

ARI Contractor Report 2002-06

Aircrew Coordination Exportable Training Package Instructor Guide

United States Army Aviation Center

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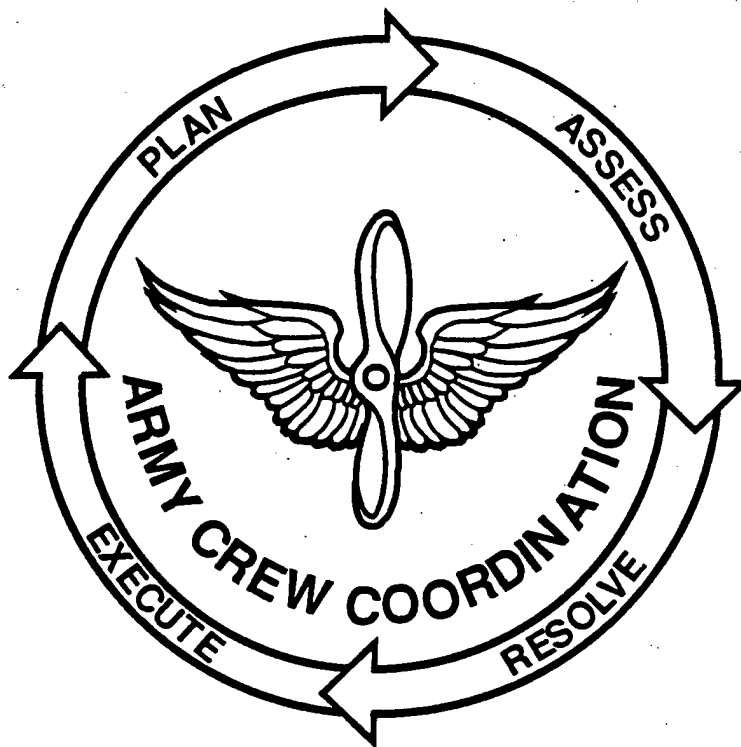
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**United States Army Aviation Center
Fort Rucker, Alabama**



**AIRCREW COORDINATION
EXPORTABLE TRAINING PACKAGE
INSTRUCTOR GUIDE**

December 1992

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Introducing the Instructor Guide

The Aircrew Coordination Course Instructor Guide contains two complete courses: The Aircrew Coordination Trainer Course (outline format for note taking) and the Aircrew Coordination Course (lesson plan format for course conduct). Also included in the instructor's package is the Aircrew Coordination Course Student Guide and the reproducible materials required to support instruction. The course guides and reproducible materials are described in detail below. Following the description of this material, the procedures to conduct the Aircrew Coordination Course are provided.

..... Description of the Course Guides and Reproducible Materials

As stated above, the Aircrew Coordination course instructor package includes two course guides, which together with the necessary reproducibles, are required to conduct the classroom, simulator, or flight instruction.

The two course guides are the:

- Aircrew Coordination Course Instructor Guide

The *Instructor Guide* is used by unit instructors (unit IPs, UTs, and IOs) 1) to take notes during the Trainer Course and 2) to conduct the Aircrew Coordination Course.

- Aircrew Coordination Course Student Guide

The *Student Guide* is used by the aircrews for note taking and reference purposes while attending the Aircrew Coordination Course.

The reproducibles, which are contained in the Reproducible Box, include the material that is used during the conduct of the courses and, therefore, cannot be reused in subsequent courses; thus, this material must be reproduced before the start of each new course. The most cost effective means of reproduction is to have materials printed through the local Training Aids Support Center (TASC). The reproducible materials are listed in the following table and are noted in text here and throughout the two guides where appropriate.

Reproducible Materials

Materials	Guide and section in which the material is located
Student Read-Aheads	<i>Instructor Guide, Appendix A.</i> Instructors will provide unit aircrews with Student Read-Ahead 1 prior to the pretraining ride and Student Read-Ahead 2 subsequent to the pretraining ride.
Grade Slips	<i>Instructor Guide, Appendix C.</i> Grade slips are used by unit instructors to evaluate aircrew coordination. As such, sufficient numbers must be reproduced prior to the start of each new course and distributed as necessary.
Practical Exercises	<i>Instructor Guide, Appendix G.</i> Instructors will pass out to students during the Aircrew Coordination Course. Students will insert the exercises into Section 2 of their <i>Student Guide</i> .
Student Handout	<i>Student Guide, Section 1.</i> This is an outline form of the Aircrew Coordination Course on which the students will take notes. Before the start of each new course, instructors will reproduce this section and insert it into the <i>Student Guide</i> .

The following sections describe in detail each of the course guides, how the guides are used, and the reproducible materials supporting each course.

Instructor Guide

The *Instructor Guide* has an Introduction, five major sections, and supporting appendices. As stated earlier, unit instructors will use the *Instructor Guide* to take notes and to conduct the Aircrew Coordination Course. (Unit instructors will also be provided a copy of the *Student Guide* and instructed on how they will use it when they conduct the Aircrew Coordination Course.)

Introducing the Instructor Guide: The purpose and use of the *Instructor Guide* is explained, together with a description of the major parts and their function in the presentation of the Aircrew Coordination Course.

Section 1 - Course Introduction and Learning Objectives: Provides 1) an area for the recording of administrative data pertinent to the conduct of the Aircrew Coordination Trainer Course and 2) the terminal and enabling learning objectives of the course.

Section 2 - Methods of Instruction: Presents instructional techniques and background information on the unique features of the course necessary for unit instructors to effectively teach the course to aircrews of their respective organizations. Included in this section is the rationale underlying the structure of the course, an explanation of the interrelationships between the various components composing the course, and the instructional techniques recommended to effectively present the Classroom Instruction and the hands-on simulator or flight training instruction. This is an outline form of Section 2 of the Aircrew Coordination Trainer Course. It is provided for unit instructors to take notes for future reference when conducting the Aircrew Coordination Course.

Section 3 - Aircrew Coordination Course. Contains all of the information necessary for the unit instructors to subsequently teach the Aircrew Coordination Course to unit rated and nonrated crewmembers. The Aircrew Coordination Course will be taught in its entirety to the unit instructors. Being involved in the actual conduct of the Aircrew Coordination Course will provide the unit instructors with the necessary experience on which to base their own presentation of the course. The section is divided into three parts:

About the Aircrew Coordination Course: Provides unit instructors with the information necessary to conduct the Aircrew Coordination Course.

Classroom Instruction: Provides the 1) the administrative data pertinent to the conduct of the Aircrew Coordination Course, 2) the terminal and enabling learning objectives of the course, and 3) the information required by unit rated and nonrated crewmembers to understand and apply the principles of crew coordination during training and evaluation rides in the simulator or aircraft.

Simulator or Flight Training and Evaluation: Provides the hands-on opportunity for unit rated and nonrated crewmembers to apply, and be evaluated on the application of, the crew coordination principles learned in the classroom.

Section 4 - Evaluation Procedures and Scenario Development: Provides unit instructors with the information and techniques necessary to develop scenarios and to evaluate unit aircrews undergoing initial crew coordination training. Unit instructors are provided the hands-on opportunity to use the information and forms required to objectively evaluate aircrews on their application of the crew coordination principles. This is an outline form of Section 4 of the Aircrew Coordination Trainer Course. It is provided for unit instructors to take notes for future reference when conducting the Aircrew Coordination Course.

Section 5 - Scenario Familiarization and Evaluation: Introduces unit instructors to the types of scenarios best suited for the conduct of crew coordination training. Unit instructors will also be given hands-on practice at applying the evaluation procedures taught in the previous section through the rating of crews made up of fellow unit instructors. This is an outline form of Section 5 of the Aircrew Coordination Trainer Course. It is provided for unit instructors to take notes for future reference when conducting the Aircrew Coordination Course.

Appendix A - Student Read-Aheads: Because trainers and unit instructors will have to provide a copy of each of the two read-aheads contained in the appendix, they are provided as reproducibles and, therefore, can be prepared before the start of each new course and distributed as necessary. Unit instructors will provide unit aircrews with Student Read-Aheads 1 and 2 prior and subsequent to the pretraining ride, respectively.

Appendix B - Case Study Discussion Guide: Broken wing awards and Army aviation accident cases from the US Army Safety Center Aviation Safety Management Information System data base are provided to support discussion of each of the BQs discussed during the Aircrew Coordination Course. To assist unit instructors, the lesson plan refers to cases applicable to the BQs being discussed; after gaining experience in conducting the course, however, other examples may be preferred and used. Appendix D of the *Student Guide* mirrors this appendix except it lacks the instructor's case study discussion notes.

Appendix C - Grade Slips: Contains the modified grade slips to be used during initial aircrew coordination training. Because the grade slips used by the trainers and unit instructors to evaluate aircrew coordination are not reusable, they are provided as reproducibles. As such, sufficient numbers must be reproduced prior to the start of each new course and distributed as necessary.

Appendix D - Aircrew Coordination Evaluation Workshop: Practical exercises are provided to establish a consistent, standardized approach by unit instructors performing evaluations. Criterion-referenced standards in the form of behavioral rating guides will be used to achieve objective evaluator ratings.

Appendix E - Aircrew Coordination Evaluation Process: Contains the procedures for use by evaluators in evaluating aircrew coordination from the time the aircrew begins the premission planning process until the crew-level after-action review is completed.

Appendix F - Scenario Guidance: Contains guidelines for use by scenario developers. It is important that each scenario developed reflects the unit METL to effectively utilize training time available.

Appendix G - Practical Exercises: Contains hard copies of the reproducible practical exercises to be passed out to the aircrews during the Aircrew Coordination Course. The four practical exercises are Stress, Planning and Rehearsal, Hazardous Thought Patterns, and Communication. Because the exercises cannot be reused, they are provided as reproducibles and must be prepared in sufficient copies for each new course.

Student Guide

The *Student Guide* consists of an Introduction, the Student Handout, and supporting appendices. The Student Handout provides a valuable source of crew coordination information for use during continuation crew coordination training and crew readiness level performance checks. The appendices also contain supporting information necessary for instructor personnel to conduct the Aircrew Coordination Course. As a repository for supporting information discussed during the course, the appendices allow for upgrading to reflect current information without having to rewrite the entire *Student Guide*. (Note: In that they cannot be reused and contain notes taken during the Aircrew Coordination Course for future reference, Sections 1 and 2 of the *Student Guide* are retained by the students upon completion of the course. Instructors must reproduce Sections 1 and 2 and insert them into the guides for use in the next course.)

Introducing the Student Guide: Explains the use of the *Student Guide* and the various sections and appendices.

Section 1 - Student Handout: The Student Handout is an outline form of the information contained in Section 3 of the *Instructor Guide*. Sufficient white space is provided for the training aircrews to take notes as unit instructors conduct the Aircrew Coordination Course. As such, the Student Handout is not reusable and is provided as a reproducible that must be copied in sufficient numbers for each new course.

