQ-5A/MQ-5B). The PO will begin to use the payload to locate the general area of the target by identifying terrain and/or cultural features leading into the target area as well as the camera pointing indicators. The PO will begin to narrow the field of view (FOV) of the payload and identify the target through the relationship of the identified features in the target area and payload indicators.

(2). Locate target using Point-at-Coordinate menu (MQ-5B). After coordinating the initial heading and airspeed to the target area with the AO, the PO will open the "Point-at-Coordinate" menu and key in the coordinates of the target. The PO will then verify the coordinates are correct and select "Apply," which sends the data to the UA. The PO will verify the payload turns toward the target area. The AO will then fly towards the PO's payload position, while monitoring the flight instruments and the depression angle. The PO will begin to narrow the FOV of the payload to identify the target. The PO will maintain the crosshairs on the target and coordinate with the AO on depression and bearing indicator changes that will require an adjustment to the UA position to maintain the required orbit parameters.

(3). Locate the target with the aid of Points NAV/Hold Loiter (MQ-5B). The PO will provide the coordinates of the target and determine groundspeed required to meet the TOT requirements. The AO will enter POINTS NAV/Hold Loiter mode. The AO will then verify the UA is flying to the target coordinates at the appropriate airspeed. As the UA flies over the target coordinates, the AO will verify it enters POINTS NAV/Hold Loiter mode above the target. The PO will identify the target by steering the payload to a bearing of 90 degrees left or right of the nose of the UA at a distance of approximately 1 kilometer.

(4). Locate the target with the aid of Camera Guide. (MQ-5B) When the Camera Guide momentary button is selected the AV will be commanded into an orbit defined by the Camera Guide parameters entered relative to the current AV stare point. Once a valid stare point has been selected the AV will be commanded towards the orbit location associated with the stare point. The airspeed and altitude remain under knobs control (the operator maintains manual control of the altitude and airspeed). Once the AV has arrived at the defined orbit location it will orbit this point at the radius defined within the Camera Guide window. When the Camera Guide momentary button is selected the text at the top of the box will read Flight Mode: Camera in green or blue text once the AV is reporting it is in Camera Guide mode.

(5). Establish orbit using point-**at**-coordinate menu (RQ-5A). After coordinating the initial heading and airspeed to the target area with the AO, the PO will open the "Utilities/Point to Coordinate" menu and have the AO key in the coordinates of the target. The PO will then verify the coordinates are correct, select "Accept text data" and "Send" the data to the UAS. The PO will then enter the Point mode by depressing the "Point" button on the camera steering module. The PO will verify the bearing indicator turns toward the target area. The AO will center the heading indicator on the bearing indicator and monitor the flight instruments and the depression angle. The PO will then, using the Point to coordinate "T" and the distance arrow on the video graphics, locate and identify the target. The AO will then use the manual procedures to establish the UAS in an orbit above the target.

(6). Establish orbit using Destination mode (RQ-5A). After coordinating the initial heading and airspeed to the target area with the AO, the PO will open the "Utilities/Go to destination" menu and have the AO key in the coordinates of the target. The PO will then verify that the coordinates are correct, select "Accept text data" and "Send" the data to the UAS. The AO will then enter the destination mode by depressing the "DEST" button on the flight control module. The AO will verify the UAS is flying to the target coordinates. As the UAS flies over the target coordinates, the AO will verify it enters the destination hold mode above the target. The PO will identify the target by steering the

camera to the optimal depression angle based on mission requirements and a bearing of 90 degrees left of the nose of the UAS.

Note. Target identification and orbit can be enhanced by performing in both the camera point mode/camera guide and the UAS destination/points NAV mode.

Task 1115

Track a Moving Target

CONDITIONS: Given a Hunter system or simulator, appropriate maps, an operator's manual/checklist.

STANDARDS:

1. Track a moving target by maintaining the target centered with the video crosshairs and maintaining optimum depression angle in accordance with the appropriate operator's manual.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

a. The Aircraft Operator (AO) will maneuver the unmanned aircraft (UA) to maintain optimum depression angle and payload bearing to the target.

b. The PO will perform crew coordination to prevent obscurations from disrupting the view of the target.

2. Procedures

a. The PO will maintain the video crosshairs on the target manually or in automatic track, or using camera guide. (MQ-5B)

b. The AO will maneuver the UA using an orbit around the target to maintain the appropriate depression angle in accordance with the appropriate operator's manual.

REFERENCES: Appropriate common references.

TASK 1144

Perform Touch-and-Go Landing

CONDITIONS: Given a Hunter system, checklist, suitable runway, and clearance by air traffic control (ATC), if required.

STANDARDS:

1. Maintain required altitudes ±100 feet.

2. Maintain appropriate airspeeds ±3 knots indicated airspeed (KIAS).

3. Maintain required ground track.

4. Complete before-landing checks no later than at the designated points during the approach.

5. Attain landing approach speed ±3 KIAS.

6. Execute touchdown on a predetermined zone 150 feet from arresting gear cable (+ 100) with the desired runway track between half of the wingspan during loading and rollout.

7. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Crewmembers will complete the required checks or procedures pertaining to their crew duties according to the checklist. The unmanned aircraft operator (AO) will read the checklist and monitor flight and engine instruments. The external operator (EO) will keep the area of observation cleared, and perform actions requested.

2. Procedures. The crewmembers will perform the following actions:

   a. Maneuver the unmanned aircraft system (UAS) to enter the downwind leg, at traffic pattern altitude between 400 and 700 above ground level (AGL) and at 70 knots. At mid downwind reduce power, set flaps as required, set elevator trimmer as required, reduce the airspeed from 70 knots to a range between 65 and 68 knots, and begin descent. Maintain the desired ground track, and turn the base leg when appropriate. Adjust the pitch and reduce the power to maintain the airspeed between 63 and 65 knots, and intercept an appropriate angle of descent.

   b. Turn final to complete the turn at or above 100 feet AGL. When established on the final approach, gradually reduce the airspeed from 63 to 65 knots to a range between 60 and 63 knots. The unmanned aircraft operator (AO) will verify all checklist items. As the aircraft nears the runway, coordinate pitch and power as necessary to control the rate of descent and airspeed for a smooth touchdown. Depending on the conditions, reduce the power to idle and touch down on the main landing gear at an airspeed between 50 and 53 knots as power is smoothly reduced. After touchdown, perform normal takeoff and climb (task 1040). Maintain directional control during the landing roll with rudders/nosewheel steering.

Note. It is the crewmember's responsibility to obtain ATC clearance for the touch-and-go landing and to advise the ATC if there is a change to a full stop landing.

NIGHT CONSIDERATIONS: Use normal approach and landing techniques at night.

CAUTION

Be aware of visual illusions at night.

REFERENCES: Appropriate common references.

TASK 1145

Perform Normal Landing

CONDITIONS: Given a Hunter system, operator's manual, and checklist.

STANDARDS:

1. Maintain required altitudes ±100 feet.

2. Maintain appropriate airspeeds ±3 knots indicated airspeed (KIAS).

3. Maintain required ground track (within half of the wingspan) of runway centerline.

4. Complete before-landing check no later than at the designated points during the approach.

5. Attain landing approach speed 60 knots ±3 KIAS.

6. Execute touchdown on a predetermined zone 150 feet from the arresting gear ±100 feet, with the desired runway track between half of the wingspan during landing and rollout.

7. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Crewmembers will complete the required checks or procedures pertaining to their crew duties according to the checklist and the preflight briefing. The unmanned aircraft operator (AO) will also read the checklist and monitor flight and engine instruments. The external operator (EO) will keep the area of observation cleared, and perform actions requested.

2. Procedures. The crewmember will perform the following actions:

a. Maneuver the unmanned aircraft system (UAS) to enter the downwind leg, at traffic pattern altitude between 400 and 700 above ground level (AGL) and at 70 knots. At mid downwind reduce power, set flaps as required, set elevator trimmer as required, reduce the airspeed from 70 knots to a range between 65 and 68 knots, and begin descent. Maintain the desired ground track, and turn the base leg when appropriate. Adjust the pitch and reduce the power to maintain the airspeed between a range of 63 and 65 knots, and intercept an appropriate angle of descent.

b. Turn final to complete the turn at or above 100 feet AGL. When established on the final approach, gradually reduce the airspeed from 63 to 65 knots to a range between 60 and 63 knots. The AO will verify all checklist items and call out "checks complete" when the last item is verified. As the UAS nears the runway, coordinate pitch and power as necessary to control the rate of descent and airspeed for a smooth touchdown. Depending on the conditions, reduce the power to idle and touch down on the main landing gear at an airspeed between 50 and 53 knots as power is smoothly reduced. After touchdown, gently lower the nosewheel to the runway. Maintain directional control during the landing roll with rudders/nosewheel steering. Engage arresting gear.

c. During crosswind conditions, use the crab-into-the-wind method to correct for drift on all legs of the traffic pattern until the short final is reached. Change the crab-into-the-wind method to a slip-into-the-wind method for round out and touchdown. During the after-landing roll, use normal rudder/nosewheel steering for directional control. Perform the after-landing procedures.

d. The ground crew will be standing by to assist in the recovery. The AO will complete all designated duties and, when called for, will read the checklist. Crewmembers will inform each other upon completion of any designated check.

Note. Although designated points are given throughout the approach for completing the before-landing checks, the crewmembers may perform these procedures earlier.

Note. Traffic considerations, air traffic control (ATC) requests, or aircraft-peculiar requirements may require deviation from normal traffic pattern airspeed prior to landing.

NIGHT CONSIDERATIONS: Use normal approach and landing techniques at night.

CAUTION

Be aware of visual illusions at night.

REFERENCES: Appropriate common references.

TASK 1163

Perform Simulated Emergency Procedures for Dual-Engine Failure Landing

CONDITIONS: Given a Hunter system, standardization instructor operator/instructor operator (SO/IO), operator's manual, and checklist.

STANDARDS:

1. Perform from memory, without error, boldface action.

2. Maintain airspeed 60 knots indicated airspeed (KIAS) ±3 KIAS.

3. Determine runway accessibility.

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. In the event of engine failure, the crewmembers will initiate procedures outlined in the checklist. The unmanned aircraft operator (AO) will complete the required checks and procedures per the checklist. The most important information for the external operator (EO) will be airspeed, rate of climb, bank angle, and engine status.

2. Procedures. The crewmembers will perform the following actions:

a. Fly a normal traffic pattern or as required. Plan for a normal approach, allowing for sufficient straightaway on final so minor alignment, speed, and altitude corrections can be made without excessive low-altitude maneuvering. Extend flaps as required for landing. Complete the dual engine fail checklist. Call out items as they are performed. The AO will verify completion of the items with the checklist.

b. Avoid abrupt changes in pitch. Maintain **60** knots until flair. Make a normal touchdown.

CAUTION

Be aware of visual illusions at night.

REFERENCES: Appropriate common references.

TASK 1175

Perform Transfer Procedures

CONDITIONS: Given a Hunter system, operator's manual, and checklist.

STANDARDS:

1. Without error, perform procedures and checks according to the appropriate operator's manual/checklist.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. For controlling and receiving, the unmanned aircraft operators (AOs) complete the required checks or procedures pertaining to their crew duties according to the appropriate operator's manual/checklist.

2. Procedures

a. Launch and recovery site:

(1) Transfer control from external operator (EO) to AO per the appropriate operator's manual/checklist.

(2) Perform exit from eye contact per appropriate operator's manual/checklist.

(3) Transfer control to another shelter per appropriate operator's manual/checklist.

(4) Perform unmanned aircraft system (UAS) return to eye contact per appropriate operator's manual/checklist.

(5) Transfer control from AO to EO per the appropriate operator's manual/checklist.

b. Launch and recovery site to forward site:

(1) Transfer from launch recovery station (LRS) AO to forward site AO per the appropriate operator's manual/checklist.

(2). Transfer from forward site AO to LRS AO per appropriate operator's manual/checklist.

REFERENCES: Appropriate common references.

TASK 1177

Perform Go-Around

CONDITIONS: Given a Hunter system, operator's manual, and checklist.

STANDARDS:

1. Maintain airspeed ±3 knots.

2. Maintain heading ±10 degrees.

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

   a. The unmanned aircraft operator (AO) will monitor flight and engine instruments.

   b. The external operator (EO) will keep the area of observation cleared and perform necessary actions.

2. Procedures. The crewmembers will perform the following actions:

   a. When it becomes doubtful that a safe landing can be accomplished, apply maximum power and simultaneously increase pitch attitude to stop the descent with minimum loss of altitude. (If in a landing emergency, land flaps retract to takeoff flaps at 53 knots. If in a takeoff emergency, takeoff flaps retract to flight flaps at 63 knots). Establish positive rate of climb and accelerate to 70 knots. If in takeoff/landing (TO/LAND), select flight at 60 knots.

   b. Throughout the maneuver, the AO assists the EO by monitoring engine instruments for proper indications and ensures that the aircraft limitations are not exceeded. The EO will assist in setting and maintaining the appropriate power setting and will advise the AO of any abnormal conditions. The crewmembers should complete all of their designated duties and, when called for, read the checklist.

Note. If a go-around is initiated in the traffic pattern prior to the landing check, use power as required to climb or maintain the desired altitude and airspeed. When operating at high-density altitude or heavy gross weight, trading off altitude for airspeed while accelerating to 60 knots may be necessary. Deciding to go-around on a single engine must be made as early as possible. When operating at high-density altitude of heavy gross weight, single-engine level flight or climb may not be possible.

CAUTION

Be aware of visual illusions at night.

REFERENCES: Appropriate common references.

TASK 1184

Perform or Describe Inadvertent Instrument Meteorological Condition

CONDITIONS: In a ground control station (GCS) under simulated inadvertent instrument meteorological conditions (IMC) or orally in a classroom environment.

STANDARDS:

1. The aircraft operator (AO) will—

   a. Maintain proper aircraft control.

   b. Maneuver unmanned aircraft (UA) out of obscurations. Climb, descend or turn as required.

   c. The AO will set the transponder to the appropriate code.

   d. If unable to maintain visual meteorological conditions (VMC), then comply with recovery procedures.

2. The mission payload operator (PO) will—

   a. Without error, tune the radios to the appropriate frequency.

   b. Conduct weather and aircraft scans periodically.

3. Request air traffic control (ATC) assistance; acknowledge and record the appropriate information.

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. The AO, upon inadvertent instrument meteorological conditions (IMC), will announce, "I am IMC," and proceed as follows:

   a. Maneuver UA out of IMC as required.

   b. Command a climb, if necessary to avoid known obstacles.

   c. Complete the inadvertent IMC recovery procedures according to local regulations and policies.

2. The PO will—

   a. Assist the AO by tuning the avionics and contacting the appropriate ATC facilities as outlined in the unit standing operating procedure (SOP). Maintain the required communications with ATC, and record ATC information when appropriate.

   b. Crosscheck the instruments as directed by the AO.

   c. Conduct weather and aircraft scans periodically with the payload to inform the AO when the aircraft is clear of clouds and obstacles. Aircraft scans are to ensure the aircraft is not developing ice on the surfaces.

d. Contact the appropriate ATC facilities as required. Maintain the required communications with ATC, and record ATC information when appropriate.

NIGHT CONSIDERATIONS: When using infrared (IR), the crew can see through thin obscurations, such as light fog or drizzle, with little degradation.

REFERENCES: Appropriate common references.

TASK 1302

Perform Procedures for Two-Way Radio Failure

CONDITIONS: Given an airborne Hunter or simulator or in a classroom.

STANDARDS:

1. Implement the correct procedures for two-way radio failure.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Correcting the loss of two-way radio communication is primarily the mission payload operator's (PO's) responsibility while the unmanned aircraft operator (AO) focuses attention on flying the unmanned aircraft system (UAS).