Section 2 - Practical Exercises: This section is provided as a place-holder for each of the four practical exercises as they are completed.

Appendix A - Hangar Talk: This appendix is a place holder for unit instructors to store recent FLIGHTFAX or other aviation-related documents covering crew coordination. In this way, current information may be provided to the unit aircrews between updates of the Aircrew Coordination Course.

Appendix B - Crew Coordination Errors: Definitions and Examples: Contains Army aviation accidents organized by the six aircrew coordination errors outlined in TC 1-210 and the ATMs. It provides another source for accident cases and a different point of view for selecting accidents to highlight specific crew coordination principles.

Appendix C - Selected Accidents by ATM Task: Provides Army aviation accidents organized by the ATM task being performed immediately before the onset of the emergency precipitating the accident. As with Appendix B, it provides another point of view from which to discuss violations of specific crew coordination principles.

Appendix D - Aircrew Coordination Case Studies: Mirrors Appendix B of the *Instructor Guide* minus the instructor discussion notes. Contains narratives of Army aviation accidents that may be selected for analysis during the Aircrew Coordination Course.

Appendix E - Aircrew Coordination Training Evaluation Guide: Contains the evaluation instructions for use in conjunction with the modified Aircrew Coordination Training Grade Slips. The grading and rating systems, rating factors, and behavioral anchors are also explained.

Appendix F - Simulator or Flight Mission Materials: Provides a listing of the materials required for the simulator or flight missions flown during the Aircrew Coordination Course.

Appendix G - Background Reading: Selected readings in crew coordination are provided to add depth to the topics discussed during the Aircrew Coordination Course. Readings are cited in the Aircrew Coordination Course lesson plan and the read-aheads. Readings will be discussed during the first hour of instruction subsequent to their assignment.

..... Procedures for Conducting the Aircrew Coordination Course

The Aircrew Coordination Course is used to train unit aircrews in the application of crew coordination principles to achieve the safe, efficient, and effective accomplishment of flying missions.

Unit instructors presenting the Aircrew Coordination Course must do the following:

1. Review the Course Description, Training Aids Index, and Special Instructions starting on page 3-1 of this guide.
2. Determine the number of unit aircrews attending the course and obtain sufficient copies of the *Student Guide* and the reproducible items to provide one set per rated and nonrated crewmember
3. Arrange with the simulator facility to obtain "canned" scenarios that may be modified to reflect appropriate unit METLs, or develop METL-based scenarios for use during Simulator or Flight Training. Appendix F of the *Instructor Guide* provides guidance for the development of scenarios.
4. Develop a simulator or flight schedule that ensures the pretraining rides are accomplished within two weeks prior to the course start date and that the two training rides and evaluation ride are accomplished within two weeks of the completion of Classroom Instruction.
5. Ensure that each rated and nonrated crewmember is provided:
 - a. Student Read-Ahead #1 at least one week prior to the pretraining ride
 - b. Student Read-Ahead #2 is provided upon completing the pretraining ride
6. Conduct the course as scheduled. Advise crewmembers to take notes on the Student Handout and to store their completed practical exercises in Section 2. Inform crewmembers that Sections 1 and 2 are theirs to take but that the remainder of the *Student Guide* must be returned. Answer all pertinent crewmember questions about the course prior to releasing them to comply with the simulator or flight schedule. Provide a telephonic contact point should any question arise subsequent to the course.
7. Ensure that an appropriate notation as to the completion of initial aircrew coordination training is made on each rated and nonrated crewmember's flight record.

Course Introduction and Learning Objectives

..... Introduction

1. Subject: Aircrew Coordination Trainer Course
2. Instructor(s): (Names and subjects; qualifications)
3. Administrative Announcements
 - Sign-in roster
 - Schedule
 - Latrines
 - Phones or message center
 - Food and drink arrangements
 - Instructional materials
4. Aircrew Coordination Trainer Course Structure
 - a. MOI for Classroom Instruction and Simulator or Flight Training and Evaluation portions of the Aircrew Coordination Course (2 hours)
 - b. The Aircrew Coordination Course (38 hours)
 - c. Evaluation Procedures and Scenario Development (5 hours)
 - d. Scenario Familiarization and Evaluation (6 hours)

..... Learning Objectives of the Aircrew Coordination Trainer Course

1. Terminal Learning Objective: Upon completion of training, unit instructors will be able to present and evaluate US Army crew coordination training.
2. Learning Objectives: Upon completion of training and using all furnished materials, unit instructors, without error, will be able to:
 - a. Describe the underlying structure of the Aircrew Coordination Course.
 - b. Employ the correct methods of instruction (MOI) for each portion of the Aircrew Coordination Course.
 - c. Present the Classroom Instruction portion of the Aircrew Coordination Course to unit crewmembers (rated and nonrated).
 - d. Conduct the mission-oriented Simulator or Flight Training and Evaluation portion of the Aircrew Coordination Course to reinforce the crew coordination principles learned in the classroom.
 - e. Evaluate the ability of unit crewmembers (rated and nonrated) to utilize crew coordination principles to achieve safe, effective, and efficient mission accomplishment.

Methods of Instruction

Methods of instruction for understanding and presenting the Classroom Instruction and Simulator or Flight Training and Evaluation portions of the Aircrew Coordination Course to rated and nonrated crewmembers (2 hours).

..... General

Methods of Instruction (MOI) prepares unit instructors to conduct the Classroom Instruction and simulator or flight portions of the Aircrew Coordination Course.

MOI instruction consists of 2 hours covering the unique features of the Aircrew Coordination Course and recommended techniques for presenting the material to the students.

Aircrew Coordination Course Structure

1. Classroom Instruction (Section 3) (18 hours)
2. Simulator or Flight Training and Evaluation (Section 3) (20 hours)
3. Framework Provided for Logical Flow of Subject Matter
 - Other aircrew coordination courses provide subjects in no particular order for use in the aviation environment. Subjects such as situational awareness may appear fourth in order of discussion, or eighth, depending on the course. Some subjects, such as team building, are not discussed at all.
 - This Aircrew Coordination Course provides a framework within which to discuss various subjects in a logical flow—as they would occur in the cockpit. This order is portrayed by the Crew Coordination Model.

-
- Another important organizer is the Crew Coordination in Army Aviation graphic.
 - Using this framework, it is now possible to place, or "glue," a given subject into the flow.
4. The Aircrew Coordination Course covers the historical background leading to its development; and the relationship between the Aircrew Training Manual (ATM) Crew Coordination Elements, the Crew Coordination Basic Qualities, and the Crew Coordination Objectives. Further, each Basic Quality will be defined, discussed in terms of supporting subjects, described in terms of performance criteria, and exemplified through use of actual Army aviation case studies.

Framework for understanding the Aircrew Coordination Course.

1. ATM Crew Coordination Elements form the basis for crew accomplishment of ATM tasks.
 - Crew coordination is built into the ATM tasks.
 - US Army Safety Center and US Army Research Institute accident analysis.
 - Results of the analysis will be covered.
2. ATM Crew Coordination Elements emphasize the interaction of crewmembers (communications) and actions (sequence and timing) to accomplish the ATM task to standard.
 - Will define crew coordination.
 - "Communications" and "sequence and timing of actions" are stressed.
 - Crew coordination task-specific standards.
3. Tells aircrews what is expected of them and how they will be evaluated.
4. ATM Crew Coordination Elements (Chapter 1, TC 1-210; Chapter 6, applicable ATM).
 - a. Communicate positively
 - b. Direct assistance
 - c. Announce actions
 - d. Offer assistance

-
- e. **Acknowledge actions**
 - f. **Be explicit**
 - g. **Provide aircraft control and obstacle advisories**
 - h. **Coordinate action sequence and timing**

5. **Aircrew Coordination Basic Qualities are used to assess the utilization of crew coordination principles by the aircrew. Collectively, the Basic Qualities indicate the achievement of the Crew Coordination Objectives.**

- a. **The Basic Qualities are a mission-level instead of a task-level look at ATM task performance; i.e., considers the "synergistic" effect of crew communications and actions.**
 - **Synergism is the ability of two individuals to combine their talents.**
 - **Effect is considered across many tasks.**
 - **Overall effectiveness is in terms of mission performance.**
 - **Like a sheet of music.**
- b. **Will measure Basic Qualities using techniques discussed during the evaluation portion (Section 4) of the Trainer Course.**
- c. **Some Basic Qualities may not map directly to an ATM task but can be observed with respect to an aircrew's attitude or behavior.**
- d. **Aircrew Coordination Basic Qualities are:**
 - (1) **Establish and maintain flight team leadership and crew climate**

-
- (2) **Permission planning and rehearsal accomplished**
 - (3) **Application of appropriate decision making techniques**
 - (4) **Prioritize actions and distribute workload**
 - (5) **Management of unexpected events**
 - (6) **Statements and directives clear, timely, relevant, complete, and verified**
 - (7) **Maintenance of mission situational awareness**
 - (8) **Decisions and actions communicated and acknowledged**
 - (9) **Supporting information or actions sought from crew**
 - (10) **Crewmember actions mutually cross-monitored**
 - (11) **Supporting information or actions offered by crew**
 - (12) **Advocacy and assertion practiced**
 - (13) **Crew-level after-action reviews accomplished**
 - **Basically a new concept at the crew level**
 - **Must instill the habit through crew coordination training**
 - **Will discuss "how to" during the Aircrew Coordination Course**

-
6. Crew Coordination Model Shows the Crew Coordination Objectives:
 - a. Establish and Maintain Team Relationships
 - b. Mission Planning and Rehearsal
 - c. Establish and Maintain Workload Levels
 - d. Exchange Mission Information
 - e. Cross-Monitor Performance
 7. Crew Coordination Model Shows the Operator Functions:
 - a. PLAN: Planning element
 - b. ASSESS: Situation Awareness (SA) element
 - c. RESOLVE: Problem Solving and Decision Making (PS&DM) element
 - d. EXECUTE: Operational Task Execution (OTX) element
 - e. Replanning element
 8. The Crew Coordination Model shows the relationship of the Crew Coordination Objectives to the crew functions. Crew Coordination Objectives are:
 - a. Behaviors taught to, and expected from, the aircrew(s)
 - b. Embedded throughout every mission flown in Army aviation
 - c. Not rated but captured from grade slip Basic Quality data

-
- d. The core for the instruction in the Aircrew Coordination Course
 - Army crew coordination training different.
 - Army has defined crew coordination behaviors.
 - Can instill these desirable behaviors.
 9. As with the framework depicted by the logo discussed earlier, the Crew Coordination Model gives a logical flow to which crew coordination subjects may be "glued."
 10. Interrelationship between the ATM task Crew Coordination Elements, Basic Qualities, and Crew Coordination Objectives.
 - Crew Coordination in Army Aviation graphic goes from detailed actions at the ATM Crew Coordination Element to broad concept with Crew Coordination Objectives.
 - Cross-walk Chart also shows the relationship of the Crew Coordination Objectives, Basic Qualities, and Crew Coordination Elements.
 11. The Army has undertaken a multi-year research program wherein crew coordination components have been defined and evaluation materials developed. Evaluation uses rating guides that embody crew coordination requirements (will discuss after presentation of the Aircrew Coordination Course).
 - Major problem with other aircrew coordination courses is the lack of an evaluation procedure.
 - Many contend that crew coordination cannot be measured.
 - Army research has shown that crew coordination can be measured.

1. Instructor Guide
 - a. Contents
 - b. Introducing the Instructor Guide (Review)
 - c. Course Introduction and Learning Objectives (Section 1)
 - d. Methods of Instruction (Section 2)
 - e. Aircrew Coordination Course (Section 3)
 - (1) About the Aircrew Coordination Course
 - (a) Course Description
 - (b) Training Aids Index
 - (c) Special Instructions
 - (2) Classroom Instruction
 - (a) Course Introduction and Learning Objectives
 - (b) The Aircrew Coordination Course is organized by ATM Crew Coordination Elements, Basic Qualities, and Crew Coordination Objectives.
 - (c) Remarks in the left margin and body of the lesson plan (page 3-11) .
 - (d) Talking points are indicated by "bullets" (•)
 - (3) Simulator or Flight Training and Evaluation

f. Evaluation Procedures and Scenario Development (Section 4)

g. Scenario Familiarization and Evaluation (Section 5)

h. Appendix A - Student Read-Aheads

Contains two read-aheads for issue to the students. The first read-ahead is issued at least one week prior to the pretraining ride, if possible. The second read-ahead is issued immediately after the pretraining ride. Both read-aheads contain information necessary for the student to be properly prepared for the training activities.

i. Appendix B - Case Study Discussion Guide

Contains the case studies referenced in the lesson body. Each case study narrative contains analysis points of discussion covering the Crew Coordination Objectives, Basic Qualities, and ATM Crew Coordination Elements illustrated by the case. Several cases are positive examples from the Broken Wing Award files of the US Army Safety Center (USASC) that exemplify outstanding application of crew coordination principles. Case study narratives, without discussion points, are included in Appendix D (*Student Guide*) for use by the students. *Be sure to cover the explanatory information in Appendix D before discussing the case studies.*

j. Appendix C - Aircrew Coordination Training Grade Slips

Contains the modified grade slips used during aircrew coordination initial training.

k. Appendix D - Aircrew Coordination Evaluation Workshop

Provides the practical exercises used to establish a consistent, standardized approach to evaluations. Criterion-referenced standards in the form of behavioral rating guides will be used to achieve objective evaluator ratings.

l. Appendix E - Aircrew Coordination Evaluation Process

Contains the process used by evaluation personnel in evaluating unit aircrews.

m. Appendix F - Scenario Guidance

Contains scenario guidelines and examples for scenario developers.

n. Appendix G - Practical Exercises

Contains the practical exercises used in the Aircrew Coordination Course.

2. Student Guide: Contains the Student Handout and general information the students need to better understand the Aircrew Coordination Course instructional materials.

a. Contents

b. Introducing the Student Guide

c. Student Handout (Section 1)

d. Practical Exercises (Section 2) (Placeholder for the following PEs)

(1) The Stress Practical Exercise contains two tests.

(2) The Planning and Rehearsal Practical Exercise enables the students to practice prioritizing their planning and rehearsal actions to meet a time limited departure.

(3) The Hazardous Thought Pattern Practical Exercise contains self-administered exercises that may provide an indication of possible dangerous trends in decision making.

- Exercises use the "forced choice" method of selection. *Emphasize the instructions in the exercise introduction to minimize student reluctance to make the forced choices.*
- Understanding the notion of hazardous thought patterns is an important student building block for understanding several of the instructional components taught in the Aircrew Coordination Course.

(4) The Communications Practical Exercise provides practice in using clear terminology to describe a tactical location.

e. Appendix A - Hangar Talk

A place-holder for unit instructors to store recent FLIGHTFAX articles, other aviation-related publication articles, and short vignettes written by IPs covering accidents and aircrew coordination.

f. Appendix B - Crew Coordination Errors: Definitions and Examples

Contains aviation accidents organized by the six aircrew coordination errors outlined in TC 1-210 and the ATMs.

g. Appendix C - Selected Accidents by ATM Tasks

Provides aviation mishaps organized by the ATM task being performed immediately prior to the flight emergency.

h. Appendix D - Aircrew Coordination Case Studies

Contains the narratives of case studies that may be selected for discussion during the Aircrew Coordination Course. This section mirrors Appendix B of the *Instructor Guide*; however, instructor notes and analysis to identify Crew Coordination Objectives, Basic Qualities, and ATM Crew Coordination Elements are *not* provided in this appendix.

i. Appendix E - Aircrew Coordination Training Evaluation Guide

Contains the evaluation instructions under which students will be graded on ATM maneuvers and rated as to Basic Quality performance. A filled-in grade slip is provided to exemplify grades and ratings.

j. Appendix F - Simulator or Flight Mission Materials

Contains a listing of the materials required for the simulator or flight missions flown during the Aircrew Coordination Course.

k. **Appendix G - Background Reading**

Provides additional depth to the crew coordination topics discussed. Readings are cited in the lesson plan and the Student Handout for the Aircrew Coordination Course and should be assigned as outside reading. Instructors should introduce daily instruction by reviewing the outside reading assignments.

1. Case Studies (*Instructor Guide*, Appendix B and *Student Guide*, Appendix D)
 - a. Used to develop an understanding by the unit aircrews of the ATM Crew Coordination Elements, Basic Qualities, and Crew Coordination Objectives.
 - b. Student analytical findings are used by the instructor.
2. Videotape
 - a. Video vignettes will be used to provide examples for evaluation purposes, to provide attention-getters, and to visually illustrate several of the case studies.
 - b. Aircrew Coordination Course instructor will present the appropriate video vignette and then lead a discussion covering the crew coordination principles involved in the mishap.
 - c. Subsequent to the Trainer Course, the videotape will be provided.
3. Small Group Exercises
 - a. Employed to exemplify the formation of teams.
 - b. Instructors are encouraged to develop role-playing and other activities.
 - c. Basic element is the crew, both rated and nonrated members.
4. Facilitating
 - a. Pretraining ride, case studies, practical exercise reviews, past experience, and instructional points may lead to animated discussions among the participating aircrews.
 - b. Instructor must develop a "feel."
 - c. Remember this is a participatory type of course.

-
5. Simulator or Flight MOI
 - a. Conduct training in simulator if at all possible
 - (1) Standardization
 - (2) Environmental, maintenance, and other effects mitigated
 - b. Conduct in aircraft if:
 - (1) No simulator exists
 - (2) Simulator not effective for mission
 - c. Aircraft considerations
 - (1) Seating and IP participation
 - (2) Safety restrictions
 - (3) Environmental restrictions
 6. Scenarios (Familiarize during Scenario Familiarization and Evaluation instruction)
 - a. Scenario guidance is provided in Appendix F.
 - b. Simulator and flight materials required for scenarios are listed in Appendix F (*Student Guide*).
 - c. Terms "scenarios" and "situational training exercises (STX)" used interchangeably.
 - d. Scenarios should be based on the unit mission essential task list (METL).

-
- e. Instructional progression for aircrew coordination initial training rides.
 - (1) During the pretraining ride, the student crew will plan and fly a tactical mission-oriented scenario. This will allow the crew to participate in the type of mission flown in the course as well as to fly with a student buddy if not yet battle-rostered. (Baseline)
 - (2) During training ride 1, the instructor observes, evaluates, and provides instruction to reinforce crew coordination principles and ATM crew performance standards learned in the classroom. Feedback is provided frequently with a full critique following the crew-level after-action review. (Crawl)
 - (3) During training ride 2, the instructor will observe and evaluate; however, the crew will be expected to operate on its own. Subsequent to completing its crew-level after-action review, the instructor will provide feedback to the crew. (Walk)
 - (4) The third training ride will be evaluated to verify successful completion of aircrew coordination initial training. Remarks will be entered on the DA Form 759-1 for successful completion. (Run)
 - f. Continuation training aircrew coordination scenarios
 - (1) Instructor observes and evaluates
 - (2) Crew will be issued/reissued a Crew Readiness Level (CRL) rating

7. Mission Planning and Rehearsal

- a. Major contributor to mission success
- b. A simple fact: Crews that plan better perform better
- c. "Commander's Intent" very important and must be stressed

-
- d. Teach mission segment-by-segment analysis
 - e. Involve the entire crew
 - f. Crew-level mission briefing ties the plan together for all crewmembers
 - g. Utilize concepts such as the shared common understanding of the mission and the recognition of situationally dependent time constraints to enhance safety and improve mission effectiveness.
 - Shared common understanding.
 - Time constraints refer to being ahead or behind the aircraft.

8. Crew-Level After-Action Reviews

- a. The routine performance of crew-level after-action reviews must be instilled for individual crews.
- b. Important from lessons-learned aspect.
- c. Embodies such concepts as critique, inquiry, advocacy, assertion, feedback, reinforcement, confirmation, and team building.

9. The Ten Laws of Teaching

- a. The Law of Reduction
 - Reduce to one liners
 - Be concise

-
- b. The Law of Expansion
 - Explain vague or unfamiliar terms
 - Clarify the unclear; illustrate with real-life examples
 - c. The Law of Color
 - Unique personal examples
 - Illustrations that bring light!
 - d. The Law of Anchor
 - Premise, then relativity
 - Attach ideas to experience
 - e. The Law of Transition
 - Alert listeners to change
 - Verify change by questioning
 - f. The Law of Pace
 - Theme, departure; theme, departure;
 - Heavy, light; heavy, light;
 - Rapid, slow; rapid, slow;

g. The Law of Humor

- Defuse tension
- Ensure relativity to subject

h. The Law of Word Usage

- Assume nothing as to understanding
- Local slang
- Impressive words
- Scare words

i. The Law of Projection

- Tone of voice
- Inflection
- Volume

j. The Law of Summary

- Emphasize important points
- Summarize covered material by block
- Summarize coming material to create interest

Aircrew Coordination Course

ABOUT THE AIRCREW COORDINATION COURSE

Course Description

The Aircrew Coordination Course is a 38-hour course of instruction that includes Classroom Instruction and Simulator or Flight Training. Classroom Instruction covers the background, research, and application of crew coordination principles. During Simulator Training, for those aircraft having an appropriate simulator, crewmembers will apply crew coordination principles and techniques during the conduct of four mission-oriented simulator periods utilizing scenarios based on the unit mission essential task list (METL). (See Table 3-1, Simulator or Flight Training Rides, on page 3-13.)