2. Procedures

a. The PO will advise the AO of the communications problem and attempt to identify and correct the malfunction.

b. If two-way radio communication cannot be established, the crew will perform the following actions:

(1) Visual flight rules (VFR) conditions. If two-way radio failure occurs while operating under VFR or if visual meteorological condition (VMC) is encountered after the failure, continue the flight under VFR. Land as soon as practical.

(2) Instrument meteorological conditions (IMC).If two-way radio failure occurs while operating in the National Airspace System (NAS), continue the flight according to instructions in the flight information handbook (FIH).

c. If ultra high frequency (UHF) two-way radio failure occurs while operating outside the continental United States (CONUS), comply with International Civil Aviation Organization (ICAO) rules or applicable host-country regulations.

REFERENCES: Appropriate common references.

TASK 1320

Perform Simulated Single-Engine Go-Around

CONDITIONS: Given a Hunter system, standardization instructor operator (SO)/instructor operator (IO), operator's manual, and checklist.

STANDARDS:

1. Maintain heading within ±10 degrees.

2. Maintain airspeed as required.

3. Correctly perform crew coordination actions.

DESCRIPTION:

4. Crew Actions

   a. The unmanned aircraft operator (AO) will monitor flight and engine instruments and perform actions requested.

   b. The external operator (EO) will keep the observation area clear.

2. Procedures. The crewmembers will perform the following actions:

   a. When a safe landing is doubtful, apply maximum power and adjust the pitch as necessary while maintaining heading control. Retract flaps to flight setting, if applicable, and adjust pitch to maintain airspeed. Retract flaps after attaining best rate-of-climb speed, single engine (Vyse), and then accelerate to Vyse for the approach.

   b. Throughout the maneuver, the unmanned aircraft operator (AO) should monitor flight and engine instruments and ensure that system limitations are not exceeded. The AO should assist the EO and should complete all designated checks and read the checklist when required.

Note. When operating at high-pressure altitudes or heavy gross weight trading altitude for airspeed while accelerating to Vyse may be necessary. For this reason, the decision to go-around should be made as early as possible. Many aircraft have a minimum altitude requirement at which single-engine go-around can be successfully completed.

CAUTION

Be aware of visual illusions at night.

REFERENCES: Appropriate common references.

TASK 1325

Perform Simulated Emergency Procedures for Single-Engine Failure during Takeoff

CONDITIONS: Given a Hunter system, standardization instructor operator (SO)/instructor operator (IO), operator's manual, and checklist.

STANDARDS:

1. Perform, from memory, without error, bold face action.

5. Maintain heading ±10 degrees.

6. Obtain and maintain 60 knots indicated airspeed (KIAS) ±3 KIAS.

7. Complete and verify procedures per checklist.

DESCRIPTION:

1. Crew Actions. In the event of engine failure, the crewmembers will initiate procedures outlined in the checklist. The unmanned aircraft operator (AO) will complete the required checks and procedures per the checklist. Most important information for the external operator (EO) will be airspeed, rate of climb, bank angle, and engine status.

2. Procedures. The EO will perform the following actions:

a. If instruments indicate that the engine has failed and the unmanned aircraft (UA) has not accelerated to 50 knots, immediately deploy arresting hook and retard throttles to idle. Stop the UA with the arresting gear, if possible. If the UA is airborne when the engine failure occurs and sufficient runway remains for a landing and stop, ensure the arresting hook is deployed, retard throttles, and land.

Note. The decision to land should be based on computed performance, the environment conditions, airspeed, and height above the runway.

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b. If engine failure occurs without sufficient runway to land and stop the UA safely, maintain directional control. If the airspeed is below 60 knots, maintain the current airspeed until sufficient altitude is obtained to trade-off altitude for airspeed to assist in accelerating to 60 knots. Complete the immediate action procedures per the checklist for single-engine failure during takeoff. Flaps should remain in takeoff configuration until established downwind where they may be retracted or reconfigured for desired approach. Never retract flaps during a turn.

c. If engine failure occurs without sufficient runway to land and UA will not climb, perform off-runway landing.

Note. When operating at high-density altitude or heavy gross weight, trading off altitude for airspeed while accelerating to 60 knots may be necessary. For this reason, the decision to go-around must be made as early as possible. When operating at high-density altitude or high gross weight, single-engine level flight or climb may not be possible.

TASK 1402

Perform Flight Mission Planning

CONDITIONS: Given a Hunter system or simulator, and given a mission briefing, navigational maps, approved software, and other materials as required.

STANDARDS:

1. Analyze the mission using the factors of mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC).

2. Perform a map/photo reconnaissance using the available map media or photos. Ensure that all known hazards are plotted on the map or into the approved software.

3. Select appropriate routes and enter all of them on a map, route sketch, or into the approved software.

4. Determine the distance ±1 kilometer, ground speed ±5 knots, and estimate time en route (ETE) ±1 minute for each leg of the flight.

5. Determine the fuel required ±10 liters.

6. Obtain and analyze weather briefing to determine that weather and environmental conditions are adequate to complete the mission.

DESCRIPTION:

1. Crew Actions

   a. The mission commander (MC) will ensure that all necessary tactical flight information is obtained and will conduct a thorough crewmember briefing per the unit standing operating procedure (SOP) and task 1000. The MC may delegate mission planning tasks to the other crewmember but retains overall responsibility for mission planning. The MC will analyze the mission in terms of METT-TC.

   b. The unmanned aircraft operator (AO) and mission payload operator (PO) will perform the planning tasks directed by the MC. They will report the results of their planning to the MC.

2. Procedures. Analyze the mission using the factors of METT-TC. Conduct a map or aerial photo reconnaissance. Obtain a thorough weather briefing that covers the entire mission and input as necessary into the approved software. Include sunset and sunrise times, density altitudes, winds, and visibility restrictions. If the mission is to be conducted at night, the briefing should also include moonset and moonrise times, ambient light levels, and an electrooptical forecast, if available. Determine routes, time, distance, and fuel requirements using approved software. Annotate the map, overlay, or approved software with sufficient information to complete the mission. Consider such items as hazards, checkpoints, observation posts, and friendly and enemy positions. Determine the sensor appropriate for the environment and time of day. Review contingency procedures.

Note. Evaluate weather impact on the mission. Considerations should include aircraft performance and limitations on visual sensors.

REFERENCES: Appropriate common references.

TASK 1472

Perform Aerial Observation

CONDITIONS: In a ground control station (GCS), simulator, or orally in a classroom environment.

STANDARDS:

1. Use the appropriate search techniques based on whether the target is moving or static.

2. Accurately locate the position of the target.

3. Accurately recognize the target.

4. Without error, make the appropriate spot reports.

5. Correctly perform crew coordination actions.

DESCRIPTION:

1. During missions involving direct observation, the crew is primarily concerned with detection, identification, location, and reporting. Tactical and nontactical environments use aerial observation.

a. Detection. Detection requires determining that an object or an activity exists.

b. Identification. Major factors in identifying a target are size, shape, and type of armament.

c. Location. The exact location of targets is the objective of the mission. Depending on the nature of the targets, the crew may be able to locate the center of mass, the boundaries of the target, or the boundaries of the entire area.

d. Reporting. Spot reports provide commanders with critical information during the conduct of missions. The requesting agency specifies the method of spot reporting. Reports of no enemy sightings are frequently just as important as actual enemy sightings.

2. Visual search is the systematic visual coverage of a given area that observes all parts of the area. The purpose of visual search is to detect objects or activities on the ground. The crew's ability to search a given area effectively depends on several factors: in addition to the limitations of the human eye itself, the most important of these factors are altitude, airspeed, terrain and meteorological conditions, and visual cues.

a. Altitude. Higher altitudes offer greater visibility with less detail. Use higher altitudes for survivability considerations.

b. Airspeed. The altitude, the terrain, the threat, and meteorological conditions determine selection of the airspeed (cruise/loiter/dash).

c. Terrain and Meteorological Conditions. Recognizable size and details of the area largely depend on the type of terrain such as dense jungle or barren wasteland. The prevailing terrain and meteorological conditions often mask objects and allow only a brief exposure period.

d. Visual Cues. In areas where natural cover and concealment make detection difficult, visual cues may indicate enemy activity. Some of these cues are as follows:

- Color. Foliage used to camouflage will differ from the color of natural foliage.
- Texture. Smooth surfaces, such as glass windows or canopies, will shine when reflecting light. Rough surfaces will not.
- Shapes and Shadows. Synthetic objects cast distinctive shadows characterized by regular shapes and contours as opposed to random patterns that occur naturally.
- Trails. Observe trails for cues as to the type/quantity of traffic and how recently it passed.
- Smoke and Dust. Observe smoke for color and volume. Dust from moving vehicles is visible at great distances.
- Movement and Light. The most easily detectable sign of enemy activity is movement and, at night, infrared (IR) light. Movement may include disturbance of foliage, snow, soil, or birds. Laser-aiming devices are easily recognizable.
- Obvious Sightings. The enemy is skillful in the art of camouflage. The crew must be aware that obvious sightings may be intentional because of high concentrations of antiaircraft weapons.

REFERENCES: Appropriate common references.

TASK 1800

Perform After-Landing Checks

CONDITIONS: Given a Hunter system, operator's manual, and checklist.

STANDARDS:

1. Without error, perform after-landing checks per the checklist.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. After the unmanned aircraft system (UAS) comes to full stop on the active runway, crewmembers will complete the required checks or procedures pertaining to their crew duties per the checklist and the preflight briefing.

2. Procedures. Crewmembers will perform the following actions:

a. Accomplish after-landing actions, as required, to include engine shutdown and UAS checks. Verify all checks with the checklist.

b. A ground crewmember should assist by directing the checklist steps and assisting in clearing the area.

NIGHT CONSIDERATIONS: Due to limited visibility, taxi speeds should be reduced for a greater margin of safety. External lighting should be requested whenever taxing in areas where obstacles are difficult to see.

REFERENCES: Appropriate common references.

TASK 2000

Perform Cold Weather Operations

CONDITIONS: Given a Hunter system or simulator or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

   a. The mission commander (MC) will direct the ground crew to complete the designated elements of preflight preparations. The aircraft operator (AO) will ensure that the tires are not frozen to the ground and all snow or ice is removed from all surfaces.

   b. Ground crew will complete the assigned checks and report the results to the MC and AO.

2. Procedures. The ground crew will perform the following actions:

   a. Before engine starts. Check all controls for full travel and freedom of movement.

   b. Warm-up and Ground Operation. A longer duration may be required to reach the designated rotor temperature.

   c. Before Launch. If the possibility of ice accumulation on flight control surfaces exists, do not attempt to takeoff. Accumulations of slush/snow on the runway greatly increase the takeoff distance and should be considered during planning.

   d. Launch. Before starting the takeoff roll, check all controls for full travel and freedom of movement. Smoothly apply power to avoid skidding conditions.

REFERENCES: Appropriate common references.

TASK 2005

Perform Desert and Hot Weather Operations

CONDITIONS: Given a Hunter system or simulator or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

a. The mission commander (MC) will direct the ground crew to complete the designated elements of preflight preparations. The aircraft operator (AO) will verify the removal of all sand or dirt from all surfaces.

b. Ground crew will complete the assigned elements and report the results to the MC and AO.

2. Procedures. The ground crew will perform the following actions:

a. Before beginning preflight, ensure the aircraft interior is free of sand and dust.

b. Before Engine Starts. Check and ensure that the landing gear struts are free of sand and grit and that the aircraft interior is free of sand and dirt.

c. Engine Start. Use standard starting procedure. Be aware that a higher-than-normal cylinder head temperature (CHT) and rotor temperature may occur, and be prepared to abort the start before temperature limitations are exceeded.

d. Warm-up and Ground Operation. Use standard procedures for warm-up and ground operations.

e. Launch. Use standard takeoff procedures.

Note. Takeoff should not be attempted during a sandstorm or dust storm. Also note that during hot weather operations, the unmanned aircraft (UA) may take longer to climb due to high CHT and rotor temperatures. **If necessary, climb using smaller increments to prevent overheating.**

f. During Flight. To minimize damage to the aircraft and the related systems, use normal procedures but avoid flying through sandstorms or dust storms when possible.

g. Landing. Use standard landing procedures.

h. Before Storing the Aircraft. Use standard procedures, taking extreme care to prevent sand and dust from entering the fuel and oil systems while servicing the aircraft. Install all protective covers to prevent sand and dust accumulation.

Note. If the fuel tanks are filled completely, expansion may cause fuel to overflow.

REFERENCES: Appropriate common references.

TASK 2010

Discuss Turbulence and Thunderstorm Operations

CONDITIONS: Given a Hunter system, simulator, or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. When flying in inadvertent or unforecasted turbulence or thunderstorms, the mission commander (MC) will ensure that the crewmembers are familiar with the procedures for flying in turbulence and thunderstorms.

2. Procedures. If turbulence is encountered, the crewmember will immediately establish the appropriate airspeed as described in the aircraft operator's manual. The MC should direct the aircraft operator (AO) to request a change of route or altitude that will provide smoother air, if that option is available, from air traffic control (ATC).

Note. Lightning within 10 nautical miles of the launch and recovery site may preclude flight operations.

REFERENCES: Appropriate common references.

TASK 2015

Perform Mountain Operations

CONDITIONS: Given a Hunter system, simulator, or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The aircraft operator (AO) will review the operator's manual regarding line-of-sight limitations and be familiar with mountain-flying hazards.

2. Procedures. The crewmembers will perform the following actions:

a. Perform the proper mission planning in accordance with task 1402.

b. Preflight. Complete a standard preflight to determine if any operating limitations will be encountered.

c. Engine Start. Use standard starting procedures.

d. Launch. Use standard takeoff procedures.

e. During Flight. Use standard procedures. Be alert for clear air turbulence that may be encountered because of uneven terrain and wind variations.

f. Landing. Use standard landing procedures.

Note. Many mountain landing strips or runways are not level. Unless local conditions dictate otherwise, always land uphill.

3. Before Storing the Aircraft. Use standard procedures. Ensure the unmanned aircraft system (UAS) is properly secured. (In mountainous areas, the possibility of severe and rapidly changing weather is greater than normal.)

REFERENCES: Appropriate common references.

TASK 2018

Recommend/Reconnoiter Drop Zone/Landing Zone/Pickup Zone

CONDITIONS: Given a Hunter system, simulator, or in a classroom environment.

STANDARDS:

1. Drop Zone/Landing Zone/Pickup Zone

   a. Perform map, photo, or visual reconnaissance of the assigned area.

   b. Determine that the drop zone/landing zone/pickup zone (DZ/LZ/PZ) is suitable for the mission (size, number of aircraft, type of cargo).

   c. Provide accurate and detailed information to organic or supported unit.

2. Holding Area (HA). Confirm suitability of a HA.

DESCRIPTION:

1. Crew Actions

   a. The crew will confirm the location of plotted hazards and record the location of un-plotted hazards. They will perform the reconnaissance using the appropriate sensors. The mission commander (MC) will confirm suitability of the area.

   b. The aircraft operator (AO) will remain oriented on the proposed HA or LZ. The AO is responsible for obstacle avoidance.

   c. The PO will perform the reconnaissance of the DZ/LZ/PZ/HA.

2. Procedures

   a. Landing Zone/Pickup Zone. The initial selection or reconnaissance of an DZ/LZ/PZ/HA begins with the analysis of maps aviation mission planning station (AMPS or paper), photos, and intelligence preparation of the battlefield (IPB)(S-2/S-3). When a reconnaissance flight is executed, the crew should refrain from loitering over or making more than one pass over the area if visual or audio disciplines are of concern. Determine the suitability of the DZ/LZ/PZ/HA by considering applicable tactical, technical, and meteorological elements. The video and crew debrief can be used to strengthen the pre-mission analysis. The reconnaissance data should be recorded on a worksheet.