One of the simulator periods will be a pre-training ride and two will be training rides conducted by a unit instructor pilot (IP) or a unit trainer (UT) should insufficient IP assets exist; the fourth training period will be an evaluation ride conducted by a unit IP to determine satisfactory course completion. Missions will be videotaped, if possible, and reviewed by the crewmembers, assisted by a unit instructor, to reinforce the crew coordination principles learned in the classroom.

During flight training, for those aircraft not having an appropriate simulator, the four mission scenarios will be flown in the aircraft and evaluated using observer notes, audio or videotape, or other appropriate techniques.

Course Data

1. Target Audience: All crewmembers (rated and nonrated)
2. Class Frequency: As required
3. Class Size: 16 crewmembers optimal. (Small class size allows for more personal involvement; also, attitudinal changes are best effected in small groups.)

4. Unit Instructor Requirements

<u>Category</u>	<u>Number</u>	<u>Duty</u>
IP	1	Course supervisor
IP/UT	2	Academic instructors*
IP	1**	Evaluators

* = UTs, if utilized, may carry students only through training ride #3.

** = Number may vary as required to accomplish timely training and evaluations; based on simulator or aircraft availability.

Note: Training efficiencies may be realized by team teaching.

5. Course Length

- a. 18 hours of Classroom Instruction consisting of 4 hours of introductory materials, 12 hours on crew coordination principles, 1 hour of review, and a 1-hour simulator or flight briefing.
- b. 20 hours of Simulator or Flight Training allocated as follows: Four 5-hour simulator or flight periods each consisting of 1.5 hours premission planning, 1.75 hours mission execution, and 1.75 hours review and critique.

List of Training Activities

1. Conduct classroom instruction.
2. Conduct mission-oriented simulator or flight training to reinforce classroom instruction.

Uniform

1. Classroom Instruction: Duty
2. Simulator or Flight Training: Flight

..... Training Aids Index

<u>Training Aid</u>	<u>ID Number</u>	<u>Description</u>
Viewgraphs	(S-VG)	
	01	Aircrew Coordination Course
	02	Introduction
	03	Course Structure and Materials
	04	Crew Coordination Model
	05	Table 1
	06	Terminal Learning Objective
	07	Learning Objectives (Hour 1)
	08	William James Quote
	09	MG Robinson Quote
	10	Overview of the Aircrew Coordination Course
	11	Definition of Crew Coordination
	12	Description of Crew Coordination Training
	13	Features of Army Crew Coordination Training
	14	Crew Coordination in Army Aviation Graphic
	15	Features of Army Crew Coordination Training (Cont.)
	16	What's New
	17	Learning Objectives (Hour 2)
	18	History of Crew Coordination Research and Programs
	19	Review of Crew Coordination Courses
	20	Analysis Findings
	21	Six Categories of Aircrew Coordination Errors
	22	Significant Actions
	23	Learning Objectives (Hour 3)
	24	Development of TC 1-210 and Revised ATMs
	25	Crew Coordination Elements
	26	Crew Coordination Considerations
	27	Features of the Revised ATMs
	28	Crew Coordination Includes
	29	Measurement of Crew Coordination
	30	Basic Qualities
	31	(Continued)
	32	Learning Objectives (Hour 4)
	33	Crew Coordination Objectives
	34	Review of the Crew Coordination Objectives
	35	Crew Coordination Objectives Contribution
	36	Overview of Basic Qualities and Crew Coordination Objectives
	37	(Continued)
	38	Description of Techniques
	39	Definitions, Discussion, Performance Criteria, and Illustrations

<u>Training Aid</u>	<u>ID Number</u>	<u>Description</u>
Viewgraphs	(S-VG)	
	40	Crew Coordination Objective 1
	41A	Learning Objectives (Hours 5 & 6)
	41B	(Continued)
	42	Basic Quality 1 w/Definition
	43	Beliefs, Attitudes, Skills, and Behavior
	44	Linkages between Beliefs, Attitudes, Skills, and Behavior
	45	Beliefs to Crew Coordination Objective
	46	(Continued)
	47	(Continued)
	48A	(Continued)
	48B	(Continued)
	49	(Continued)
	50	The Effective Crew
	51	The Ineffective Crew
	52	How to Build an Effective Team
	53	Flight Team Leadership and Followership
	54	Military Considerations
	55	Leadership Principles
	56	(Continued)
	57	Leadership Counseling
	58	Motivation
	59	Coercion
	60	Disagreement and Differences
	61	Critical Phases of Team Building
	62	Team Management Problems in the Cockpit
	63	Basic Quality 1 Rating Factors
	64	(Continued)
	65	(Continued)
	66	(Continued)
	67	Illustrations of Crew Coordination Objective 1
	68	Crew Coordination Objective 2
	69	Learning Objectives (Hours 7, 8, & 9)
	70A	Basic Quality 2
	70B	(Continued)
	71	Unique Requirements of the Army Flight Environment
	72	Rotary Wing Tactical Missions
	73	High Probability Crew Coordination Error Operational Profiles
	74	Events Present in Aviation Accident Cases
	75	Flight Planning and Rehearsal

<u>Training Aid</u>	<u>ID Number</u>	<u>Description</u>
Viewgraphs	(S-VG)	
	76	Flight Planning Sequence
	77	Rehearsal Sequence
	78	Factors Affecting the Planning and Rehearsal Process
	79	Prioritizing the Planning and Rehearsal Process
	80	Planning and Rehearsal Practical Exercise
	81A	Flight Planning Elements
	81B	Continued
	82	Planning and Rehearsal Benefits
	83	Basic Quality 2 Rating Factors
	84	(Continued)
	85	(Continued)
	86	Illustrations of Basic Quality 2
	87	Learning Objectives for Hours 7, 8, and 9 (Cont.)
	88	Basic Quality 3 w/Definition
	89	Decision Making Styles
	90	Classical Analytical Decision Making Process
	91	Automatic Decision Making Process
	92	Key Differences
	93	Application of Decision Style
	94	Importance of Decision Making
	95	Hazardous Attitudes
	96	Hazardous Thought Pattern Exercises
	97	Basic Quality 3 Rating Factors
	98	(Continued)
	99	Basic Quality 3 Illustrations
	100	Crew Coordination Objective 3
	101	Learning Objectives (Hour 10)
	102	Basic Quality 4 w/Definition
	103	Importance of Prioritizing and Managing Workload
	104	Workload in the Army's Flight Environment
	105	Causes of High Workload
	106	Effects of High Workload
	107	Managing High Workload
	108	Effects of Low Workload
	109	Operationally/Nonoperationally-Related Distractions
	110	Dealing with Distractions
	111	Basic Quality 4 Rating Factors
	112	(Continued)
	113	Basic Quality 4 Illustrations
	114	Learning Objectives (Hour 10) (Cont.)
	115	Basic Quality 5 w/Definition

<u>Training Aid</u>	<u>ID Number</u>	<u>Description</u>
Viewgraphs	(S-VG)	
	116	Types of Unexpected Events
	117	Preparing for Unexpected Events
	118	Coping with Unexpected Events
	119	Basic Quality 5 Rating Factors
	120	(Continued)
	121	Basic Quality 5 Illustrations
	122	Crew Coordination Objective 4
	123	Learning Objectives (Hours 11, 12, & 13)
	124	Related ATM Crew Coordination Elements
	125	Basic Quality 6 w/Definition
	126	Communication Model
	127	Barriers to Communication
	128	Communication Practical Exercise
	129	Effective Speaking
	130	Effective Listening
	131	Nonverbal Communications
	132	Briefings
	133	Critiques and Feedback
	134	Aircrew Communications
	135	Basic Quality 6 Rating Factors
	136	(Continued)
	137	(Continued)
	138	Basic Quality 6 Illustrations
	139	Learning Objectives (Hours 11, 12, and 13) (Cont.)
	140	Basic Quality 7 w/Definition
	141	Situational Awareness Influencers
	142	Situational Awareness Considerations
	143	Group Mind
	144	Basic Quality 7 Rating Factors
	145	(Continued)
	146	Basic Quality 7 Illustrations
	147	Learning Objectives (Hours 11, 12, and 13) (Cont.)
	148	Basic Quality 8 w/Definition
	149	Positive Communication
	150	Accepted Procedures
	151	Basic Quality 8 Rating Factors
	152	(Continued)
	153	Basic Quality 8 Illustrations
	154	Learning Objectives (Hours 11, 12, and 13) (Cont.)
	155	Basic Quality 9 w/Definition

<u>Training Aid</u>	<u>ID Number</u>	<u>Description</u>
Viewgraphs	(S-VG)	
	156	Cockpit Climate and Inputs
	157	Inquiry
	158	Basic Quality 9 Rating Factors
	159	(Continued)
	160	Basic Quality 9 Illustrations
	161	Crew Coordination Objective 5
	162	Learning Objectives (Hours 14, 15, & 16)
	163	Related ATM Crew Coordination Elements
	164	Basic Quality 10 w/Definition
	165	Concern for Task Accomplishment
	166	Recognition of Information Overload
	167	Recognition of Task Saturation
	168	Recognition of Incapacitation
	169A	Links in Error/Poor Judgement Chain
	169B	(Continued)
	170	Break Error Chain
	171	Other Techniques
	172	Basic Quality 10 Rating Factors
	173	(Continued)
	174	Basic Quality 10 Illustrations
	175	Learning Objectives (Hours 14, 15, and 16) (Cont.)
	176	Basic Quality 11 w/Definition
	177	ATM Requirement
	178	Indicator of Effective Team Building
	179	Techniques to Enhance Offering
	180	Basic Quality 11 Rating Factors
	181	(Continued)
	182	Basic Quality 11 Illustrations
	183	Learning Objectives (Hours 14, 15, and 16) (Cont.)
	184	Basic Quality 12 w/Definition
	185	Advocacy and Assertion
	186	Importance of Advocacy and Assertion
	187	What Advocacy and Assertion Are Not
	188	Basic Quality 12 Rating Factors
	189	(Continued)
	190	Basic Quality 12 Illustrations
	191	Learning Objectives (Hours 14, 15, and 16) (Cont.)
	192	Basic Quality 13 w/Definition
	193	Crew-Level After-Action Reviews
	194	What After-Action Review Is Not/Is
	195	After-Action Reviews