      (1) Tactical

      (a) Mission. Determine if the mission can be accomplished from the selected DZ/LZ/PZ/HA. Consider flight time, fuel, number of sorties, and access routes.

      (b) Location. If conducting a reconnaissance for an insertion mission, consider the distance of the DZ/LZ/PZ/HA from the supported unit or objective, and the supported unit's mission, equipment, and method of travel to and from the DZ/LZ/PZ/HA.

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

(2) Technical

(a) Number of Aircraft. Determine if the size of the DZ/LZ/PZ/HA will support the type and amount of aircraft that will be landing to the ground or hovering, as part of multi-ship operations. It may be necessary to provide an additional LZ nearby, or land aircraft at the same site in successive flights.

(b) DZ/LZ/PZ/HA Shape. Vertical Obstacles and actual landing area surface condition will support operations by aircraft at/near their maximum operational gross weight.

(c) Surface Conditions. Consider slopes and blowing sand, snow, or dust. Be aware that vegetation may conceal surface hazards (for example, large rocks, ruts, or stumps). Areas selected should also be free of sources of rotor wash signature. If the area is wet, consider the effects of mud and aircraft weight.

(d) Size of DZ/LZ or HA. The area around the DZ/LZ/PZ/HA should be clear of obstacles that could cause aircraft damage. Situation depending, consideration should be given to plotting obstacles. Target location and target store may be used to determine the size of the DZ/LZ/PZ/HA.

(e) Obstacles. Hazards within the LZ that cannot be eliminated must be plotted.

(f) Approach or Departure Direction. The direction of approach or departure should be over the lowest obstacles and generally into the wind with mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC) considered.

(g) Vulnerability. Consideration must be given to the vulnerability of ground troops in the LZ during air assault operations and to helicopters in the HA.

(3) Meteorological

(a).Ceiling and Visibility. Must be considered in order to prevent inadvertent instrument meteorological conditions (IMC).

(1) Winds. Determine approach and departure paths.

(2) Density Altitude. High density altitude may limit loads and, therefore, require more sorties.

(b).Holding Area. All of the following items will be considered when selecting a HA.

(1) Cover and concealment.

(2) Obstacles within the HA.

(3) Key terrain.

(4) Avenues of approach and departure.

(5) Security.

NIGHT CONSIDERATIONS: Unimproved and unlit areas are more difficult to evaluate at night because of low contrast. Knowledge of the various methods for determining the height of obstacles is critical to successfully completing this task. Visual obstacles should be treated the same as physical obstacles. DZ/LZ/PZ/HA will require a larger area at night. Details of the landing area will be more difficult to see.

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

MOUNTAIN/PINNACLE/RIDGELINE CONSIDERATIONS: Evaluate the suitability of the area, paying particular attention to density altitude and winds. Determine a suitable path for a go-around. Operations at high altitudes are more likely to expose the aircraft to visual detection and radar and heat seeking weapons.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2019

Perform Route Reconnaissance

CONDITIONS: Given a Hunter system or simulator or in a classroom environment.

STANDARDS:

1. Correctly perform route reconnaissance.

2. Make an accurate and detailed report.

3. Correctly perform crew-coordinated actions.

DESCRIPTION:

1. Crew Actions

a. The aircraft operator's (AO's) main focus will be on maintaining data link with the ground data terminal and monitoring the flight and engine instruments. The AO's second consideration will be on maintaining the unmanned aircraft (UA) in the optimum range of depression and bearing from the target to acquire video of the route/road.

b. The mission payload operator's (PO's) main focus will be on maintaining the video crosshairs on the target to provide the AO with a steady, accurate depression angle and bearing to maneuver the unmanned aircraft system (UAS) around. The PO will also coordinate closely with the AO to maintain the optimum depression angle or bearing drifting away from the desired limits. The PO will also keep the AO informed of any obstructions encountered so the AO can maneuver the UAS to maintain a clear line of sight to the road/route.

2. Procedures. The crew will perform the following actions:

a. The PO will verify the start point, the direction of the road/route search, the type of maneuver required to perform the search and will coordinate this information with the AO. The PO will verify a low rate of camera movement and a narrow field of view have been selected to facilitate obtaining satisfactory video of the road/route and the immediate area. When the AO maneuvers the UAS into a position with the optimal depression based on mission requirements, the PO will begin the road/route scan. The PO will maintain the video crosshairs centered on the road and perform the road/route scan until a target is encountered or the UA no longer is in position to maintain an optimal depression angle based on mission requirements. At this time, the PO will stop the scan and hold the position on the road until the AO again maneuvers the UAS into a position where the depression angle is optimal based on mission requirements. The PO will then resume the road/route scan. The AO and PO will coordinate any trends in the depression angle, bearing, obstructions, or maneuvers that will affect collecting video.

b. On a straight road search, the AO will maintain a moving racetrack parallel to the road. The AO will maintain the base leg closest to the road and in the direction of the road search at a distance 1.5 to 2 kilometers (approximately 60-degree depression angle). When the depression angle becomes 45 degrees or higher, the AO will begin a 10- to 20-degree bank turn away from the road to a reciprocal heading from the base leg heading. When the bearing to the PO's stop point is approximately 120 degrees off the nose of the UAS, the AO will start a turn back to the base leg heading that parallels the

road using 10 to 20 degrees of bank. When the depression angle is optimal based on mission requirements, the PO will reinitiate the road scan.

c. When a static target is encountered, the PO will maintain the video crosshairs on the target to provide the AO an accurate and stable depression angle and bearing by which to maneuver the UAS around the target. The AO, in coordination with the PO, will establish a UAS maneuver pattern to maintain the target below the desired depression angle.

d. When a moving target is encountered, the PO will maintain the video crosshairs on the target as it moves along the road. The AO will maintain the UAS in a position to maintain a depression angle that is optimal based on mission requirements. The AO will perform the racetrack maneuver being aware that the reciprocal heading leg will be much shorter because the target will be moving away from the UAS. At a bearing of approximately 120 degrees off the nose of the UAS, the AO will begin the turn back with the base leg heading paralleling the road.

e. For a curved/hidden road search, the AO and PO must coordinate to determine which side of the road is best for observation, where obstructions might occur, and what maneuvers to perform in the event that obstructions are encountered. The AO may have to maneuver the UAS from one side to the other or fly down the center of the road to avoid obstructions to the road search and maintain a depression angle that is optimal based on mission requirements.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2025

Conduct Digital Communications

CONDITIONS: Given a Hunter system or simulator and waypoints or target data

STANDARDS:

1. Without error, send a tactical communications (TACCOM) message.
2. Without error, perform mail file manager functions between consoles.
3. Correctly perform crew coordination procedures.

DESCRIPTION:

1. Without error, send a TACCOM message per TM 9-5895-692-10.
2. Without error, perform mail file manager functions between consoles per TM 9-5895-692-10.

Note. Many missions will appear similar. Always verify mission load before entering mission mode during flight.

REFERENCES: Appropriate common references and TM 9-5895-692-10.

TASK 2054

Perform Target Hand Over to an Attack Helicopter

CONDITIONS: In a ground control station (GCS) or with a remote video terminal (RVT) in a training or tactical environment or orally in a classroom environment.

STANDARDS:

1. Perform target hand over without error.

2. Use the communications procedure that will best accomplish the mission.

3. Provide the proper security during the attack.

4. Correctly perform crew coordination actions.

DESCRIPTION: Using the proper radio phraseology and signal operating/operation instructions (SOI) procedures, the crew will alert the attack helicopter, describe the target, and give its location. In some cases, the attack helicopter may need an escort from its holding area to an attack or firing position to engage the target. Both the unmanned aircraft system (UAS) and the attack aircrews must understand the method for locating the target, the execution command, and postattack method. The standardized elements for target hand over are as follows:

1. Alert and Target Description. This alerts the attack helicopter that a target hand over is about to occur. It identifies the sender and describes the target (type, number, and activity); for example, "K13 (AH-64), this is KO6 (UAS), three tanks and four BMPs moving west."

2. Target Location. The unmanned aircraft crewmember (UAC) gives the direction of the target in degrees and range from the battle position (for example, "120 degrees at 2,800 meters"). The UAC may reference from a known point (for example, the target reference point or the engagement area) or use grid coordinates.

3. Method of Attack. The UAC describes the planned scheme of maneuver, fire distribution, and maneuver for the attack; for example, "Attack targets west of north-south road."

4. Execution. The UAC gives the command to initiate the attack. The two commands are as follows:

   a. "At my command." The attack helicopter engages when the UAC says "fire."

   b. "When ready." The attack helicopter fires when ready. Assume "When ready" when no other command of execution is given.

5. Postattack Method. The attack helicopter unmasks to evaluate the effect on the target and begins planning subsequent engagements. The UAC describes ingress and egress routes into new positions; for example, "Move to holding area 4; on order, attack from battle position 21."

REFERENCES: Appropriate common references and FM 1-112 and FM 1-114.

TASK 2066

Perform Zone Reconnaissance

CONDITIONS: In a ground control station (GCS), simulator, or orally in a classroom environment.

STANDARDS:

1. Conduct thorough mission planning in accordance with task 1402.

2. Conduct a detailed map reconnaissance.

3. Make specific and timely reports about information obtained during the zone reconnaissance.

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. A zone reconnaissance is conducted to obtain information about natural and manmade features within specified boundaries. The purpose may be to locate suitable routes of advance for main elements (air or ground) or to find the enemy. The aircrew must reconnoiter the zone in a systematic manner.

2. After receiving the mission assignment, the crew should conduct a detailed map reconnaissance and analyze the known enemy situation according to the factors of mission, enemy, terrain and weather, troops and support available, time available, and civilian considerations (METT-TC). Then the unmanned aircraft operator (AO) should select the altitudes and waypoints that will best accomplish the mission.

3. A zone reconnaissance is a detailed reconnaissance. Therefore, the crew must check—

   a. Fording sites.

   b. Trails for recent use.

   c. Densely wooded areas for stay-behind or ambush units.

   d. Bridges for condition, location, demolition, and classification.

   e. Hilltops and dominant manmade features for observation posts.

4. The unmanned aircraft operator (AO) flies the mission on the predetermined route or another route if required by the situation. The mission payload operator (PO) uses the sensors at optimum standoff ranges to clear terrain and detect possible enemy activity. The AO maintains navigation within specified boundaries unless authorized to cross them.

5. The crew must report the evidence or absence of enemy activity. They must also provide specific reports about route conditions, checkpoint times, and any other information requested. Reports must be timely and specific.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2067

Perform Area Reconnaissance

CONDITIONS: In a ground control station (GCS), simulator, or orally in a classroom environment.

STANDARDS:

1. Conduct thorough mission planning in accordance with task 1402.
2. Conduct a detailed map reconnaissance.
3. Make specific and timely reports about information obtained during the area reconnaissance.
4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Autonomous (Program Mode) Area Search. (RQ-5A)

   a. Preplan a mission plan to include flight parameters, camera action point parameters and operations, and airborne video cassette recorder (AVCR) operations for each waypoint of the flight plan.

   b. The mission plan waypoints will be calculated to provide the camera with at least a 15-second observation time of the designated camera point at an airspeed of 65 knots. The distance between camera points will not exceed 200 to 250 meters. The distance between waypoints will not be less than 500 meters. The distance between the unmanned aircraft system (UAS) leg and the modular mission payload (MMP) leg will be approximately 1,000 meters at 5,000 feet above ground level (AGL).

   c. The unmanned aircraft operator (AO) will select the program mode after the mission payload operator (PO) sets the zoom/field of view (FOV) function to the medium position. The AO/PO will then load the mission plan to the UAS and verify the airborne video cassette recorder (AVCR) is set to record mode. The AO and PO will monitor the plan execution.

2. Point Mode Area Search. (RQ-5A)

   a. Prepare a mission plan on the air vehicle location display (AVLD)/enhanced mission planner (EMP) outlining the area to be searched. Do not load this plan to the UAS. Load it only to the AVLD/EMP.

   b. The PO will zoom the MMP sensor in and load the utility/accumulated footprint menu function to the AVLD/EMP. Do not zoom out beyond the midway point with the MMP sensor while the footprint function is active.

   c. The PO will use the mouse-to-mark function of the point mode to mark one of the corners of the planned area and depress the point mode button. The PO will observe the video while changing the zoom/FOV from narrow to medium and back to narrow. The PO will then move to a new point by the last one viewed and use the mouse-to-mark function to again move the video crosshairs and observe the new area. Repeat this procedure until the area is covered with the video footprint.

d. The AO will follow the MMP pattern that the PO has created as if it were a road search. The AO will maintain a 45- to 60-degree depression angle for each point searched using the mouse-to-mark function.

3. Stick Mode Area Search. (RQ-5A)

a. Search an area measuring approximately 1x1 kilometer.

(1). The AO/PO will first plot the area on the appropriate map to check the area and size and then crate a mission plan on the AVLD outlining the area to be searched. Zoom in as far as possible using the paper map.

(2). The AO will establish a hold mode above the center point of the area to be searched and maintain a 45- to 60-degree depression angle.

(3). The PO will scan the area in a preplanned pattern to cover the entire area. The utility/accumulated footprint function may be used to facilitate complete and accurate coverage of the area to be searched. The PO will use low rate and zoom in and out to observe the area to be searched.

b. Search an area measuring larger than 1x1 kilometer.

(1). The AO/PO will first plot the area on the appropriate map to check the area and size and then create a mission plan on the AVLD outlining the area to be searched. Zoom in as far as possible using the paper map.

(2). The AO will follow the modular mission payload (MMP) pattern the PO has created as if it were a road search. The AO will maintain a 45- to 60-degree depression angle for each point searched.

(3). The PO will scan the entire area using a preplanned pattern. The utility/accumulated footprint function may be used to facilitate complete and accurate coverage of the area to be searched. The PO will use low rate and zoom in and out to observe the area to be searched.

4. Auto Search. (MQ-5B)

a. Provides the mission payload operator (PO) with the ability to methodically control an area search without having to control the payload manually. The two search types available to the operator are point and pattern (line and area). Searches are created using the mission planner.

b. Point Search. The PO selects the initial location for the search to begin, then the payload slowly spirals the camera outward from the center in a clockwise direction. The spiral pattern is based on the following predefined factors: camera field of view (FOV), camera type, and overlap.

c. Pattern (Area) Search. The mission planner is used during preflight or just prior to starting the search to define the search polygon. The steps of the search pattern are calculated just prior to starting the search based on unmanned aircraft (UA) height above the ground and sensor FOV.

d. The aircraft operator (AO) will follow the pattern the PO has created.

5. Manual Area Search. (MQ-5B)

a. Search an area measuring approximately 1x1 kilometer:

(1) The AO/PO will first plot the area on the appropriate map to check the area and size and then create a mission plan outlining the area to be searched.

(2) The AO will establish a hold mode above the center point of the area to be searched.

(3) The PO will scan the area in a preplanned pattern to cover the entire area. Coverage parameters in the options menu on the sensor control panel may be selected to view coverage splotches on the scrolling map to facilitate complete and accurate coverage of the area to be searched. The PO will zoom in and out to observe the area to be searched.

b. Search an area measuring larger than 1x1 kilometer:

(1) The AO/PO will first plot the area on the appropriate map to check the area and size and then create a mission plan outlining the area to be searched.

(2) The AO will maintain a depression angle that is optimal based on mission requirements for each point searched.