<u>Training Aid</u>	<u>ID Number</u>	<u>Description</u>
Viewgraphs	(S-VG)	
	196	After-Action Review Considerations
	197	Table 3-2 (AAR Checklist)
	198	Basic Quality 13 Rating Factors
	199	Basic Quality 13 Illustrations
	200	Summary of Classroom Instruction
	201	(Continued)
	202	Cross-walk Chart
	203	Simulator or Flight Training and Evaluation
	204	Learning Objectives (Hour 18)
	205	Introduction
	206	Crew Coordination Evaluation
	207	Grading Scheme
	208	Rating Scheme
	209	Training Feedback
	210	Confidentiality
	211	Simulator or Flight Training Crew Briefing
	212	Learning Objectives (Sim/Flt Hours 1-20)
Videotape	(VT)	
	01	"Attention Getter" (AH-1 Brown-out)
	02	Ketchikan
	03	Mission Plan (CH-54)
	04	Fast Rope (UH-60)
	05	Rappelling (UH-1)
	06	Eastern 401
	07	Airport
	08	Mid-air (UH-60)
	09	High Risk (OH-58)

1. General

- a. In conducting Classroom Instruction, instructor(s) will use slides, overheads, videos, handouts, reference material, and other training materials.
 - b. To conduct Simulator or Flight Training, for those aircraft having an appropriate simulator, crew coordination-trained IPs or UTs (observer position) (collectively referred to as instructors) and instructor operators (IO) (console position) will be required. The availability of a simulator does not preclude performing mission-oriented scenarios in the aircraft.
 - (1) For simulators with adequate seating, the instructor should occupy a non-control position with nonrated crewmembers occupying other available positions. For two-place crew-served aircraft not having an appropriate simulator, the instructor will be required to assume an active crewmember role in addition to instructor duties. In all cases, instructors will evaluate the aircrew's performance with respect to crew coordination and, during the first training ride, provide additional instruction, as required. During the second training ride, crews will operate on their own, and the instructor should observe and evaluate on a non-intervention basis. The pretraining and third training rides will be formal evaluations, with the third training ride determining satisfactory course completion. At unit discretion, battle-rostered crews may be awarded a Crew Readiness Level (CRL) 1 rating upon successful completion of the course.
 - (2) IOs will operate the simulator, monitor video cameras (if installed), and enter events and situations into the scenario, as directed by the instructor, during conduct of the simulated mission.
 - c. During the instructor's post-mission critique, the videotape of the flight, if recorded, will be reviewed by the aircrew and used to reinforce instructor-observed examples of both good and poor application of crew coordination principles. The instructor will also debrief aircrews on the application of crew coordination principles observed during their premission planning and crew-level after-action review activities. In effect, the instructor's critique will cover all facets of the mission from receipt to termination.
2. Classroom Arrangement: The "horseshoe" arrangement with the instructor at the open end is recommended for this type of classroom instruction.
 3. Simulator Periods: Aircrews will be scheduled as instructors, IOs, and simulators become available.
 4. Flight Periods: Aircrews will be scheduled as aircraft and instructors become available.

-
5. **Examination:** There is no formal written examination for the Classroom Instruction portion of the Aircrew Coordination Course. During Simulator or Flight Training and Evaluation, aircrews will receive one formally graded pretraining ride, two graded practice rides, and one formally graded evaluation ride (including an oral exam), which will determine satisfactory course completion. Remedial training will be scheduled for those aircrews not demonstrating appropriate crew coordination behaviors.
 6. **Scheduling:** Classroom Instruction may be conducted as six 3-hour blocks or three 6-hour blocks. Simulator or Flight Training will be conducted as aircraft, simulators, instructors, and IOs become available.

Note: To preclude disruptions and scheduling problems, attendees should be excused from all duties during course attendance.

Note: Simulator or flight periods should be scheduled not later than two weeks after completion of Classroom Instruction to ensure that Crew Coordination Objectives are still fresh in the crewmember's mind.

CLASSROOM INSTRUCTION

S-VG 01

Classroom Instruction: Instruction covering the background, research, and application of crew coordination principles.

..... Introduction

01+00/S-VG 02

Academic instruction covering administrative data, course structure, training materials, learning objectives, and introductory information necessary to support subsequent instruction covering the crew coordination principles.

1. Administrative Data (Student Handout, p. 1-1)
 - a. Subject: Aircrew Coordination Course
 - b. Instructor(s): (Names and subjects; qualifications)
 - c. Administrative announcements
 - Sign-in roster
 - Schedule
 - Latrines
 - Phones or message center
 - Food and drink arrangements
 - Training materials
 - Student Handout
 - Reference materials

S-VG 03 (1)

2. Course Structure and Materials

S-VG 04 (1)

a. Crew Coordination Model

- Relate to logo
- Depicts crew functions in a logical flow
- Detailed model (*Student Guide*, Appendix G, p. G-23)

S-VG 03 (2)

b. ATM Crew Coordination Elements and tasks

- Provide the foundation for crew coordination
- Crew Coordination Elements imbedded in ATM tasks

c. Crew Coordination Basic Qualities

- Mission-level evaluation of crew coordination
- Will define during course

d. Crew Coordination Objectives

- The major difference between Army and other courses on crew coordination
- Crew coordination behaviors will be defined, trained, and evaluated

e. Case study illustrations (*Student Guide*, Appendix D)

- Analyses based on actual Army aviation accidents
- Exemplify requirement for crew coordination training

f. *Student Guide*

- Information for joint use of instructors and students

- Valuable reference source for refresher and continuation crew coordination training
- Background reading file of military and commercial articles

g. Simulator or flight training

- The hands-on practical application portion of the course
- Crew coordination principles taught in the classroom are put to use in mission-oriented scenarios based on unit mission essential task list (METL)

S-VG 05

- Four simulator or flight sessions (Table 3-1 below) (Student Handout, Table 1-1, p. 1-4) during which students follow a crawl-walk-run progression leading from close guidance and instruction on the application of crew coordination principles to a final evaluation ride, which completes the course

Table 3-1. Simulator or Flight Training Rides

Ride	Description	Remarks
1	Pretraining	"Baseline" ride
2	Training	"Crawl" ride
3	Training	"Walk" ride
4	Evaluation	"Run" ride

- Once all Army aviation aircrews are trained, we may do away with the crew coordination error accidents such as we are about to see. (Give background details of the attention-getter accident to be shown)

VT 01

Note: Play video accident "attention-getter" at this point. Following the video, stress that the prevention of such accidents and improvement of combat mission effectiveness is why we are here; that many of the accidents on record had nothing to do with material failure or the skills of the individual aviator but resulted from a failure of crewmembers to coordinate cockpit tasks for which they may or may not have been assigned responsibility. Explain that the primary purpose of the course is to teach the students the crew coordination principles and techniques they need to know in order to eliminate crew coordination accidents and maximize crew effectiveness.

S-VG 06

Terminal Learning Objective: Upon completion of training, crewmembers (rated and nonrated) will be able to employ crew coordination principles to achieve safe, effective, and efficient performance of assigned flying missions.

S-VG 07

Learning Objectives: With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

Learning Objectives for Hour 1

1. Describe the structure of the Aircrew Coordination Course and how it facilitates learning.
2. Define crew coordination.
3. Define crew coordination training.
4. Identify the unique features of aircrew coordination training.
5. Explain the importance of the new methods instituted by the Army to train and evaluate aviation personnel.

Note: Learning objectives will be reviewed prior to presenting each subsequent block. Learning objectives are imbedded in the text preceding the instruction.

S-VG 08/09

- Introduce the William James and MG Robinson quotes
- Stress that an attitudinal change in the Army is necessary to convert from individual pilot to crew operations and that MG Robinson's quote effectively defines this new approach to crew-based operations in a single statement

S-VG 10

1. Overview of the Aircrew Coordination Course (Student Handout, p. 1-5)
 - Discuss the positioning of the pretraining ride, the two training rides, and the evaluation ride
 - Discuss the breakdown of each ride into the premission planning (1.5 hours), simulator or flight (1.75 hours), and crew-level after-action review (1.75 hours) parts (5 hours per ride, 20 hours total)
 - Break down of the Classroom Instruction is 4 hours of introduction, 12 hours on the crew coordination principles, 1 hour review, and 1 hour simulator or flight briefing (18 hours total)

S-VG 11

2. Definition of Crew Coordination

Crew coordination is defined as the interaction between crewmembers (communication) and actions (sequence and timing) necessary for tasks to be performed efficiently, effectively, and safely. It involves the effective utilization of *all* available resources—hardware, software, and liveware.

S-VG 12

3. Description of Crew Coordination Training (TC 1-210)

Aircrew training must emphasize crew coordination as a vital part of the overall training program. It is a set of principles, attitudes, procedures, and techniques that transforms individuals into an effective crew

S-VG 13 (1)

4. Features of Army Crew Coordination Training: (Student Handout, p. 1-6)

S-VG 04 (2)

- a. Uses the Crew Coordination Model to describe crew functions
 - Model visually depicts the crew functional cycle and the relationship of the Crew Coordination Objectives
 - Will discuss model later in the course

S-VG 13 (2)

- b. Incorporates the eight ATM Crew Coordination Elements
 - A result of the USASC and ARI aviation accident analysis
 - Imbedded in each of the ATM tasks
 - Will show examples later in the course
- c. Provides an evaluation method using 13 Crew Coordination Basic Qualities
 - Looks at crew coordination across several or many ATM tasks at the mission-level of performance
 - Will provide training in each of the Basic Qualities and then measure application during the simulator or flight periods
- d. Defines the five Crew Coordination Objectives to be achieved by each crew
 - Is what makes Army crew coordination training unique
 - Is a set of defined behaviors taught to all crewmembers, which is expected to be applied during mission performance
 - Can be measured and corrective training actions taken at the unit level to foster the application of crew coordination principles
- e. Organizes instruction around the Crew Coordination Model, the ATM Crew Coordination Elements, the Crew Coordination Basic Qualities, and the Crew Coordination Objectives

S-VG 14

- Crew Coordination in Army Aviation graphic depicts the relationship of the crew coordination components and the structure of the Aircrew Coordination Course
- Briefly discuss flow from ATM tasks to Basic Qualities to Crew Coordination Objectives to CCM functions

S-VG 15

- f. Assimilates ideas and techniques from existing DoD and commercial aircrew coordination training programs
 - Will discuss techniques such as the two-challenge rule, most conservative response, Bubba check, and use of excessive professional courtesy
- g. Emphasizes team formation, communications, premission planning, rehearsal, and crew-level after-action reviews
 - These actions are at the core of crew coordination. Without team formation and leadership, cannot effectively accomplish the mission; and without communications, can't form effective teams.
 - Importance of other actions essential to mission accomplishment and the learning process
- h. Uses multiple, situationally-driven decision making techniques
 - Two primary methods addressed, analytical and automatic; both of which are basically time dependent
 - Must use proper decision making technique depending upon the situation
- i. Utilizes standardized terminology during all mission phases
 - Literature is full of examples of missed communications
 - "Cheer up" vs. "Gear up," "Takeoff power!" vs. "Take off power"
 - Class question: What does "No Joy" mean? Tally?
- j. Practical application of crew coordination principles during hands on training in the simulator or aircraft
 - Another hallmark of Army aviation crew coordination training
 - Without the hands-on component, is possible that what was taught will be forgotten in a short period of time
 - Will reinforce crew coordination principles during refresher and continuation training