(3) The PO will scan the entire area using a preplanned pattern to cover the entire area. Coverage parameters in the options menu on the sensor control panel may be selected to view coverage splotches on the scrolling map to facilitate complete and accurate coverage of the area to be searched. The PO will zoom in and out to observe the area to be searched.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2092

Transmit Tactical Reports

CONDITIONS: In a ground control station (GCS), simulator, or orally in a classroom environment and given sufficient information to compile a tactical report.

STANDARD: Transmit appropriate report using the proper format.

DESCRIPTION:

1. Crew Actions

a. The unmanned aircraft operator (AO) is responsible for aircraft control and obstacle avoidance. The AO will coordinate with the mission payload operator (PO) as to who will make the report.

b. The designated crewmember will prepare the information for the report and coordinate with the mission commander (MC) prior to sending it.

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

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

(1).Call sign of observer.

(a). SALUTE.

a. S—size.

b. A—activity.

c. L—location.

d. U—unit (if known).

e. T—time.

f. E—equipment.

2. What you are doing about it.

a. Battle Damage Assessment (BDA) Report. Submit a BDA report following naval gunfire, artillery fire (if requested), or a tactical air strike.

(1) ALPHA: Call sign of observing source.

(2) BRAVO: Location of target.

(3) CHARLIE: Time the strike started and ended.

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

(5) ECHO: Itemized destruction.

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

b. Enemy Shelling, Bombing, or Chemical, Biological, Radiological, and Nuclear (CBRN) Warfare Activity Report. Submit this report following enemy shelling, bombing, or CBRN warfare activity.

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

(2) BRAVO: Position of observer (grid coordinates in code).

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

(4) DELTA: Time from (date-time of attack).

(5) ECHO: Time to (for illumination time).

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

(7) GOLF: Number and nature of guns, mortars, aircraft, or other means of delivery, if known.

(8) HOTEL: Nature of fire (barrage, registration, and so forth) or CBRN-1 type of burst (air or surface) or type of toxic agent.

(9) INDIA: Number and type of bombs, shells, rockets, and so forth.

(10) JULIETT: Flash-to-bang time in seconds.

(11) KILO: If CBRN-1, damage (in code) or crater diameter.

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

(13) MIKE: If CBRN-1, cloud height (state top or bottom) 10 minutes after burst.

(14) NOVEMBER: If CBRN-1, cloud width 10 minutes after burst.

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

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c. Meaconing, Intrusion, Jamming, and Interference Report. Once jamming is discovered, report the interference as soon as practicable to higher headquarters.

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

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

(3) Line 3: Location (your grid location).

(4) Line 4: Frequency affected (frequency).

(5) Line 5: Type of equipment affected (ultra high frequency [UHF], very high frequency [VHF], frequency modulation [FM], and so forth).

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

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

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

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

(10) Line 10: Operator's name and rank.

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

REFERENCES: Appropriate common references, FM 3-11, and FM 2-0.

TASK 2162

Call for and Adjust Indirect Fire

CONDITIONS: In a ground control station (GCS), simulator, or orally in a classroom environment.

STANDARDS:

1. The crew will positively identify the target and perform the Call for fire and artillery adjustment checklist following the instructions step by step.

2. Upon positive identification of the target, the unmanned aircraft operator (AO) will orbit above or to one side of the target in order to provide 60-degree depression angle or better to the target.

3. The AO and mission payload operator (PO) will coordinate who will freeze the video and perform the Call for fire and artillery adjustment function to be communicated to the artillery unit (suggest the AO perform the video freeze and adjustment functions to free the PO to maintain the crosshairs on the target at all time).

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The AO's main focus will be on the flight and data link instruments to ensure the UAS is responding to all inputs correctly and is maintaining continuous link with the ground data terminal (GDT). The PO's main focus will be to locate and identify the target. The focus of the AO and PO will then be to coordinate and follow the checklist to accomplish an artillery adjustment on the target.

a. PO Actions. The PO will coordinate the checklist with the AO to ensure that all items are accomplished in order. The PO will maintain the video crosshairs on the target (especially prior to the video being frozen) for the artillery adjustment function to be performed and during the period the AO's video is frozen.

b. AO Actions. The AO will maintain an orbit above or to the side of the target. The AO will attain 60-degree depression angle or better prior to freezing the video. Upon freezing the video, the AO will perform the artillery adjustment procedure and provide the data to the firing artillery unit.

2. Procedures

a. Planned Targets. Planned targets may be scheduled or on call. They should be planned against confirmed, suspected, or likely enemy locations and on prominent terrain to serve as reference points for shifting fires onto targets of opportunity.

b. Unplanned Targets. Targets of opportunity are engaged by grid or shift from a known point. Subsequent indirect artillery adjustments are made based on a reference line, and indirect aerial fires can be adjusted similarly.

c. Call-for-Fire Elements. The call-for-fire elements are—

(1) Observer identification (appropriate call sign).

(2) Warning order (type mission; for example, adjust fire, fire for effect, suppression, immediate suppression).

(3) Location of target (grid coordinates, known location designation, shift with appropriate reference line).

(4) Description of target.

(5) Method of engagement (type adjustment, trajectory, ammunition, or distribution desired).

(6) Method of fire and control (for example, “At my command” or “When ready”).

Note Compass directions are sent to the fire direction center (FDC) in mils. If the direction is in degrees, the observer must so indicate.

Note When using a spotting line for adjustments, the FDC will assume that the gun-target line is used unless otherwise specified by the observer.

Note If the observer is using a spotting line and repositions the aircraft, the observer must inform the FDC if the spotting line changes by 5 degrees or more.

REFERENCES: Appropriate common references, FM 3-40.140, and FM 6-30.

TASK 2472

Perform Airborne Data Relay Mission

CONDITIONS: Given a Hunter system or simulator, operator's manual, and checklist.

STANDARDS:

1. Correctly perform the relay mission.

2. Ensure that the geometry of the aircraft will support good relay operations.

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The crew will identify the mission requirements and coordinate mission planning to ensure accomplishment of the relay mission. The crew should know and understand the factors requiring the mission to be aborted or altered.

2. Procedures

a. Mission Brief. Determine relay orbit and alternate orbit tracks.

b. Preflight. The crew will establish active relay on the ground prior to launch.

c. During Flight. The unmanned aircraft operator (AO) will perform the following actions:

(1) Fly the aircraft to the entry point of the relay program, and report to the appropriate facility (ground control station [GCS] or launch recovery station [LRS]).

(2) Adjust airspeed and altitude to the desired relay configuration.

(3) Establish relay with the mission unmanned aircraft system (UAS) and conduct the mission.

(4) Monitor both aircraft instruments and respond appropriately to problems.

Note. If a threat causes deviation from the planned mission, the mission commander (MC) should make every effort to continue the mission when the threat has passed.

Note. "OTHER UAS FAIL" is a unique warning to relay operations. Follow the specific guidelines in the checklist for proper procedures.

REFERENCES: Appropriate common references.

TASK 2601

Perform Maintenance Preflight Inspection

CONDITIONS: Given a Hunter system and TM 9-1550-693-23-1.

STANDARDS:

1. Correctly follow the maintenance preflight checklist per TM 9-1550-693-23-1, appendix A.

2. Correctly determine discrepancies

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. The crew will perform a maintenance preflight inspection per TM 9-1550-693-23-1, appendix A, for a general maintenance test flight.

2. The crew will perform a maintenance preflight inspection per TM 9-1550-693-23-1, appendix A, for a limited maintenance test flight.

REFERENCES: Appropriate common references.

Task 2602

Perform Limited Maintenance Test Flight

CONDITIONS: Given a Hunter system and TM 9-1550-693-23-1.

STANDARDS:

1. Without error, perform the limited maintenance test flight per TM 9-1550-693-23-1, appendix A.

2. Correctly determine malfunctions or discrepancies and apply corrective actions/troubleshooting procedures.

3. Correctly perform crew coordination actions.

DESCRIPTION: The crew will perform a limited maintenance test flight per TM 9-1550-693-23-1, appendix A, as directed.

REFERENCES: Appropriate common references.

TASK 2603

Perform Limited Maintenance Test Flight–External

CONDITIONS: Given a Hunter system and TM 9-1550-693-23-1.

STANDARDS:

1. Without error, perform the limited maintenance test flight–external per TM 9-1550-693-23-1, appendix A.

2. Correctly determine malfunctions or discrepancies and apply corrective actions/troubleshooting procedures.

3. Correctly perform crew coordination actions.

DESCRIPTION: The crew will perform a limited maintenance test flight–external per TM 9-1550-693-23-1, appendix A, as directed.

REFERENCES: Appropriate common references.

TASK 2604

Perform General Maintenance Test Flight

CONDITIONS: Given a Hunter system and TM 9-1550-693-23-1.

STANDARDS:

1. Without error, perform the general maintenance test flight per TM 9-1550-693-23-1, appendix A.

2. Correctly determine malfunctions or discrepancies and apply corrective actions/troubleshooting procedures.

3. Correctly perform crew coordination actions.

DESCRIPTION: The crew will perform a general maintenance test flight per TM 9-1550-693-23-1, appendix A, as directed.

REFERENCES: Appropriate common references.

TASK 2605

Perform General Maintenance Test Flight–External

CONDITIONS: Given a Hunter system and TM 9-1550-693-23-1.

STANDARDS:

1. Without error, perform the general maintenance test flight–external per TM 9-1550-693-23-1, appendix A.

2. Correctly determine malfunctions or discrepancies and apply corrective actions/troubleshooting procedures.

3. Correctly perform crew coordination actions.

DESCRIPTION: The crew will perform a general maintenance test flight–external per TM 9-1550-693-23-1, appendix A, as directed.

REFERENCES: Appropriate common references.

TASK 2606

Perform Maintenance Postflight Inspection

CONDITIONS: Given a Hunter system and TM 9-1550-693-23-1.

STANDARDS:

1. Correctly follow the maintenance postflight checklist per TM 9-1550-693-23-1, appendix A.

2. Correctly determine malfunctions or discrepancies and apply corrective actions/troubleshooting procedures.

3. Correctly perform crew coordination actions.

DESCRIPTION: The crew will perform a maintenance postflight inspection per TM 9-1550-693-23-1, appendix A, for a limited or general maintenance test flight.

REFERENCES: Appropriate common references.

Appendix B

RQ-7 Shadow ATP Requirements

FLIGHT HOUR MINIMUMS

B-1. Semiannual aircraft flying-hour requirements.

- FAC 1—24 hours, of which 8 hours must be flown in each crew station.
- FAC 2—12 hours, of which 4 hours must be flown in each crew station.
- FAC 3—No crew duties authorized with Army UASs.

B-2. Semiannual simulation device flying-hour requirements. Trainers and evaluators may credit instructor/operator (I/O) hours toward their semiannual simulation device flying-hour requirements. FAC 1 UACs may apply a maximum of 12 simulation hours flown in a semiannual period toward that period's semiannual flying-hour requirements. FAC 2 UACs may apply a maximum of 6 simulation hours flown in a semiannual period toward that period's semiannual flying-hour requirements.

- FAC 1—8 hours, of which 3 hours must be flown in each crew station.
- FAC 2—4 hours, of which 1 hour must be flown in each crew station.
- FAC 3—3 hours, which may be flown in either crew station.

Note. UTs, IOs, and SOs may credit those hours they fly while performing assigned duties at any crew position toward their semiannual flying-hour requirement.

CURRENCY REQUIREMENTS

B-3. To be considered current, a UAC must—

- Perform every 60 consecutive days a launch and recovery and 1 hour of flight operations of the UAS or a compatible simulator.
- Perform every 120 consecutive days in a launch and recovery and 1 hour of flight operations of the UAS.

B-4 Units deployed for contingency operations, the first O-6 commander may waive launch and recovery requirements for forward site personnel when conducting split base operations. Prior to resuming launch and recovery duties, the forward site personnel must demonstrate proficiency to an IO.

B-5 A UAC whose currency has lapsed must complete a proficiency flight evaluation per paragraph 2-12 of this publication. Simulators may not be used to reestablish currency.

B-6 To be considered current, a ground crewmember must—

- Perform every 60 consecutive days launch operations in the UAS.

RQ-7 TASK LIST

B-7 **Task Number.** Each ATM task is identified by a 10-digit SAT number. For convenience, only the last four digits are listed in this training circular. The last four digits of—

- Base tasks are assigned 1000-series numbers (table B-1).
- Mission tasks are assigned 2000-series numbers (table B-2 and table B-3).
- Additional tasks are assigned 3000-series numbers.

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

B-8 Task **Title.** The task title identifies a clearly defined and measurable activity.

B-9 Conditions**.** The conditions specify the situation (normal operation, wartime, training, or evaluations) under which the task will be performed. They describe important aspects of the performance environment. All conditions must be met before task iterations can be credited.

B-10 **IO/SO.** There are currently no designated tasks that require an IO/SO to be at the controls.

B-11 **Annual Task and Iteration Requirements.** The required annual task and iterations are specified in paragraph 2-26.

Note. UTs, IOs, and SOs may credit those hours they fly while performing assigned duties at any crew position toward their semiannual flying-hour requirement.

Table B-1. UAC base task list

Task	*Title*	*AO*	*PO*	*N*	*EVAL*
1000	Participate in a Crew Mission Briefing	X	X	X	S
1013	Operate Mission Planning System	X	X		S
1022	Perform Preflight Inspection	X	X	X	S
1024	Perform Engine Start/Systems Check	X			S
1032	Perform Radio Communication Procedures	X	X		S
1040	Perform Normal Takeoff and Climb	X	X		S
1045	Perform Flight in Knob Control	X			S
1048	Perform Fuel Management Procedures	X	X		S
1050	Perform Flight Utilizing Automatic Flight Mode	X			S
1070	Describe or Perform Emergency Procedure	X	X		S
1080	Perform Tactical Automated Landing System Abort	X			S
1085	Perform Tactical Automated Landing System Recovery	X	X		S
1099	Operate Identification Friend or Foe System	X			S
1110	Track a Static Target	X	X	X	S
1115	Track a Moving Target	X	X	X	S
1175	Perform Transfer Procedures	X			
1184	Perform or Describe Inadvertent Instrument Meteorological Conditions	X	X	X	S
1302	Perform Procedures for Two-Way Radio Failure	X	X		
1402	Perform Flight Mission Planning	X	X	X	S
1472	Perform Aerial Observation	X	X	X	S
1800	Perform After-Landing Checks	X	X		S

Legend:

EO—External operator

AO—Unmanned aircraft operator

PO—Mission payload operator

N—Night

EVAL—Mandatory annual proficiency and readiness test (APART)

X—Mandatory annual task iteration requirement

S—Standardization flight evaluation

SM—Simulator

Note. Tasks evaluated in a more demanding mode may be credited toward completion of annual evaluation requirements. "N" is considered the most demanding mode, followed by "D," and "SM."

Note. Tasks identified with "SM" only in the EVAL column will be evaluated on the simulator.

Table B-2. UAC mission task list

Task	*Title*
2000	Perform Cold Weather Operations
2005	Perform Desert and Hot Weather Operations
2010	Discuss Turbulence and Thunderstorm Operations
2015	Perform Mountain Operations
2018	Recommend/Reconnoiter Landing Zone/Pickup Zone
2019	Perform Route Reconnaissance
2025	Conduct Digital Communications
2054	Perform Target Hand Over to an Attack Helicopter
2066	Perform Zone Reconnaissance
2067	Perform Area Reconnaissance
2092	Transmit a Tactical Report
2162	Call for and Adjust Indirect Fire

Table B-3. UAS ground crewmember task list

Task	*Title*	*D*	*N*	*EVAL*
1000	Participate in a Crew Mission Briefing	X	X	X
1022	Perform Preflight Inspection	X	X	X
1024	Perform Engine Start/Systems Checks	X	X	
1040	Perform Normal Takeoff and Climb	X	X	X
1070	Describe or Perform Emergency Procedure	X		X
1800	Perform After-Landing Checks	X		X
2000	Perform Cold Weather Operations	X		
2005	Perform Desert and Hot Weather Operations	X		
Note. Tasks evaluated in a more demanding mode may be credited toward completion of annual evaluation requirements. "N" is considered the most demanding mode, followed by "D."				

TASK 1000

Participate in a Crew Mission Briefing

CONDITIONS: Prior to ground or flight operations with a Shadow system or simulator and given DA Form 7525 (*UAS Mission Schedule/Brief*) and a unit-approved crew briefing checklist.

STANDARDS:

1. Without error, brief the mandatory and mission-related items detailed on DA Form 7525.

   a. Assign crewmember mission duties and responsibilities.

   b. Assign crewmember duties and responsibilities per the crew briefing checklist.

   c. Have the crewmembers acknowledge that they fully understand the assignment of duties and responsibilities.

DESCRIPTION:

1. Crew Actions

   a. A designated briefing officer/noncommissioned officer (NCO) will evaluate and brief key areas of the mission to the mission commander (MC) per AR 95-23. The MC will acknowledge a complete understanding of the mission brief and initial DA Form 7525.

   b. The MC has overall responsibility for the crew mission briefing. The MC will ensure that the crew is current and qualified to perform the mission. The MC may direct the other crewmembers to perform all or part of the crew briefing.

   c. The crewmembers being briefed will address any questions to the briefer and will acknowledge that they understand the assigned actions, duties, and responsibilities. Lessons learned from previous debriefings should be addressed as applicable during the crew briefing.

2. Procedures. Brief the mission using a unit-approved crew mission briefing checklist. Figure B-1 shows a suggested format for a Shadow unmanned aircraft system (UAS) crew briefing checklist. Identify mission and flight requirements that will demand effective communication and proper sequencing and timing of actions by the crewmembers.

REFERENCES: Appropriate common references.

SHADOW CREW MISSION BRIEF								
Mission Date:		**Mission Number:**			**Mission Time Frame:**			
SITUATION								
Enemy Forces: (Brief description of threat and estimated enemy courses of action.)								
Weather:								
Temperature: Min Max								
Pressure Altitude:								
Density Altitude:								
Ceiling:								
Visibility:								
Chance of Precip:								
Sfc Wind at LRS:								
Altitude Winds: 2000ft: 4000ft: 6000ft: 8000ft:					Freezing Level: Lightning Warnings: Advisories/Warnings:			
Friendly Forces: Forward Site					***Friendly Forces: LRS Site***			
FS Squad Leader/IO:					LRS Squad Leader/IO:			
MC:					MC:			
AO:					AO:			
PO:					PO:			
Primary UA Number:					Ground Crew Leader:			
Alternate UA Number:					Primary Launch Shelter:			
Primary Controlling GCS:					Alternate Launch Shelter:			
Alternate Controlling GCS:								
FS GCS Location:					***LRS GCS Location:***			
FS GDT Location:					***LRS GDT Location:***			
FS GDT Address:					***LRS GDT Address:***			
PGCS Location:					***PGCS Address:***			
Primary TALS Location:					***Alternate TALS Location:***			
TALS Height:					***TALS Distance:***			
TDP Location:					***Runway Heading:***			
MISSION								
BDE Mission:								
Platoon Mission:								
Mission: (Mission statement for this flight)								

EXECUTION		
Intent: (Platoon Leaders intent for this flight)		
Concept of the Operation: (Brief paragraph of how the operation will flow) Include movement to hand off point, hand off procedures, etc.		
Task to Maneuver Units: Unit Supporting: Launch Time: Hand Off Location: Hand Off Time to FS: Hand Off Altitude:		TOT of First Target: Bingo Fuel Procedures: Hand Off Time to LRS: Actions on delay of Launch: Actions on delay of Recovery:
Return Home		
Location:	Altitude:	Airspeed:
Estimated Landing Time: Stand Off ROZ distances: (by TGT location) Flight Pattern: (by TGT location) ALO Coordination: (any rotary or fixed wing activity in the AO) FSE Coordination: (any fire support operations in the AO) Air Coordination Restrictions: (any flight restrictions, route specifications or no fly areas)		
SERVICE AND SUPPORT		
BDE TOC Location:		MICO ACT Location:
Supported Unit TOC Location:		LRS TOC Location:
Refuel Location:		ALOC Location:
MEDEVAC Freq:		ALOC Freq:
COMMAND AND SIGNAL		
Succession of Command: (list both LRS and FS sites)		
Signal		
Primary FM:		Alternate FM:
Control Tower Freq:		HF Freq:
Platoon Command Freq:		UHF Freq:
Primary UA		Alternate UA
IFF Code		IFF Code
Primary C2 Link:		Primary C2 Link:
Secondary C2 Link:		Secondary C2 Link:
Video Link:		Video Link:
Supported Unit Freq:		Preflight Freq:
TALS Freq:		TALS Freq:
Net ID/Hop/Key:		

Crew actions, duties, and responsibilities: (Elements of crew coordination)	
Communicate positively.	Acknowledge actions.
Direct assistance.	Be explicit.
Announce actions.	Provide UA control and obstacle advisories.
Offer assistance.	Coordinate action sequence and timing.
Additional Instructions:	
Appendix A: Target Matrix	
Appendix B: Risk Assessment	

Figure B-1. Example of a Shadow crew mission brief

TASK 1013

Operate Mission Planning System

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Without error, build a mission plan to accomplish mission objectives while maintaining operational parameters.

2. Without error, enter and verify the mission waypoints and parameters.

3. Without error, build and display threat, target, air traffic control (ATC) restrictions, and air corridors.

4. Without error, build and display a payload plan.

5. Correctly perform crew coordination procedures.

DESCRIPTION: The mission commander (MC) is responsible for ensuring that pertinent data has been correctly entered and subsequently saved onto the hard drive. Depending on the situation, the crew may perform programming cooperatively or independently. The MC will perform, or will task the unmanned aircraft operator (AO) or mission payload operator (PO) to perform software configuration, data processing, and loading. The steps will be completed per TM 9-5895-681-10, *Operator's Manual for Shadow 2000 TUAV System*.

REFERENCES: Appropriate common references.

TASK 1022

Perform Preflight Inspection

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Without error, perform the preflight checks, unmanned aircraft (UA) preflight, and launcher inspections in accordance with the operator's manual/checklist.

2. Correctly enter and verify the appropriate information on DA Form 2408-12 (*Army Aviator's Flight Record*) and DA Form 2408-13 (*Aircraft Status Information Record*), DA Form 2408-13-1 (*Aircraft Maintenance and Inspection Record*), and DA Form 2408-18 (*Equipment Inspection List*).

3. Verify the data on the DD Form 365-4 (*Weight and Balance Clearance Form F–Transport/Tactical*).

4. Correctly perform preflight inspection [with a minimum of three ground crewmembers] utilizing proper challenge and response crew coordination.

5. Correctly perform crew coordination actions.

DESCRIPTION:

1. The aircraft operator (AO) will ensure that proper preflight checks are verified using the appropriate operator's manual/checklist.

2. The AO will ensure the appropriate information is entered on DA Form 2408-12, DA Form 2408-13, DA Form 2408-13-1, DA Form 2408-18, and DD Form 365-4.

3. The crewmembers will complete the preflight checks, AV preflight, and launcher inspections as directed and ensure the preflight of the aircraft and launcher meets the required preflight inspection criteria.

4. All crewmembers will use standard challenge and response communications.

NIGHT CONSIDERATIONS: If time permits, accomplish the preflight inspections during daylight hours. During the hours of darkness, use a flashlight with an unfettered lens to supplement available lighting. Oil leaks and other defects are difficult to see using a flashlight with a colored lens.

REFERENCES: Appropriate common references.

TASK 1024

Perform Engine Start/Systems Check

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Without error, perform procedures and checks according to the checklist.

2. Ensure that engine and systems are operating within prescribed tolerances.

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Crewmembers will complete the required checks or procedures pertaining to their crew duties according to the checklist and the preflight briefing.

2. Procedures. Ground Crewmembers will position the unmanned aircraft system (UAS) properly for run-up. The aircraft operator (AO) will complete the engine and systems checks and ensure that the engine, related systems, and equipment are operating properly. The checklist will be used to verify that all checks are completed. The unmanned aircraft operator (AO) shall read the checklist and ensure all the checklist items are completed.

3. All crewmembers will use the standard challenge and response communications.

WARNING

Exercise extreme caution during limited visibility and night operations.

REFERENCES: Appropriate common references.

TASK 1032

Perform Radio Communication Procedures

CONDITIONS: Given a Shadow system or simulator and established radio communication.

STANDARDS:

1. Without error, tune system radios to the proper frequencies.

2. Establish radio contact with the appropriate air traffic control (ATC) facility.

3. When communicating with ATC facilities, use the correct radio communication procedures and phraseology according to the Department of Defense (DOD) flight information publication (FLIP).

4. Acknowledge each radio communication with ATC by using the correct aircraft call sign.

5. Acknowledge and comply with ATC instructions to change frequencies.

6. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Radio communication is primarily the unmanned aircraft operator's (AO's) responsibility. However, if crewmembers monitor two frequencies simultaneously, they will keep each other informed of any actions or communications conducted on their respective frequency.

2. Procedures

a. The crew will use radio communications procedures and phraseology as appropriate for the area of operations. Standard phrases and terms will be used during all transmissions.

b. The AO will tune the system radios as required and maintain a continuous listening watch on the assigned frequencies. When required, the AO will establish communications with the appropriate ATC facility. The AO will monitor the frequency before transmitting and will use the correct radio call sign when acknowledging each communication. The AO will transmit pilot reports, position reports, and flight plan changes (as required).

c. When advised to change frequencies, the AO will acknowledge the transmission before making the change. The AO will select the new frequency as soon as possible unless instructed to do so at a specific time, fix, or altitude.

Note. When performing this task, the AO will coordinate according to the mission briefing.

REFERENCES: Appropriate common references.

TASK 1040

Perform Normal Takeoff and Climb

CONDITIONS: Given a Shadow system or simulator, with preflight and engine start procedures completed, checklist, air traffic control (ATC) clearance (if required), and launch crew.

STANDARDS:

1. Without error, perform unmanned aircraft (UA) launch procedures in accordance with the appropriate operator's manual/checklist.

2. Without error, perform UA post-launch procedures in accordance with the appropriate operator's manual/checklist.

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

   a. The unmanned aircraft operator (AO) will coordinate with the ground crew to safely execute checklist procedures to achieve Shadow departure from launcher.

   b. All crewmembers will use standard "challenge and response" communication.

2. Perform launch and post-launch procedures per the appropriate operator's manual/checklist.

REFERENCES: Appropriate common references.

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TASK 1045

Perform Flight in Knob Control

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Change heading commands to meet mission waypoints.

2. Adjust for winds.

3. Adjust airspeed commands to meet time-over-target (TOT) requirements while staying within operating parameters.

4. Adjust altitude commands to meet waypoint requirements.

5. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The unmanned aircraft operator's (AO's) focus will be on the flight instruments ensuring that the unmanned aircraft system (UAS) is responding appropriately. The AO will also coordinate with the mission payload operator (PO), who cross-checks TOT calculations for airspeed.

2. Procedures

a. Determine Heading. From the correct UAS location, use the map display or appropriate paper map and determine the correct magnetic heading to the next waypoint or target with corrections for wind.

b. Determine Airspeed. From the current UAS position, determine distance to the next waypoint or target. Calculate the proper airspeed to reach the waypoint/target within the specified time and operational parameters. Initiate new airspeed command on the airspeed slider on the unmanned aircraft (UA) control panel. Monitor pitch indication and airspeed for proper response.

c. Determine Altitude. Set the altitude command, with the altitude slider on the UA control panel, for the correct altitude for the next waypoint/target. Monitor throttles/revolutions per minute (RPM) and engine instruments as well as altitude and rate-of-climb indicators for proper response.

d. Course Corrections. If the next target is too close to fit within time over target (TOT) specifications, adjust heading to delay arrival on the waypoint/target.

REFERENCES: Appropriate common references.

TASK 1048

Perform Fuel Management Procedures

CONDITIONS: Given an appropriate map with mission route denoted, altitude, weather conditions, unmanned aircraft system (UAS) takeoff weight.

STANDARDS:

1. Determine total mission flight time within ±5 minutes.

2. Determine fuel consumption within ±6 liters.

3. Correctly perform crew coordination procedures.

DESCRIPTION:

1. The unmanned aircraft operator (AO) calculates flight time by totaling the distance from the launch site, to and between all targets, and back to the recovery site.

2. The AO calculates maximum amount of flight time by determining the number of liters of fuel expended per hour. The AO must take into account the fuel necessary for launch and recovery.

REFERENCES: Appropriate common references.

TASK 1050

Perform Flight Utilizing Automatic Flight Modes

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Without error, exercise all automatic flight modes.

2. Without error, load a program to the unmanned aircraft system (UAS).

3. Without error, engage the correct flight mode.

4. Without error, verify UAS enters the selected flight mode.

5. Without error, verify airspeed, heading, and altitude are set to programmed settings.

6. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The aircraft operator (AO) will announce all flight mode changes. The AO will verify that the UAS enters the selected flight mode by monitoring the flight mode section of the unmanned aircraft (UA) control panel.

2. Procedures

a. Flight Plan Mode. The AO selects and loads a validated flight plan to the UA. Ensure the appropriate mission is loaded by verifying the flight plan waypoints on the air vehicle (AV) control panel. Verify UA waypoints, airspeed and altitude are appropriate for the mission and do not exceed system limitations. The AO will engage flight plan flight mode on the AV control panel. Airspeed and altitude sliders shall be adjusted, as required, and verified until AV enters fully automated flight. Verify AV tracks to and achieves designated points and executes flight plan parameters within designated limitations.

b. Points Navigation (NAV) Mode. The AO will engage points NAV on the UA control panel. Airspeed and altitude sliders shall be adjusted, as required, and verified. Define points NAV destination by curser placement on the main map display, or by data entry in the points NAV dialog box in the AV control panel. Verify that the UA tracks to and achieves designated point and executes orbit parameters within design limitations.

c. Auto Launch Mode. The AO will engage the auto launch soft button located on the AV control panel, ONLY when the preflight, engine start, and pressurization of the launcher have been completed in accordance with the appropriate operator's manual/checklist; and the UA is prepared for launch. Once the AO verifies the UA has reached desired RPM while in auto launch; the AO may proceed with the countdown. After the UA has left the launcher, precede with the standard post launch checks. Verify the UA shifts into knobs mode after reaching 1,000 feet above ground level (AGL) if the mission or airspace requirements do not dictate an operator commanded change in flight modes at a lower altitude.

d. Tactical Automated Landing System (TALS) Loiter Mode. When the UA is ready for recovery, descend the UA to the required altitude per the local standing operating procedure (SOP). Once the UA is at the appropriate altitude, depress the TALS loiter soft button located on the AV control

panel. The AO will ensure the UA enters the loiter circle on the main map display and loiters in the appropriate direction defined in the TALS setup menu. The AO will verify the UA transitions to the appropriate acquisition altitude as reported in the TALS setup menu.

REFERENCES: Appropriate common references.

TASK 1070

Describe or Perform Emergency Procedure

CONDITIONS: Given a Shadow system, simulator, or in a classroom.

STANDARDS:

1. Without error, perform, simulate the performance, or describe the appropriate emergency procedure according to the operator's manual or checklist.