5. What's New About How the US Army Trains and Evaluates Aircrews

- a. Battle rostering: A key concept in aircrew coordination training and evaluation
 - Will also train non-battle-rostered aviation personnel (FAC 2)
 - Is possible for battle-rostered crews to be rated as Crew Readiness Level 1 upon successful completion of training
- b. Individual and collective training integration: From ATM tasks to critical wartime missions, crew coordination is an essential element
- c. Employment of situational training exercises: Mission/performance effectiveness measures to target shortcomings for correction.
 - Unit instructors prepare scenarios which include mission essential tasks
 - Evaluation of mission performance may reveal areas where mission training requires emphasis
- d. Leads to crew readiness level progression: The systematic advancement to operating as a team in the cockpit
 - Use same technique in training crew coordination principles during the simulator or aircraft scenario training
 - Pretraining ride and first training ride are instructional; second training ride is crew operating on its own with assistance as required; fourth ride is evaluated (crawl-walk-run approach to training)
- e. Training philosophy: We train and evaluate according to how we will fight
 - Course will train crew coordination principles critical to survival in the aviation environment
 - Principles will be practiced in the classroom, simulator, and the aircraft
 - Application will be evaluated annually or after a battle-rostered crew change
 - Evaluation factors covered during initial crew coordination training

Learning Objectives for Hour 2

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

- 1. Explain the historical evolution of crew coordination training in the U.S. Army.**
- 2. Recognize the six aircrew coordination errors identified by the USASC/ARI Aviation Accident Analysis.**
- 3. Describe the four major actions resulting from the USASC/ARI Aviation Accident Analysis.**

S-VG 18

- 1. History of Crew Coordination Research and Programs (Student Handout, p. 1-10)**

S-VG 19

a. Review of the crew coordination courses

- Crew coordination training may also be referred to as cockpit resource management, integrated resource management, aircrew coordination training, or by several other terms.
- (1) Northwest Airlines and Line Oriented Flight Training**
 - (a)** To improve crew coordination through the use of flight simulators. Skills developed should lead to flight line improvements
 - (b)** Concept of mission-oriented simulator flight training
 - (2) United Airlines and Command, Leadership, and Resource Management training**
 - (a)** Simulator research into subtle incapacitation recognition
 - (b)** One of the best known comprehensive training programs which involves lecture, seminars, small encounter groups, and simulators

- (b) Uses crew coordination information gained from Army tactical aviation units
- (c) Focus is on hands-on, practical crew coordination skills and behaviors

S-VG 20

- b. Findings from the analysis of rotary wing accident investigations (*Student Guide*, Appendix G, p. G-10)
 - (1) US Army Safety Center (USASC) and US Army Research Institute (ARI) analysis
 - Conducted during Feb-Apr 1990
 - Covered the period FY84-FY89
 - (2) 596 accidents; 88 with aircrew coordination error (15%)(Appendix B; *Student Guide*, Appendices B, C, and D)
 - (a) 41% of the crew coordination error accidents involved communication failures
 - (b) 35% of the crew coordination error accidents involved workload or prioritization failures
 - (3) Incidents resulted from failure to plan and mentally rehearse mission events and responsibilities
 - (4) UH-60 and AH-64 were the significant contributors

S-VG 21

- 2. Six Categories of Crew Coordination Errors Identified by the USASC/ARI Aviation Accident Analysis
 - Involve class in offering examples of crew coordination errors with which they have been involved
 - a. Failure of the pilot on the controls (P*) to properly direct assistance from other crewmembers
 - b. Failure of a crewmember to announce a decision or action that affected the ability of other crewmembers to properly perform their duties

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- c. Failure of a crewmember to communicate positively (verbally and non-verbally)
 - d. Failure of the Pilot in Command (PC) to assign crew responsibilities properly before and during the mission
 - e. Failure of the P or other crewmembers to offer assistance or information that was needed or had been requested previously by the P*
 - f. Failure of the P* to execute flight actions in the proper sequence with the actions of other crewmembers

S-VG 22

- 3. Significant Actions Facilitated by the Identification of the Six Categories of Crew Coordination Errors
 - a. Rewrite of TC 1-210 to incorporate the crew approach to ATM task performance
 - b. Identification and definition of the eight ATM Crew Coordination Elements
 - c. Redesign of the ATMs to incorporate the Crew Coordination Elements into each task
 - d. Development of an aircrew coordination course to assimilate research findings with current approaches to aircrew coordination training

Learning Objectives for Hour 3

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Explain the purpose of TC 1-210.
2. Identify the correct definition for each of the ATM Crew Coordination Elements.
3. Describe how the Crew Coordination Elements were incorporated into the ATM tasks.
4. Explain the requirement for a comprehensive approach to the measurement of crew coordination and why the Basic Qualities were developed.

S-VG 24

1. Revision of TC 1-210 and the ATMs (Student Handout, p. 1-14)
 - Focus of the Aircrew Training Program (TC 1-210) is on individual, crew, and collective training
 - a. Individual proficiency in the ATM tasks required to operate the aircraft is an essential prerequisite for the training effort
 - b. Absolute efficiency of Army aircraft in the combined arms effort requires that crews function as a unit
 - c. Unit collective tasks are identified by the unit mission essential task list (METL)
 - d. TC 1-210 links the individual, crew, and unit collective tasks together to achieve combat proficiency

2. Eight Crew Coordination Elements Defined

a. **Communicate positively**

Good cockpit teamwork requires positive communication among crewmembers. Communication is positive when the sender directs, announces, requests, or offers; the receiver acknowledges; and the sender confirms, based on the receiver's acknowledgement or action. Crewmembers must use positive communication procedures for the essential crew coordination actions identified in the description of each task. They should remain aware of the potential for misunderstandings and make positive communication a habit in the aircraft. Positive communication:

- Is quickly and clearly understood
- Permits timely actions
- Makes use of a limited vocabulary of explicit terms and phrases to improve understanding in a high-ambient-noise environment

b. **Direct assistance**

A crewmember will direct assistance when he cannot maintain aircraft control, position, or clearance. He also will direct assistance when he cannot properly operate or troubleshoot aircraft systems without help from the other crewmembers. Directives are necessary when one crewmember cannot reasonably be expected to know what or when assistance is needed by the other crewmembers. Examples are emergencies; the P's decision to change the sequence, timing, or priority of the P's or CE's assistance; and a P or CE who is relatively inexperienced in the mission being flown or the flight environment. Directives normally are not needed when the assistance required is part of a crewmember's assigned responsibility in the task description.

c. **Announce actions**

To ensure effective and well-coordinated actions in the aircraft, all crewmembers must be aware of expected aircraft movements and unexpected individual actions. Each crewmember will announce any action that affects the actions of the other crewmembers. Such announcements are essential when the decision or action is unexpected and calls for supporting action from the other crewmembers to avoid a potentially hazardous situation.

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- (3) FAA Advanced Qualification Program
 - (a) Outgrowth of the airlines crew coordination training programs and annual evaluation of crews
 - (b) Incorporates proficiency-based evaluations of the entire crew
 - (4) US Army "Dynamics of Aircrew Communications and Coordination" (DACC)
 - (a) Initial aircrew coordination instruction at USAAVNC; also in exportable training package format
 - (b) Provided the link between the old and new approaches to aircrew coordination training
 - Conducted just prior to navigation phase
 - Deals with behaviors such as inquiry, advocacy, conflict, critiques, and decision making; not task oriented
 - Current aircrew coordination training incorporates DACC concepts into the basic qualities
 - (5) CAE - Link Aircrew Coordination Training
 - (a) AH-64 Training Brigade uses CAE-link course
 - (b) Critical success factors of intimate knowledge, proper attitude, and skills
 - (6) Human Error Accident Reduction Training (HEART)
 - (a) USASC training for Aviation Safety Officers
 - (b) Contractual effort
 - HEART not technically crew coordination training but does cover many crew coordination subjects
 - (7) US Army Aviation Aircrew Coordination Course
 - (a) Builds on past experience, both commercial and military

d. Offer assistance

A crewmember will provide the assistance or information that has been requested. He also will offer assistance when he sees that another crewmember needs help. All crewmembers must be aware of the flight situation and recognize when the P* deviates from normal or expected actions. They must never assume that the P* recognizes a hazard or the need for assistance.

e. Acknowledge actions

Communications in the aircraft must include supportive feedback to ensure that crewmembers correctly understand announcements and directives. Acknowledgements need to be short and need to positively indicate that the message was received and understood. "Roger" or "OK" may not be sufficient. The preferred method is to repeat critical parts of the message in the acknowledgment.

f. Be explicit

Crewmembers must avoid using terms that have multiple meanings; misinterpretations can cause confusion, delays, or accidents. Examples are "Right," "Back up," and "I have it." Crewmembers also must avoid using indefinite modifiers such as, "Do you see *that* tree?" or "You are coming in a *little* fast." In such cases, one crewmember may mistakenly assume that the other crewmember's attention is focused on the same object or event. More confusion arises when each crewmember interprets the terms differently.

Crewmembers should use clear terms and phrases and positively acknowledge critical information. During terrain flight, for example, the P must give enough information to permit the P* to fly the aircraft efficiently and safely over the intended route. He must provide navigation directions and information so that the P* does not have to concentrate on reading the instruments.

g. Provide aircraft control and obstacle advisories

Although the P* is responsible for aircraft control during terrain flight, the other crewmembers may need to provide aircraft control information regarding airspeed, altitude, or obstacle avoidance. Because wires are difficult to see, they are a major hazard to helicopters at NOE altitudes. Aircrews must anticipate wires along roadways; near buildings, antennas, and towers; or in combat areas where wire-guided missiles have been launched. Therefore, crewmembers wearing NVG must consider obstacle clearance a primary task directive.

Crewmembers should precede aircraft control and obstacle advisories by a positive command that immediately conveys the required action to the P*. A brief explanation of why the change is necessary should follow; for example, "Slow down, wires, 12 o'clock, 100 meters," or "Stop now, wires." In some instances, the CE may notice that the P* has let the aircraft move laterally or vertically away from a sling load. The CE should precede the advisory by a positive directive; for example, "Up 2 feet, hold," or "Right two feet, hold." When the P* reaches the desired altitude or position, the CE should announce "Hold."

h. **Coordinate action sequence and timing**

Proper sequencing and timing ensures that the actions of one crewmember mesh with the actions of the other crewmembers.