2. Correctly perform crew coordination actions.

DESCRIPTION:

Crew Actions. Crewmembers will perform all emergency procedures described in the operator's manual or checklist. They will also state the actions required in performing those emergency procedures that cannot be practiced or simulated. The discussion will include procedures outlined in the operator's manual, the flight information handbook (FIH), and the applicable crew coordination actions.

REFERENCES: Appropriate common references.

TASK 1080

Perform Tactical Automated Landing System Abort

CONDITIONS: Given a Shadow system or simulator, suitable runway, and clearance by air traffic control (ATC) (if required).

STANDARDS:

1. Monitor safe flight to predetermined wave-off point.

2. Without error, perform Tactical Automated Landing System (TALS) Recovery Failure in accordance with the appropriate operator's manual/checklist as required.

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. During ground control station (GCS) preset and preflight checks, the altitude and distance from the touch down point (TDP) are established.

2. Use local standing operating procedure (SOP) and guidance to set these parameters.

3. Crew Actions. Given that the unmanned aircraft (UA) has aborted the TALS landing or the unmanned aircraft operator (AO) has selected ABORT on the AUTO LAND menu.

a. The AO will announce, "TALS abort."

b. The AO will verify that the UA has entered Wave-off on the AV control panel and is flying safely to the wave-off point.

c. The AO will take control of the UA in knobs mode once the UA has established the wave-off point or other pre-described position per the local SOP.

d. Once safe flight is established, the AO may continue with normal operations.

e. If the abort was not commanded by the AO, then the AO will perform TALS recovery failure procedures in accordance with the appropriate operator's manual/checklist.

4. When the UA has entered wave-off, the AO should note the following:

a. The engine is at maximum revolutions per minute (rpm).

b. The UA is climbing to wave-off point altitude.

c. The UA is heading to wave-off point.

REFERENCES: Appropriate common references.

TASK 1085

Perform Tactical Automated Landing System Recovery

CONDITIONS: Given a Shadow system or simulator, suitable runway, and clearance by air traffic control (ATC) (if required).

STANDARDS:

1. Without error, verify Tactical Automated Landing System (TALS) setup and survey tabs.

2. Maneuver the unmanned aircraft (UA) to the acquisition altitude ±100 feet.

3. Complete TALS recovery per the appropriate operator's manual/checklist (CL).

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Unmanned aircraft crewmembers (UACs) will ensure setup and survey data is correct for current weather and runway considerations. Using appropriate flight modes ensure UA descends to the acquisition altitude.

2. Maneuver the UA to a position such that the tangent of the projected orbit point is intercepted. Open the AUTO LAND menu and position over the map display so the TALS graphics are still visible.

a. Without one-button auto-land: When the UA is 60 to 90 degrees from lining up with the runway, activate TALS airborne subsystem. When the UA achieves 15 to 25 degrees from the runway alignment, engage ACQUIRE. Monitor TALS status throughout the procedure for warnings and failures. Engage LAND AV push button once available.

b. With one-button auto-land: When the UA is within 2 kilometers of the acquisition loiter point (700 meters from the orbit), engage the one button auto-land. Monitor TALS status throughout the procedure for warnings and failures.

3. Continue to monitor recovery initiation window (RIW), master caution window, and the Shadow 200 warning panel for system failures. Prepare to abort TALS landing if out-of-parameter condition develops. If the system automatically aborts the AUTO LAND sequence (outside decision point), assume control via appropriate flight mode.

REFERENCES: Appropriate common references.

TASK 1099

Operate Identification Friend or Foe System

CONDITIONS: Given a Shadow system or simulator or in a classroom environment equipped with the Mark XII identification friend or foe (IFF) system or control head.

STANDARDS:

1. Correctly prepare the system for operation.
2. Correctly perform the self-test check.
3. Correctly classify IFF/transponder (XPDR) defects relative to the mission.
4. Correctly operate the equipment without assistance.
5. Correctly perform crew coordination actions.

DESCRIPTION: The crew will perform or simulate the operational and employment procedures and precautions for the IFF system. These include preflight inspection; turn on, self-test and operational checks; mission employment doctrine and operating procedures; partial failure alternatives; indication or signal interpretation; and shutdown procedures. If the keyable identification transponder (KIT) 1A or KIT 1C is not available or not installed, simulate IFF operations using the control head.

REFERENCES: Appropriate common references.

TASK 1110

Track a Static Target

CONDITIONS: Given a Shadow system or simulator or in a classroom.

STANDARDS:

1. Position the unmanned aircraft system (UAS) payload to maintain a resolution of 1.75 or less in infrared (IR) or 1.17 or less in Electro-Optical (EO) and the optimum depression angle.

2. Maintain crosshairs centered on the target and coordinate with the aircraft operator (AO) to maintain the optimal depression and resolution.

3. Correctly perform crew coordination actions.

4. If required to illuminate/designate target for acquisition when using the UAS payload with a laser pointer/designator.

DESCRIPTION:

1. Crew Actions. For tracking a static target, the aircraft operator's (AO's) main focus will be on the flight instruments to ensure the unmanned aircraft (UA) is responding appropriately to airspeed, altitude and heading inputs to achieve depression and resolution requirements. The mission payload operator's (PO's) main focus will be to coordinate with the AO on flight parameters to arrive over the target within the time constraints and maintain the proper orbit position, and to identify and maintain the crosshairs on the target. The AO will assist in tracking the static target in the following modes: knobs mode, points NAV mode, or flight plan mode. The PO will track the static target using Point-At-Coordinate, AUTO Track, or manual control of the payload. The PO will determine resolution using the coverage parameters dialog, the auto search menu. For the depression, use the depression angle information located on the overlays for the video screen.

2. Procedures for tracking a static target:

a. Determine heading to the target. The PO will determine, from the current location using the main map display, the UA's present position coordinates and/or appropriate maps, the correct heading to the target, and will coordinate the new heading with the AO. The AO will initiate the turn to the desired heading and monitor the flight instruments to ensure rollout occurs on the desired heading.

b. Determine airspeed to the target. The PO determines the distance from the UA to the target and calculates the groundspeed required to arrive at the target within the specified time over target (TOT). The AO will confirm the groundspeed required to adjust the airspeed control, and monitor the flight instruments for correct response to the speed adjustment.

c. Identify the target. The PO will brief the AO on the target description and general location. **If there is a requirement to provide a laser spot or designation for target acquisition by other sources, ensure the PO observes the principles of beam attenuation and beam divergence. The PO will provide accurate target illumination/designation.** The AO will continue to monitor the flight instruments as well as keeping the laser/designator free of obstacles.

(1) Locate target using manual payload control. The PO will begin to use the payload to locate the general area of the target by identifying terrain and/or cultural features leading

into the target area as well as the camera pointing indicators. The PO will begin to narrow the field of view (FOV) of the payload and identify the target through the relationship of the identified features in the target area and payload indicators.

(2) Locate target using Point-at-Coordinate menu. After coordinating the initial heading and airspeed to the target area with the AO, the PO will open the "Point-at-Coordinate" menu and key in the coordinates of the target. The PO will then verify the coordinates are correct, select "Apply" which sends the data to the UA. The PO will verify the payload turns toward the target area. The AO will then fly towards the PO's payload position, while monitoring the flight instruments and the depression angle. The PO will begin to narrow the FOV of the payload to identify the target. The PO will maintain the crosshairs on the target and coordinate with the AO on depression and bearing indicator changes that will require an adjustment to the UA position to maintain the required orbit parameters.

(3) Locate the target with the aid of points NAV. The PO will provide the coordinates of the target and determine groundspeed required to meet the TOT requirements. The AO will enter POINTS NAV mode. The AO will then verify the UA is flying to the target coordinates at the appropriate airspeed. As the UA flies over the target coordinates, the AO will verify it enters POINTS NAV hold mode above the target. The PO will identify the target by steering the payload to a bearing of 90 degrees left or right of the nose of the UA at a distance of approximately 1 kilometer.

REFERENCES: Appropriate common references.

TASK 1115

Track a Moving Target

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Track a moving target by maintaining the target centered with the video crosshairs and an appropriate depression angle or by maintaining a resolution of 1.75 or less in infrared (IR) or 1.17 or less in Electro-Optical (EO).

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

a. The aircraft operator (AO) will maneuver the unmanned aircraft (UA) to maintain optimum resolution, depression angle and payload bearing to the target.

b. The mission payload operator (PO) will perform crew coordination to prevent obscurations from disrupting the view of the target. The PO will determine the resolution using either the Coverage Parameters dialog or the Auto Search menu.

2. Procedures

a. The PO will maintain the video crosshairs on the target manually or in AUTOTRACK.

b. The AO will maneuver the UA using an orbit around the target to maintain an appropriate depression or resolution.

REFERENCES: Appropriate common references.

TASK 1175

Perform Transfer Procedures

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Without error, perform procedures and checks per the appropriate operator's manual/checklist (CL).

2. Correctly determine any malfunctions and apply corrective action/troubleshooting procedures.

3. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Controlling aircraft operator (AO) and receiving AO will complete the required checks or procedures pertaining to the crew duties per the checklist.

2. Procedures. Ground control station (GCS) to portable ground control station :

a. Transfer control to another shelter per appropriate operator's manual/CL. AO to mission payload operator (PO), same GCS.

b. Transfer control to other station per appropriate operator's manual/CL.

REFERENCES: Appropriate common references.

TASK 1184

Perform or Describe Inadvertent Instrument Meteorological Conditions Procedures

CONDITIONS: Given a Shadow system or simulator under simulated instrument meteorological conditions (IMC) or orally in a classroom environment.

STANDARDS:

1. The aircraft operator (AO) will—

   a. Maintain proper aircraft control.

   b. Maneuver unmanned aircraft (UA) out of obscurations. Climb, descend or turn as required.

   c. Set the transponder to the appropriate code.

   d. If unable to maintain visual meteorological conditions (VMC), then comply with recovery procedures.

2. The mission payload operator (PO) will—

   a. Without error, tune the radios to the appropriate frequency.

   b. Conduct weather and aircraft scans periodically.

3. Request air traffic control (ATC) assistance; acknowledge and record the appropriate information.

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. The AO, upon inadvertent IMC, will announce, "I am IMC," and proceed as follows:

   a. Maneuver UA out of IMC as required.

   b. Command a climb, if necessary to avoid known obstacles.

   c. Complete the inadvertent IMC recovery procedures according to local regulations and policies.

2. The PO will—

   a. Assist the AO by tuning the avionics, setting the transponder, and contacting the appropriate ATC facilities as outlined in the unit standing operating procedure (SOP). Maintain the required communications with ATC, and record ATC information when appropriate.

   b. Crosscheck the instruments as directed by the AO.

   c. Conduct weather and aircraft scans periodically with the payload to inform the AO when the aircraft is clear of clouds and obstacles. Aircraft scans are to ensure the aircraft is not developing ice on the surfaces.

   d. Contact the appropriate ATC facilities as required. Maintain the required communications with ATC, and record ATC information when appropriate.

NIGHT CONSIDERATIONS: When using infrared (IR), the crew can see through thin obscurations, such as light fog or drizzle, with little degradation.

REFERENCES: Appropriate common references.

TASK 1302

Perform Procedures for Two-Way Radio Failure

CONDITIONS: Given a Shadow system or simulator or in a classroom.

STANDARDS:

1. Implement the correct procedures for two-way radio failure.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. Correcting the loss of two-way radio communication is primarily the mission payload operator's (PO's) responsibility while the unmanned aircraft operator's (AO's) attention is on flying the unmanned aircraft system (UAS).

2. Procedures

a. The PO will advise the AO of the communications problem and attempt to identify and correct the malfunction.

b. If two-way radio communication cannot be established, the crew will perform the following actions:

(1) Visual flight rules (VFR) conditions. If two-way radio failure occurs while operating under VFR or if visual meteorological conditions (VMC) are encountered after the failure, continue the flight under VFR. Land as soon as practical.

(2) Instrument meteorological conditions (IMC).

c. If two-way radio failure occurs while operating in the National Airspace System, continue the flight according to instructions in the flight information handbook (FIH).

d. If ultra high frequency (UHF) two-way radio failure occurs while operating outside continental United States (CONUS), comply with International Civil Aviation Organization (ICAO) rules or applicable host-country regulations.

REFERENCES: Appropriate common references.

TASK 1402

Perform Flight Mission Planning

CONDITIONS: Given a Shadow system or simulator and given a mission briefing, access to the latest weather information, Notice to Airmen (NOTAM), flight planning aides, necessary charts, forms and publications, approved software, and other materials as required.

STANDARDS:

1. Analyze the mission using the factors of mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC).

2. Perform a map/photo reconnaissance using the available map media or photos. Ensure that all known hazards are plotted on the map or into the approved software.

3. Select appropriate routes and enter all of them on a map, route sketch, or into the approved software.

4. Determine the distance ±1 kilometer and estimate time en route (ETE) ±1 minute for each leg of the flight.

5. Complete for the mission:

   a. Total flight time and mission time.

   b.Determine fuel required for mission ensuring fuel reserve requirements are met in accordance with the operator's manual.

6. Obtain the weather briefing and confirm that the weather will be at or above the minimums for flight.

7. Perform composite risk management (CRM).

DESCRIPTION:

1. Crew Actions

   a. The mission commander (MC) will ensure that all necessary tactical flight information is obtained and will conduct a thorough crewmember briefing per the unit standing operating procedure (SOP) and task 1000. The MC may delegate mission planning tasks to the other crewmember but retains overall responsibility for mission planning. The MC will analyze the mission in METT-TC terms.

   b. The aircraft operator (AO) and mission payload operator (PO) will perform the planning tasks directed by the MC. They will report the result of the mission planning to the MC.

2. Procedures. Analyze the mission using the factors of METT-TC. Conduct a map or aerial photoreconnaissance. Obtain a thorough weather briefing that covers the entire mission and input as necessary into the approved software. Include sunset and sunrise times, density altitudes, winds, and visibility restrictions. If the mission is to be conducted at night, the briefing should also include moonset and moonrise times, ambient light levels, and an electro optical forecast, if available. Determine altitudes, routes, time, distances, winds aloft, and fuel requirements using approved software. Annotate the map, overlay, or approved software with sufficient information to complete the

mission. Consider such items as hazards, checkpoints, observation posts, and friendly and enemy positions. Determine the sensor appropriate for the environment time of day. Review contingency procedures. Ensure that the CRM is complete prior to the execution of the mission and the appropriate signatures are obtained.

Note. Evaluate the weather impact on the mission. Considerations should include aircraft performance and limitations on visual sensors.

REFERENCES: Appropriate common references.

TASK 1472

Perform Aerial Observation

CONDITIONS: Given a Shadow system or simulator or in a classroom.

STANDARDS:

1. Use the appropriate search techniques based on whether the target is static or moving.

2. Accurately locate the position of the target.

3. Accurately recognize the target.

4. Without error, make the appropriate spot reports.

5. Correctly perform crew coordination actions.

DESCRIPTION:

1. During missions involving direct observation, the crew is primarily concerned with detection, identification, location, and reporting. Tactical and nontactical environments use aerial observation.

a. Detection. Detection requires determining that an object or an activity exists.

b. Identification. Major factors in identifying a target are size, shape, and type of armament.

c. Location. The exact location of targets is the objective of the mission. Depending on the nature of the targets, the crew may be able to locate the center of mass, the boundaries of the target, or the boundaries of the entire area.

d. Reporting. Spot reports provide commanders with critical information during the conduct of missions. The requesting agency specifies the method of spot reporting. Reports of no enemy sightings are frequently just as important as actual enemy sightings.