S-VG 26

3. **How are Crew Coordination Considerations Reflected in Each ATM Task?**

- a. ATM tasks include crew coordination procedures based on the findings of the aviation accident analysis and research testbed.
- b. Inclusion of crew coordination in ATM tasks reflects philosophy that no task is an individual undertaking; each can be performed more effectively and safely by the coordinated efforts of the entire crew

S-VG 27

c. **Features of the revised ATMs**

- (1) Crew coordination standards
- (2) Duties, actions, and responsibilities of all crewmembers identified in task descriptions
- (3) "Conduct Crew Mission Briefing" task added (Task 1000), together with a Crew Briefing Checklist
- (4) Standardized terminology provided
- (5) Examples of ATM crew coordination requirements
 - (a) Task 1001, Plan a VFR Flight (Instructor identifies requirements; e.g., direct other crewmember to complete designated flight planning elements)

- (b) Task 1016, Perform Hover Power Check (Instructor and aircrews jointly identify requirements; e.g., P* will announce his intent to bring the aircraft to a stationary hover, P will monitor aircraft instruments, etc.)
- (c) Task 1028, Perform VMC Approach (Aircrews identify requirements; e.g., P* will announce termination, use of manual stabilator, etc.)

S-VG 28

- d. Crew coordination is enhanced by battle-rostering and culminates in the effective execution of aircrew tasks. It includes:
 - (1) Involvement of the entire crew in mission planning and the rehearsal of critical mission events and contingencies
 - (2) Development of standardized communication techniques, including the use of confirmation and acknowledgment
 - (3) Assignment of specific task priorities and responsibilities to crewmembers and their confirmation of those responsibilities as part of the preflight crew briefing
 - (4) Involvement of each crewmember in monitoring the need for assistance in coping with terrain, visual conditions, mission, and other stressors
 - (5) Development of positive team relationships to preclude overconfidence or subconscious intimidation because of rank or experience differences

Note: Battle-rostering and crew coordination are two separate concepts and are linked only by concurrent introduction into the training literature. Crew coordination is not learning how to operate an aircraft with a particular crewmember; it is a set of standardized operating procedures and techniques to be used in any situation.

S-VG 29

- 4. Measurement of Crew Coordination: The requirement for a comprehensive approach to evaluation
 - a. Task-level approach where ATM Crew Coordination Elements are integrated into each task

-
- b. Comprehensive approach using the 13 Crew Coordination Basic Qualities based on research conducted by both the Army and commercial aviation

Note: Will define Basic Qualities.

S-VG 30

- (1) Establish and maintain flight team leadership and crew climate
- (2) Pre-mission planning and rehearsal accomplished
- (3) Application of appropriate decision making techniques
- (4) Prioritize actions and distribute workload
- (5) Management of unexpected events
- (6) Statements and directives clear, timely, relevant, complete, and verified

S-VG 31

- (7) Maintenance of mission situational awareness
- (8) Decisions and actions communicated and acknowledged
- (9) Supporting information or actions sought from crew
- (10) Crewmember actions mutually cross-monitored
- (11) Supporting information or actions offered by crew
- (12) Advocacy and assertion practiced
- (13) Crew-level after-action reviews accomplished
 - Considers the "synergistic" effects of crew interrelationships on overall mission performance
 - Comprehensive approach recognizes mission involves the accomplishment of many ATM tasks
 - Like a sheet of music, ATM tasks are the "notes," overall performance in terms of the Basic Qualities provides the "melody."

Learning Objectives for Hour 4

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Identify the correct definition for each of the five Crew Coordination Objectives.
2. Explain the purpose of the Crew Coordination Model.
3. Know how each Crew Coordination Objective contributes to flight safety and mission effectiveness.
4. Relate each Basic Quality to its associated Crew Coordination Objective.
5. Define the techniques adopted by the Aircrew Coordination Course; e.g., Two-Challenge Rule.

S-VG 33

1. ATM Crew Coordination Elements and Basic Qualities are measured to determine whether or not the objectives of the crew coordination program have been achieved; i.e., the five Crew Coordination Objectives. These five Crew Coordination Objectives are: (Student Handout, p. 1-20)
 - a. **Establish and Maintain Team Relationships**

To establish a positive working relationship that allows the crew to communicate openly and freely and to operate in a concerted manner.
 - b. **Mission Planning and Rehearsal**

To explore, in concert, all aspects of the assigned mission and analyze each segment for potential difficulties and possible reactions in terms of the commander's intent

c. **Establish and Maintain Workload Levels**

To manage and execute the mission workload in an effective and efficient manner with redistribution of task responsibilities as the mission situation changes

d. **Exchange Mission Information**

To establish intra-crew communications using effective patterns and techniques that allow for the flow of essential data between crewmembers

e. **Cross-Monitor Performance**

To cross-monitor each other's actions and decisions to reduce the likelihood of errors impacting mission performance and safety

S-VG 04 (3)

2. **Crew Coordination Model Developed to Describe the Relationship of the Five Crew Coordination Objectives to the Crew Functional Cycle**

- a. Resulted from the Army crew coordination research effort. Provides 1) a framework upon which to "glue" relevant aircrew coordination instruction and 2) a key to the crew coordination actions required during any particular phase of the functional cycle.

Note: Tie to Crew Coordination Logo.

- (1) **PLAN:** Planning element
- (2) **ASSESS:** Situation Awareness (SA) element
- (3) **RESOLVE:** Problem Solving and Decision Making (PS&DM) element
- (4) **EXECUTE:** Operational Task Execution (OTX) element (ATM tasks, battle drills)
- (5) **Replanning** element starts cycle over again

S-VG 14 (2)

- b. Go from detailed actions (ATM Crew Coordination Elements) to mission-level (Basic Qualities) to broad concepts (Crew Coordination Objectives). *Crew coordination has been defined and we are able to evaluate its components.*

S-VG 34

- 3. Review of the Crew Coordination Objectives and Their Contribution to Flight Safety and Mission Effectiveness
 - a. Review of the five Crew Coordination Objectives
 - Obtain student participation in defining each of the Crew Coordination Objectives during the review
 - (1) Establish and maintain team relationships
 - (2) Mission planning and rehearsal
 - (3) Establish and maintain workload levels
 - (4) Exchange mission information
 - (5) Cross-monitor performance

S-VG 35

- b. How does each Crew Coordination Objective contribute to flight safety and mission effectiveness?
 - (1) During the course, case studies will be used to analyze examples of good and bad crew coordination as categorized within specific Crew Coordination Objectives
 - (2) Illustrations for analysis will be selected from Army aviation accident cases in the USASC ASMIS data base (Appendix B and *Student Guide*, Appendix D; see also *Student Guide*, Appendices B and C)
 - (3) Analysis will consider how failure to observe ATM Crew Coordination Elements, Basic Qualities, and Crew Coordination Objectives contributed to the illustrated accident; and how the observance of certain crew coordination principles might have prevented the accident.

S-VG 36

4. Overview of the 13 Crew Coordination Basic Qualities (BQ) and Their Relationship to the Five Crew Coordination Objectives (CCO)
 - a. CCO 1: Establish and maintain team relationships
 - (1) BQ 1: Establish and maintain flight team leadership and crew climate
 - b. CCO 2: Mission planning and rehearsal
 - (1) BQ 2: Pre-mission planning and rehearsal accomplished
 - (2) BQ 3: Application of appropriate decision making techniques
 - c. CCO 3: Establish and maintain workload levels
 - (1) BQ 4: Prioritize actions and distribute workload
 - (2) BQ 5: Management of unexpected events

S-VG 37

- d. CCO 4: Exchange mission information
 - (1) BQ 6: Statements and directives clear, timely, relevant, complete, and verified
 - (2) BQ 7: Maintenance of mission situational awareness
 - (3) BQ 8: Decisions and actions communicated and acknowledged
 - (4) BQ 9: Supporting information and actions sought from crew
- e. CCO 5: Cross-monitor performance
 - (1) BQ 10: Crewmember actions mutually cross-monitored
 - (2) BQ 11: Supporting information and actions offered by crew
 - (3) BQ 12: Advocacy and assertion practiced
 - (4) BQ 13: Crew-level after-action reviews accomplished

5. Descriptions of Techniques Referred to in the Aircrew Coordination Course

a. Two-challenge rule

The key to early response to incapacitation lies in the ability to establish a norm against which the results of incapacitation can be measured. The two-challenge rule provides for automatic assumption of duties from any crewmember who fails to respond to two consecutive challenges. This overcomes our natural tendency to believe the pilot flying must know what he is doing, even as he departs from established parameters

b. Excessive professional courtesy

In general, we are hesitant to call attention to deficient performance in others, particularly if they are senior to us. Thus, even when one crewmember does point out performance which is outside of established parameters, it is typically done with very little emphasis. For example, a P will usually inform the PC* that he is "a little fast" or "a little low," no matter how far off the parameter he is

c. Most conservative response

Occasionally, there is disagreement in the cockpit which cannot be resolved due to lack of information. It is best to agree in advance to take the most conservative action in these situations until additional information is available

05+00/S-VG 39

Academic instruction on crew coordination principles, which covers the in-depth definitions, discussion, performance criteria, and illustrations of the 13 Crew Coordination Basic Qualities organized under their respective Crew Coordination Objective.

S-VG 14 (3)

Note: Show Crew Coordination in Army Aviation graphic. Emphasize that the remainder of the course is organized by Basic Qualities categorized under the appropriate Crew Coordination Objective. Encourage participation by asking class to relate specific Basic Qualities to the appropriate Crew Coordination Objective. Review structure prior to discussing the Basic Qualities. (S-VG 36/37)

S-VG 40

Crew Coordination Objective 1: Establish and Maintain Team Relationships

Note: Review definition of Crew Coordination Objective 1: Establish a positive working relationship that allows the crew to communicate openly and freely and to operate in a concerted manner.

- This Crew Coordination Objective has one Basic Quality:

- BQ 1: Establish and maintain flight team leadership and crew climate

S-VG 41A/41B

Learning Objectives for Hours 5 and 6

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Explain the difference between traditional leadership and functional (flight team) leadership.
2. Recognize the definition of a belief, attitude, skill, or behavior.
3. Describe the linkages between beliefs, assumptions, attitudes, and behaviors.
4. Determine the difference between effective and ineffective crews.
5. Implement the techniques for building effective flight teams.
6. Recognize the components of flight team leadership and followership.
7. Recognize the performance criteria for BQ 1.
8. Determine how BQ 1 and its associated Crew Coordination Elements were involved in Army aviation accidents.

Note: Identify related ATM Crew Coordination Elements:

No related ATM Crew Coordination Elements.

S-VG 42

Basic Quality 1: Establish and Maintain Flight Team Leadership and Crew Climate

1. Definition of Basic Quality 1: (Student Handout, p. 1-25)

This Basic Quality addresses the relationships among the crew and the overall climate of the flight deck. Aircrews are teams with a designated leader and clear lines of authority and responsibility. The PC sets the tone of 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, the crew must be effective in resolving the disagreement.