2. Visual search is the systematic visual coverage of a given area that observes all parts of the area. The purpose of visual search is to detect objects or activities on the ground. The crew's ability to search a given area effectively depends on several factors: in addition to the limitations of the human eye itself, the most important of these factors are altitude, airspeed, terrain and meteorological conditions, and visual cues.

a. Altitude. Higher altitudes offer greater visibility with less detail. Use higher altitudes for survivability considerations.

b. Airspeed. The altitude, the terrain, the threat, and meteorological conditions determine selection of the airspeed (cruise/loiter/dash).

c. Terrain and Meteorological Conditions. Recognizable size and details of the area largely depend on the type of terrain such as dense jungle or barren wasteland. The prevailing terrain and meteorological conditions often mask objects and allow only a brief exposure period.

d. Visual Cues. In areas where natural cover and concealment make detection difficult, visual cues may indicate enemy activity. Some of these cues are as follows:

- Color. Foliage used to camouflage will differ from the color of natural foliage.
- Texture. Smooth surfaces, such as glass windows or canopies, will shine when reflecting light. Rough surfaces will not.
- Shapes and Shadows. Synthetic objects cast distinctive shadows characterized by regular shapes and contours as opposed to random patterns that occur naturally.
- Trails. Observe trails for cues as to the type/quantity of traffic, and how recently it passed.
- Smoke and Dust. Observe smoke for color and volume. Dust from moving vehicles is visible at great distances.
- Movement and Light. The most easily detectable sign of enemy activity is movement and, at night, infrared (IR) light. Movement may include disturbance of foliage, snow, soil, or birds. Laser-aiming devices are easily recognizable.
- Obvious Sightings. The enemy is skillful in the art of camouflage. The crew must be aware that obvious sightings may be intentional because of high concentrations of antiaircraft weapons.

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REFERENCES: Appropriate common references.

TASK 1800

Perform After-Landing Tasks

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Without error, perform all postflight procedures.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. The unmanned aircraft crewmember's (UAC's) will accomplish all postflight checklist procedures.

2. The UACs will ensure that the Tactical Automated Landing System (TALS) is placed in the standby mode, lights are turned off, transmitters are turned off, ground data terminal (GDT) is stowed, video cassette recorder (VCR) and Versa Module Eurobus (VME) recorders are stopped, and controlling agencies are notified of recovery (for example air traffic control [ATC], range control).

3. The unmanned aircraft operator (AO) will correctly fill out the system logbooks, ensuring all deficiencies are annotated.

REFERENCES: Appropriate common references.

TASK 2000

Perform Cold Weather Operations

CONDITIONS: Given a Shadow system or simulator or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

a. The mission commander (MC) will direct the ground crew to complete the designated elements of preflight preparations. The aircraft operator (AO) will verify the removal of all snow or ice from all surfaces.

b. The ground crew will complete the assigned checks and report the results to the MC and AO.

c. Warm-up and Ground Operation. A longer duration may be required to reach designated rotor temperature.

2. Procedures. The ground crew will perform the following actions:

a. Before Engine Start. Check all controls for full travel and freedom of movement.

b. Before Launch. If the possibility of ice accumulation on flight surfaces exists, do not attempt to takeoff.

REFERENCES: Appropriate common references.

TASK 2005

Perform Desert and Hot Weather Operations

CONDITIONS: Given a Shadow system, simulator, or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions

a. The mission commander (MC) will direct the crew to complete the designated elements of preflight preparations. The aircraft operator (AO) will verify the removal of all sand or dirt from all surfaces.

b. The ground crew will complete the assigned elements and report the results to the MC and AO.

2. Procedures. The ground crew will perform the following actions:

a. Before beginning preflight, ensure the aircraft interior is free of sand and dust.

b. Before Engine Start. Check to ensure that the landing gear struts are free of sand and dirt.

c. Engine Start. Use normal starting procedure. Be aware that a higher-than-normal cylinder head temperature (CHT) and rotor temperature may occur, and be prepared to abort the start before temperature limitations are exceeded.

d. Warm-up and Ground Operation. Use standard procedures for warm-up and ground operations.

e. Launch. Use standard takeoff procedures.

Note. Takeoff should not be attempted during a sandstorm or dust storm. Also note that during hot weather operations, the unmanned aircraft (UA) may take longer to climb owing to high CHT and rotor temperatures. **If necessary, climb using smaller increments to prevent overheating.**

f. During Flight. To minimize damage to the aircraft and the related systems, use normal procedures but avoid flying through sands storms or dust storms when possible.

g. Landing. Use standard landing procedures.

h. Before Storing the Aircraft. Use standard procedures, taking extreme care to prevent sand and dust from entering the fuel and oil systems while servicing the aircraft. Install all protective covers to prevent sand and dust accumulation.

Note. If the fuel tanks are filled completely, expansion may cause fuel to overflow.

REFERENCES: Appropriate common references.

TASK 2010

Discuss Turbulence and Thunderstorm Operations

CONDITIONS: Given a Shadow system or simulator or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. When flying in inadvertent or unforecasted turbulence or thunderstorms, the mission commander (MC) will ensure that the crewmembers are familiar with the procedures for flying in turbulence and thunderstorms.

2. Procedures. If turbulence is encountered, the crewmember will immediately establish the appropriate airspeed as described in the aircraft operator's manual. The MC should direct the aircraft operator (AO) to request a change of route or altitude that will provide smoother air, if that option is available, from air traffic control (ATC).

Note Inclusion of this task in the air training manual (ATM) is not intended to imply that the crewmember should operate in turbulence and thunderstorms. Avoidance is the best procedure.

Note Lightning within 10 nautical miles of the launch and recovery site may preclude flight operations.

REFERENCES: Appropriate common references.

TASK 2015

Perform Mountain Operations

CONDITIONS: Given a Shadow system or simulator or in a classroom environment.

STANDARDS:

1. Correctly perform or describe the appropriate procedures according to the listed references.

2. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The unmanned aircraft operator (AO) will review the operator's manual regarding line-of-sight limitations and be familiar with mountain-flying hazards.

2. Procedures. The crewmembers will perform the following actions:

a. Preflight. Complete a detailed performance evaluation to determine if any operating limitations will be encountered.

b. Starting Engine(s). Use normal starting procedures.

c. Launch. Use normal takeoff procedures.

d. During Flight. Use normal procedures. Be alert for clear air turbulence that may be encountered because of uneven terrain and wind variations.

e. Landing. Use normal landing procedures.

Note. Many mountain landing strips or runways are not level. Unless local conditions dictate otherwise, always land uphill.

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3. Before Storing the Aircraft. Use normal procedures. Ensure the unmanned aircraft system (UAS) is properly secured. (In mountainous areas, the possibility of severe and rapidly changing weather is greater than normal.)

REFERENCES: Appropriate common references.

TASK 2018

Recommend/Reconnoiter Drop Zone/Landing Zone/Pickup Zone

CONDITIONS: Given a Shadow system, simulator, or in a classroom environment.

STANDARDS:

1. Landing Zone/Pickup Zone

   a. Perform map, photo, or visual reconnaissance of the assigned area.

   b. Determine that the drop zone/landing zone/pickup zone (DZ/LZ/PZ) is suitable for the mission (size, number of aircraft, type of cargo).

   c. Provide accurate and detailed information to organic or supported unit.

2. Holding Area (HA). Confirm suitability of a HA.

DESCRIPTION:

1. Crew Actions

   a. The crew will confirm the location of plotted hazards and record the location of unplotted hazards. They will perform the reconnaissance using the appropriate sensors. The mission commander (MC) will confirm suitability of the area.

   b. The aircraft operator (AO) will remain oriented on the proposed HA or LZ.
   The AO is responsible for obstacle avoidance.

   c. The mission payload operator (PO) will perform the reconnaissance of the DZ/LZ/PZ/HA.

2. Procedures

   a. Landing Zone/Pickup Zone. The initial selection or reconnaissance of an DZ/LZ/PZ/HA begins with the analysis of maps aviation mission planning station (AMPS) or paper, photos, and intelligence preparation of the battlefield (IPB)(S-2/S-3). When a reconnaissance flight is executed, the crew should refrain from loitering over or making more than one pass over the area if visual or audio disciplines are of concern. Determine the suitability of the DZ/LZ/PZ/HA by considering applicable tactical, technical, and meteorological elements. The video and crew debrief can be used to strengthen the pre-mission analysis. The reconnaissance data should be recorded on a worksheet.

      (1) Tactical

         (a) Mission. Determine if the mission can be accomplished from the selected DZ/LZ/PZ/HA. Consider flight time, fuel, number of sorties, and access routes.

         (b) Location. If conducting a reconnaissance for an insertion mission, consider the distance of the DZ/LZ/PZ/HA from the supported unit or objective, and the supported unit's mission, equipment, and method of travel to and from the DZ/LZ/PZ/HA.

         (c) Security. Consider the size and proximity of threat elements versus the availability of security forces. Consider cover and concealment, key terrain, and

avenues of approach and departure. The area should be large enough to provide dispersion.

(2) Technical

(a) Number of Aircraft. Determine if the size of the DZ/LZ/PZ/HA will support the type and amount of aircraft that will be landing to the ground or hovering, as part of multi-ship operations. It may be necessary to provide an additional LZ nearby, or land aircraft at the same site in successive flights.

(b) DZ/LZ/PZ/HA Shape. Vertical Obstacles and actual landing area surface condition will support operations by aircraft at/near their maximum operational gross weight.

(c) Surface Conditions. Consider slopes and blowing sand, snow, or dust. Be aware that vegetation may conceal surface hazards (for example, large rocks, ruts, or stumps). Areas selected should also be free of sources of rotor wash signature. If the area is wet, consider the effects of mud and aircraft weight.

(d) Size of LZ or HA. The area around the DZ/LZ/PZ/HA should be clear of obstacles that could cause aircraft damage. Situation depending, consideration should be given to plotting obstacles. Target location and target store may be used to determine the size of the DZ/LZ/PZ/HA.

(e) Obstacles. Hazards within the LZ that cannot be eliminated must be plotted.

(f) Approach or Departure Direction. The direction of approach or departure should be over the lowest obstacles and generally into the wind with mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC) considered.

(g) Vulnerability. Consideration must be given to the vulnerability of ground troops in the LZ during air assault operations and to helicopters in the HA.

(3) Meteorological

a. Ceiling and Visibility. Must be considered in order to prevent inadvertent instrument meteorological conditions (IMC).

(1) Winds. Determine approach and departure paths.

(2) Density Altitude. High density altitude may limit loads and, therefore, require more sorties.

b. Holding Area. All of the following items will be considered when selecting a HA.

(1) Cover and concealment.

(2) Obstacles within the HA.

(3) Key terrain.

(4) Avenues of approach and departure.

(5) Security.

NIGHT CONSIDERATIONS: Unimproved and unlit areas are more difficult to evaluate at night

because of low contrast. Knowledge of the various methods for determining the height of obstacles is critical to successfully completing this task. Visual obstacles should be treated the same as physical obstacles. DZ/LZ/PZ/HA will require a larger area at night. Details of the landing area will be more difficult to see.

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

MOUNTAIN/PINNACLE/RIDGELINE CONSIDERATIONS: Evaluate the suitability of the area, paying particular attention to density altitude and winds. Determine a suitable path for a go-around. Operations at high altitudes are more likely to expose the aircraft to visual detection and radar and heat seeking weapons.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2019

Perform Route Reconnaissance

CONDITIONS: Given a Shadow system or simulator or in a classroom environment.

STANDARDS:

1. Correctly perform route reconnaissance.

2. Make an accurate and detailed report.

3. Correctly perform crew-coordinated actions.

DESCRIPTION:

1. Crew Actions

a. The aircraft operator's (AO's) main focus will be on maintaining data link with the ground data terminal and monitoring the flight and engine instruments. The AO's second consideration will be on maintaining the unmanned aircraft (UA) in the optimum range of depression and bearing from the target to acquire video of the route/road.

b. The mission payload operator's (PO's) main focus will be on maintaining the video crosshairs on the target to provide the AO with a steady, accurate depression angle and bearing to maneuver the unmanned aircraft system (UAS) around. The PO will also coordinate closely with the AO to maintain the optimum depression angle or bearing drifting away from the desired limits. The PO will also keep the AO informed of any obstructions encountered so the AO can maneuver the UAS to maintain a clear line of sight to the road/route.

2. Procedures. The crew will perform the following actions:

a. The PO will verify the start point, the direction of the road/route search, the type of maneuver required to perform the search and will coordinate this information with the AO. The PO will verify a low rate of camera movement and a narrow field of view have been selected to facilitate obtaining satisfactory video of the road/route and the immediate area. When the AO maneuvers the UAS into a position with the optimal depression based on mission requirements, the PO will begin the road/route scan. The PO will maintain the video crosshairs centered on the road and perform the road/route scan until a target is encountered or the UA no longer is in position to maintain a optimal depression angle based on mission requirements. At this time, the PO will stop the scan and hold the position on the road until the AO again maneuvers the UAS into a position where the depression angle is optimal based on mission requirements. The PO will then resume the road/route scan. The AO and PO will coordinate any trends in the depression angle, bearing, obstructions, or maneuvers that will affect collecting video.

b. On a straight road search, the AO will maintain a moving racetrack parallel to the road. The AO will maintain the base leg closest to the road and in the direction of the road search at a distance 1.5 to 2 kilometers (approximately 60-degree depression angle). When the depression angle becomes 45 degrees or higher, the AO will begin a 10- to 20-degree bank turn away from the road to a reciprocal heading from the base leg heading. When the bearing to the PO's stop point is approximately 120 degrees off the nose of the UAS, the AO will start a turn back to the base leg heading that parallels the road using 10 to 20 degrees of bank. When the depression angle is optimal based on mission requirements the PO will reinitiate the road scan.

c. When a static target is encountered, the PO will maintain the video crosshairs on the target to provide the AO an accurate and stable depression angle and bearing by which to maneuver the UAS around the target. The AO, in coordination with the PO, will establish a UAS maneuver pattern to maintain the target below the desired depression angle.

d. When a moving target is encountered, the PO will maintain the video crosshairs on the target as it moves along the road. The AO will maintain the UAS in a position to maintain a depression angle that is optimal based on mission requirements. The AO will perform the racetrack maneuver being aware that the reciprocal heading leg will be much shorter since the target will be moving away from the UAS. At a bearing of approximately 120 degrees off the nose of the UAS, the AO will begin the turn back with the base leg heading paralleling the road.

e. For a curved/hidden road search, the AO and PO must coordinate to determine which side of the road is best for observation, where obstructions might occur, and what maneuvers to perform in the event that obstructions are encountered. The AO may have to maneuver the UAS from one side to the other or fly down the center of the road to avoid obstructions to the road search and maintain a depression angle that is optimal based on mission requirements.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2025

Conduct Digital Communications

CONDITIONS: Given a Shadow system or simulator.

STANDARDS:

1. Ensure proper configuration of ground control station (GCS) tactical local area network TACLAN network as required.

2. Configure the GCS command, control, communications, computers, and intelligence (C4I) software as required.

3. Exchange C4I messages using common message processor (CMP) and Tactical Communications TACOMM.

4. Perform file transfer protocol (XFTP) file transfer protocol between consoles.

5. Without error, send closed captioned telemetry.

6. Correctly perform crew coordination procedures.

DESCRIPTION:

1. Crew Actions

a. The mission commander (MC) will provide several items of configuration data for the (P)GCS. The mission payload operator (PO) will have primary responsibility for C4I operations, but the unmanned aircraft operator (AO) will be required to properly configure their console.

b. Upon receiving configuration data, the AO and PO will configure their respective consoles.

c. The AO and PO will bring up required C4I programs during preset checklist.

d. The PO will use the additional configuration data to input address information as required into the CMP.

2. Procedures

a. The PO will perform XFTP between consoles.

b. Upon takeoff, the PO will message the launch time via C4I.

c. Throughout the flight, the PO will respond to any messages received and provide target information as applicable via C4I.

Note. Many missions will appear similar. Always verify mission load before entering mission mode during flight.

REFERENCES: Appropriate common references.

TASK 2054

Perform Target Hand Over to an Attack Helicopter

CONDITIONS: Given a Shadow system or simulator or in a classroom environment.

STANDARDS:

1. Complete target hand over without error.

2. Use the communications procedure that will best accomplish the mission.

3. Provide the proper security during the attack.

4. Correctly perform crew coordination actions.

DESCRIPTION: Using the proper radio phraseology, and signal operating instructions (SOI) procedures, the crew will alert the attack helicopter, describe the target, and give its location. Both the unmanned aircraft system (UAS) and the attack aircrews must understand the method for locating the target, the execution command, and postattack method. The standardized elements for target hand over are as follows:

1. Alert and Target Description. This alerts the attack helicopter that a target hand over is about to occur. It identifies the sender and describes the target (type, number, and activity); for example, "K13 (AH-64), this is KO6 (UAS), three tanks and four BMPs moving west."

2. Target Location. The unmanned aircraft crewmember (UAC) gives the direction of the target in degrees and range from the battle position (for example, "120 degrees at 2,800 meters"). The UAC may reference from a known point (for example, the target reference point or the engagement area) or use grid coordinates.

3. Method of Attack. The UAC describes the planned scheme of maneuver, fire distribution, and maneuver for the attack; for example, "Attack targets west of north-south road."

4. Execution. The UAC gives the command to initiate the attack. The two commands are as follows:

   a. "At my command." The attack helicopter engages when the UAC says, "Fire."

   b. "When ready." The attack helicopter fires when ready. Assume "When ready" when no other command of execution is given.

   c. Post-attack Method. The attack helicopter unmasks to evaluate the effect on the target and begins planning subsequent engagements. The UAC describes ingress and egress routes into the new positions; for example, "Move to holding area 4; on order, attack from battle position 21."

REFERENCES: Appropriate common references and FM 1-112 and FM 1-114.

TASK 2066

Perform Zone Reconnaissance

CONDITIONS: Given a Shadow system or simulator or in a classroom environment.

STANDARDS:

1. Conduct thorough mission planning in accordance with task 1402.

2. Conduct a detailed map reconnaissance.

3. Make specific and timely reports about information obtained during the zone reconnaissance.

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. A zone reconnaissance is conducted to obtain information about natural and manmade features within specified boundaries. The purpose may be to locate suitable routes of advance for main elements (air or ground) or to find the enemy. The aircrew must reconnoiter the zone in a systematic manner.

2. After receiving the mission assignment, the crew should conduct a detailed map reconnaissance and analyze the known enemy situation according to the factors of mission, enemy, terrain and weather, troops and support available, time available, and civilian considerations (METT-TC). Then the unmanned aircraft operator (AO) should select the altitudes and waypoints that will best accomplish the mission.

3. A zone reconnaissance is a detailed reconnaissance. Therefore, the crew must check—

a. Fording sites.

b. Trails for recent use.

c. Densely wooded areas for stay-behind or ambush units.

d. Bridges for condition, location, demolition, and classification.

e. Hilltops and dominant manmade features for observation posts.

4. The AO flies the mission on the predetermined route or another route if required by the situation. The mission payload operator (PO) uses the sensors at optimum standoff ranges to clear terrain and detect possible enemy activity. The unmanned aircraft operator (AO) maintains navigation within specified boundaries unless authorized to cross them.

5. The crew must report the evidence or absence of enemy activity. They must also provide specific reports about route conditions, checkpoint times, and any other information requested. Reports must be timely and specific.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2067

Perform Area Reconnaissance

CONDITIONS: Given a Shadow system or simulator or in a classroom environment.

STANDARDS:

1. Conduct thorough mission planning in accordance with task 1402.

2. Conduct a detailed map reconnaissance.

3. Make specific and timely reports about information obtained during the area reconnaissance.

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Auto Search. Provides the mission payload operator (PO) with the ability to methodically control an area search without having to control the payload manually. The two search types available to the operator are point and pattern (line and area). Searches are created using the mission planner.

a. Point Search. The PO selects the initial location for the search to begin, then the payload slowly spirals the camera outward from the center in a clockwise direction. The spiral pattern is based on the following predefined factors: camera field of view (FOV), camera type, and overlap.

b. Pattern (Area) Search. The mission planner is used during preflight or just prior to starting the search to define the search polygon. The steps of the search pattern are calculated just prior to starting the search based on unmanned aircraft (UA) height above the ground and sensor FOV.

c. The unmanned aircraft operator (AO) will follow the pattern the PO has created.

2. Manual Area Search.

a. Search an area measuring approximately 1x1 kilometer:

(1) The unmanned aircraft operator (AO)/PO will first plot the area on the appropriate map to check the area and size and then create a mission plan outlining the area to be searched.

(2) The AO will establish a hold mode above the center point of the area to be searched.

(3) The PO will scan the area in a preplanned pattern to cover the entire area. Coverage parameters in the options menu on the sensor control panel may be selected to view coverage splotches on the scrolling map to facilitate complete and accurate coverage of the area to be searched. The PO will zoom in and out to observe the area to be searched.

b. Search an area measuring larger than 1x1 kilometer:

(1) The AO/PO will first plot the area on the appropriate map to check the area and size and then create a mission plan outlining the area to be searched.

(2) The AO will maintain at least a 45-degree depression angle for each point searched.

(3) The PO will scan the entire area using a preplanned pattern to cover the entire area. Coverage parameters in the options menu on the sensor control panel may be selected to view coverage splotches on the scrolling map to facilitate complete and accurate coverage of the area to be searched. The PO will zoom in and out to observe the area to be searched.

REFERENCES: Appropriate common references and FM 1-114.

TASK 2092

Transmit a Tactical Report

CONDITIONS: Given a Shadow system or simulator or in a classroom and given sufficient information to compile a tactical report.

STANDARD: Transmit appropriate report using the proper format.

DESCRIPTION:

1. Crew Actions

a. The unmanned aircraft operator (AO) is responsible for aircraft control and obstacle avoidance. The AO will coordinate with the mission payload operator (PO) as to who will make the report.

b. The designated crewmember will prepare the information for the report and coordinate with the mission commander (MC) prior to sending it.

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

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

(1) Call sign of observer.

(2) SALUTE.

(a) S—size.

(b) A—activity.

(c) L—location.

(d) U—unit (if known).

(e) T—time.

(f) E—equipment.

(3) What you are doing about it.

b. Battle Damage Assessment (BDA) Report. Submit a BDA report following naval gunfire, artillery fire (if requested), or a tactical air strike.

(1) ALPHA: Call sign of observing source.

(2) BRAVO: Location of the target.

(3) CHARLIE: Time the strike started and ended.

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

(5) ECHO: Itemized destruction.

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

c. Enemy Shelling, Bombing, or Chemical, Biological, Radiological, and Nuclear (CBRN) Warfare Activity Report. Submit this report following enemy shelling, bombing, or CBRN warfare activity.

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

(2) BRAVO: Position of observer (grid coordinates in code).

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

(4) DELTA: Time from (date-time of attack).

(5) ECHO: Time to (for illumination time).

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

(7) GOLF: Number and nature of guns, mortars, aircraft, or other means of delivery, if known.

(8) HOTEL: Nature of fire (barrage, registration, and so forth) or CBRN-1 type of burst (air or surface) or type of toxic agent.

(9) INDIA: Number and type of bombs, shells, rockets, and so forth.

(10) JULIETT: Flash-to-bang time in seconds.

(11) KILO: If CBRN-1, damage (in code) or crater diameter.

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

(13) MIKE: If CBRN-1, cloud height (state top or bottom) 10 minutes after burst.

(14) NOVEMBER: If CBRN-1, cloud width 10 minutes after burst.

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

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d. Meaconing, Intrusion, Jamming, and Interference Report. Once jamming is discovered, report the interference as soon as practicable to higher headquarters.

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

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

(3) Line 3: Location (your grid location).

(4) Line 4: Frequency affected (frequency).

(5) Line 5: Type of equipment affected (ultra high frequency [UHF], very high frequency [VHF], frequrncy modulation (FM), and so forth).

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

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

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

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

(10) Line 10 Operator's name and rank.

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

REFERENCES: Appropriate common references and FM 3-11 and FM 2-0.

TASK 2162

Call for and Adjust Indirect Fire

CONDITIONS: In a ground control station (GCS), simulator, or orally in a classroom environment.

STANDARDS:

1. The mission payload operator (PO) will positively identify the target and perform the call for fire and artillery adjustment checklist following the instructions step by step.

2. Upon positive identification of the target, the unmanned aircraft operator (AO) will orbit above or to one side of the target in order to provide a 60 degree depression angle to the target.

3. The AO and PO will coordinate who will freeze the video and perform the call for fire and artillery adjustment function to be communicated to the artillery unit (suggest the AO perform the video freeze and adjustment functions to free the PO to maintain the crosshairs on the target at all time).

4. Correctly perform crew coordination actions.

DESCRIPTION:

1. Crew Actions. The AO's main focus will be on the flight and data link instruments to ensure the unmanned aircraft (UA) is responding to all inputs correctly and is maintaining continuous link with the ground data terminal. The PO's main focus will be to locate and identify the target. The focus of the AO and PO will then be to coordinate and follow the checklist to accomplish an artillery adjustment on the target.

a. PO Actions. The PO will coordinate the checklist with the AO to ensure all item are accomplished in order. The PO will maintain the video crosshairs on the target, especially prior to the video being frozen, for the artillery adjustment function to be performed and during the period the AO's video is frozen.

b. AO Actions. The AO will maintain an orbit above or to the side of the target. The AO will maintain the UA in a 60-degree depression angle or better prior to freezing the video. Upon freezing the video, the AO will perform the artillery adjustment procedure and provide the data to the firing artillery unit.

2. Procedures

a. Planned Targets. Planned targets may be scheduled or on call. They should be planned against confirmed, suspected, or likely enemy locations and on prominent terrain to serve as reference points for shifting fires onto targets of opportunity.

b. Unplanned Targets. Targets of opportunity are engaged by grid or shift from a known point. Subsequent indirect artillery adjustments are made based on a reference line and indirect aerial fires can be adjusted similarly.

c. Call-for-Fire Elements. The call-for-fire elements are—

(1) Observer identification (appropriate call sign).

(2) Warning order (type mission; for example, adjust fire, fire for effect, suppression, immediate suppression).

(3) Location of target (grid coordinates, known location designation, shift with appropriate reference line).

(4) Description of target.

(5) Method of engagement (type adjustment, trajectory, ammunition, or distribution desired).

(6) Method of fire and control (for example, "At my command" or "When ready").

Note. Compass directions are sent to the fire direction center (FDC) in mils. If the direction is in degrees, the observer must so indicate.

Note. When using a spotting line for adjustments, the FDC will assume that the gun-target line is used unless otherwise specified by the observer.

Note. If the observer is using a spotting line and repositions the aircraft, the observer must inform the FDC if the spotting line changes by 5 degrees or more.

REFERENCES: Appropriate common references, FM 3-40.140, and FM 6-30.

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

AGL	above ground level
AGR	Active Guard and Reserve
AMPS	aviation mission planning station
AO	unmanned aircraft operator
APART	annual proficiency and readiness test
AR	Army regulation
ARNG	Army National Guard
ARTEP	Army Training and Evaluation Program
ATC	air traffice control
ATM	aircrew training manual
ATP	aircrew training program
AV	air vehicle
AVCR	airborne video cassette recorder
AVLD	air vehicle location display
BDA	battle damage assessment
BMP	Boyevaya Mashina Pyekhoty (Russian-designed equipment)
C4I	command, control, communication, computers, and intelligence
CBRN	chemical, biological, radiological, and nuclear
CCA	computer console assembly
CHT	cylinder head temperature
CL	checklist
CMD/RPT	command/report
CMP	common message processor
CONUS	continental United States
CRM	composite risk management
CTL	commander's task list
DA	Department of the Army
DAC	Department of the Army civilian
DART	downed aircraft recovery team
DOD	Department of Defense
DZ	drop zone
EMP	enhanced mission planner
EO	external operator
ETA	estimated time of arrival
ETE	estimated time en route

ETM	electronic technical manual
ETP	exportable training plan
FAC	flight activity category
FAR	Federal Aviation Regulation
FDC	fire direction center
FHP	flying-hour program
FIH	flight information handbook
FLIP	flight information publication
FM	frequency modulation
FOV	field of view
FREQ	frequency
GCS	ground control station
GDT	ground data terminal
GPS	Global Positioning System
HA	holding area
HF	high frequency
IAS	indicated airspeed
IATF	individual aircrew training folder
ICAO	International Civil Aviation Organization
ID	identification
IFF	identification friend or foe
IFRF	individual flight record folder
IMC	instrument meteorological conditions
IO	instructor operator
IPB	intelligence preparation of the battlefield
IR	infrared
KIAS	knots indicated airspeed
KIT	keyable identification transponder
LRS	launch recovery station
LZ	landing zone
MC	mission commander
MCU	mission control unit
MEDEVAC	medical evacuation
METL	mission-essential task list
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, and civilian considerations
MMP	modular mission payload
MOPP	mission-oriented protective posture
MOSP	multimission optronic stabilized platform
MTF	maintenance test flight
MTP	mission training plan

NA	not applicable
NAS	National Airspace System
NCO	noncommissioned officer
NGR	National Guard regulation
NOTAM	Notice to Airmen
NVD	night vision devise
PCS	permanent change of station
PFE	proficiency flight evaluation
PGRM	Program
PO	mission payload operator
PZ	pickup zone
RH	return home
RIW	recovery initiation window
RL	readiness level
ROZ	restricted operating zone
RPM	revolutions per minute
RVT	remote video terminal
S	Satisfactory
SALUTE	size, activity, location,unit, time, equipment
SAT	systems approach to training
SO	standardization instructor operator
SOI	signal operating instructions
SOP	standing operating procedure
SPINS	special instructions
SSN	social security number
STX	situational training exercise
TACCOM	tactical communications
TACLAN	tactical local area network
TALS	Tactical Automated Landing System
TB	technical bulletin
TC	training circular
TDA	table of distribution and allowance
TDP	touch down point
TDY	temporary duty
TM	technical manual
TOE	table of organization and equipment
TOT	time over target
U	Unsatisfactory
UA	unmanned aircraft
UAC	unmanned aircraft crewmember
UAS	unmanned aircraft system

UHF	ultra high frequency
USAAWC	United States Army Aviation Warfighting Center
USAR	United States Army Reserve
UT	unit trainer
VCR	video cassette recorder
VFR	visual flight rules
VHF	very high frequency
VMC	visual meteorological conditions
VME	Versa Module Eurobus
XFTP	X-file transfer protocol
XPDR	Transponder

SECTION I I–TERMS

V_a	maximum designed maneuvering speed
V_b	turbulence penetration speed
Vf	design flap speed
Vfc	maximum flap extended speed
Vlof	lift-off speed (rotation speed +3 knots)
Vne	never exceed speed
Vr	rotation speed
Vref	indicated airspeed that the aircraft should have on the approach path when the aircraft is approximately 50 feet higher than the intended touchdown point, in the landing configuration. It is the approach speed shown in the aircraft operator's manual.
Vs	power-off stall speed
Vso	stall speed in landing configuration
Vx	best angle-of-climb speed
Vy	best rate-of-climb speed
Vyse	best rate-of-climb speed, single engine

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TC 1-600
23 August 2007

By order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0721405

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