Note: Traditional leadership centralizes leadership in the leader with followers fully dependent on the leader. Functional leadership assigns leadership and followership roles as the situation evolves. Flight team leadership recognizes the impact of leadership style on the working environment. Regardless of leadership style, final decision and direction authority is always retained by the PC.

S-VG 43

2. Beliefs, Attitudes, Skills, and Behavior

- a. *Belief:* Mental acceptance of the truth or actuality of something
 - Resistant but can be changed
 - Reflect cultural, geographical, and life experience influences
- b. *Attitude:* A frame of mind affecting one's thoughts or behavior
 - Not observable, but discernable
 - Modifiable
 - Motivators for behavior

- c. *Skill*: Proficiency, ability, or dexterity; expertness
 - Stick and Rudder
 - Social and Communication
 - Leadership and Management
 - Planning, Problem Solving, and Decision Making
 - Crew Coordination
- d. *Behavior*: The actions or reactions of individuals under specified circumstances
 - Observable
 - Modifiable
 - Reward good behaviors
 - Change poor behaviors

S-VG 44

3. Linkages Between Beliefs, Attitudes, and Behaviors

Note: Numbers in parentheses indicate the appropriate belief-Crew Coordination Objective 1-5 chain in which the belief, assumption, attitude, or behavior falls.

S-VG 45/46/47/48A/48B/49

a. Old implicit beliefs

Beyond the pilot, the rest of the crew is backup and basically unimportant to the mission (1)

We can figure things out during the mission; we have to remain flexible (2)

Pilots can handle all workload alone (3)

Pilots are aware of all available decision options (4)

Pilots can collect and integrate all important decision information alone (4)

Pilots operating alone make the best decisions (4)

Pilots are infallible in their flying skills (5)

b. New explicit assumptions

The entire crew is critical to mission success (1)

Once airborne, there may be little time to develop and coordinate actions and decisions; contingencies and options should be developed and discussed before the need arises (2)

The quality of mission task performance is highest when the workload is effectively distributed across crewmembers (3)

Crews can effectively distribute task execution responsibilities (3)

A qualified crew will surface a greater range of decision options than the pilot alone will produce (4)

A more complete set of decision support information will be generated by the crew than by the pilot alone (4)

On average, decisions that consider crew recommendations will be better than decisions made by the pilot alone (4)

All crewmembers make mistakes (5)

Crewmembers can catch other crewmembers' mistakes before they have serious consequences (5)

c. Essential attitudes

My fellow crewmembers are an important resource; I need to use them and treat them with respect (Values crew)(1)

The best time to address risk and potentially hazardous or short lead time situations is on the ground if time is available; I must encourage the entire crew to provide input so each crewmember has a common understanding of the mission (Consider relevant mission factors)(2)

Overloads increase the risk of errors and poor mission performance; providing support to overloaded crewmembers is essential to effective mission execution (Provide or accept help)(3)

I may have information that is important to another crewmember; I must take action to ensure that he receives this information in a timely manner (Give information)(4)

Other crewmembers may provide important perspectives and information that I have not considered; I need to take action to ensure the delivery of this information to the group (Get information)(4)

Human errors are a fact of life, everyone makes them; they should be corrected with minimum disruption to ongoing tasks, mission execution, or to team relationships (Crew fallibility)(5)

d. Behaviors (Crew Coordination Objectives)

Establish and maintain interpersonal relationships to create and maintain a harmonious team atmosphere and to execute mission objectives (Establish and Maintain Team Relationships)(1)

Thoroughly plan each mission and rehearse difficult segments to reduce uncertainties and preclude problems from developing (Mission Planning and Rehearsal)(2)

Allocate workload in a reasonable manner across crewmembers (Establish and Maintain Workload Levels)(3)

Establish and maintain the same mission plan and a common frame of reference within each crewmember's mind in as much detail as possible (Exchange Mission Information)(4)

Expose the decision-maker to the full range of action options available at each important decision point (Exchange Mission Information)(4)

Check each other's actions for possible errors (Cross-Monitor Performance)(5)

S-VG 50

4. Effective and Ineffective Crews

a. The effective crew

Effective crews are composed of assertive crewmembers who consistently engage in situational leadership. Each crewmember knows he/she is a productive member of the team and is willing to help fellow crewmembers without request. The entire crew participates as a team in the planning,

execution, and after-action review phases of the mission. With the exception of high workload conditions or short lead times, an analytical style of decision making is employed and each crewmember feels free to express concerns or advocate a position. The cockpit climate is relaxed and friendly but professional in its execution of mission objectives. Crewmembers provide timely and clearly stated information to one another to maintain a common understanding of conditions, actions, and decisions. Critiques and after-action reviews are constructive and are anticipated as a learning experience to enhance future crew performance.

S-VG 51

b. The ineffective crew

Ineffective crews are composed of crewmembers who are unable to balance task and personnel considerations. Crewmember's feelings may range from frustration to just being along for the ride; they generally do not help one another without direction. The sole planner and decision maker is the PC who provides only a cursory briefing to the crew. Crewmembers may be left wondering about their actions, duties and responsibilities. The cockpit climate is business-like; however, confusion is likely to occur during high workload and short lead time situations because only the PC understands the mission objectives and is unable to explain requirements under such conditions—even after the crisis has passed. Critiques and after-action reviews, when done, are accusatory and nonproductive. Unit personnel may express dissatisfaction when assigned to fly with a particular member of such a crew.

S-VG 52

5. How to Build an Effective Team

a. Management style (*Student Guide*, Appendix G, p. G-55)

Nurturing: A nurturing manager (1, 9) would place emphasis on people ensuring crewmembers are happy, contented, and feel a sense of warmth and acceptance. He will want to cooperate to ensure efficient flight performance (people but not task oriented)

Autonomous: An autonomous manager (1, 1) would have a minimum response to both people and performance. He is only on the job to reach some private goal, maybe retirement. He is a coaster. He is visible and looks occupied without actually doing anything and contributes as little as possible without getting into trouble (neither people nor task oriented)

Balancer: A middle-of-the-road manager (5, 5) who adjusts to the tempo that others have come to adopt. He will not push for more even though the results obtained are less than what might have been accomplished by a different approach. In this way some progress is made and everyone feels that something has been done. When conflict arises, he adjusts by splitting the difference in ways that include compromise, accommodation, and adjustment (neither task nor people oriented)

Aggressive: An aggressive manager (9, 1) is a controller. He controls the situation in such a way that the human element interferes in a minimum way. He has little concern for thoughts, feelings, or attitudes of others. He uses authority to control and expects obedience or else—no ifs, ands, or buts (task but not people oriented)

Assertive: An assertive manager (9, 9) is a leader. He believes work is accomplished by committed people in pursuit of a common purpose based on a relationship of trust and respect. He is involved (both people and task oriented)

b. Theories X, Y, and Z

Theory X (autocratic approach) proposes all people are lazy and cannot be given responsibility. A Theory X leader would be directive, structuring, critical, and autocratic

Theory Y (democratic or participative approach) proposes that people are industrious and should be allowed to participate in the management function. A Theory Y leader would stress democratic procedures, participative decision making, and self-control

Theory Z (situational approach) proposes that managers need to combine characteristics of both Theory X and Y to be successful in current times

- Will a manager's or leader's style ever change?
- What managerial approach might one take on an air assault mission? A resupply mission to a base camp?
- What approach might a PC take to a new crewmember? After he's been in the crew for some time? When he's fully demonstrated ability to perform as a crewmember?

6. Flight Team Leadership and Followership

- a. Command authority is established by regulation and is not questioned

AR 95-1, General Provisions and Flight Regulations, Chapter 4, Section II, formally establishes positions and responsibilities for command and leadership within individual aircraft and flights of multiple aircraft

- Not a school for mutiny
- Must preserve command authority
- Crew coordination training advocates assertive, not rebellious behavior

- b. Flight team leadership: Leadership may come from any crewmember with the appropriate technical knowledge, skills, and information at a given time; situationally driven

- c. Authority vs. assertiveness

- Approval from PC to inquire, advocate, and assert
- If not given, frustration and anger result

- d. Assertiveness vs. aggressiveness

- Assertive behaviors fostered
- Aggressive behaviors (e.g., hostility) must be dealt with in a timely manner. Referral to a flight surgeon could be appropriate

- e. Followership

Every noncommand crewmember is responsible for actively contributing to the team effort, monitoring changes in the situation, and being assertive when necessary. With respect to upholding the command structure, there must be an attitude of professionalism in spite of any problems or barriers that may be caused by cultural factors and differences in perspective

- Are good leaders good followers as well?
- Can good followers also be good leaders?

f. Two-challenge rule

- Challenge to authority?
- Life threatening situation?
- Nonlife threatening situation?

S-VG 54

g. Military grade and position considerations (*Student Guide*, Appendix G, p. G-35)

(1) Rank

- Commissioned and Warrant
- Enlisted

(2) Duty position

- Unit
 - Commander
 - Platoon leader
 - Aviator
- Cockpit
 - IP
 - PC
 - P
- Student examples

S-VG 55

- h. Leadership principles (FM 22-100, Military Leadership; Chapters 2, 4, and 6)
- (1) Know yourself and seek self-improvement
 - (2) Be technically and tactically proficient
 - (3) Seek responsibility and take responsibility for your actions
 - (4) Make sound and timely decisions
 - (5) Set the example
 - (6) Know your soldiers and look out for their well-being

S-VG 56

- (7) Keep your subordinates informed
- (8) Develop a sense of responsibility in your subordinates
- (9) Ensure the task is understood, supervised, and accomplished
- (10) Build the team
- (11) Employ your unit in accordance with its capabilities

S-VG 57

- i. FM 22-101, Leadership Counseling
- Covers both personal and performance counseling
 - Provides a summary covering the ABCs of counseling and a checklist

S-VG 58

- j. Motivation
- What causes people to act? Motivation is basically internal but leaders can provide incentives to induce action

-
- (1) Goal directed
 - Want, need, desire for status, wealth, power
 - (2) Leader provides conditions
 - Approachable
 - Open door policy, talks with subordinates, visits facilities to show he cares
 - Open-minded
 - Doesn't cut off conversations, considers recommendations, attends to speaker
 - Realist
 - Avoids self-deception, looks at situation as is, does not misconstrue facts to match expectations
 - Goals and standards set
 - Officer Efficiency Report
 - Enlisted Efficiency Report
 - ATM
 - SOP
 - (3) Several levels of motivation (lowest to highest level)
 - *Compliance*: I do it because I have to! (Gun-to-the-head approach; no one watching, don't do; i.e., checklists)
 - *Identification*: I do it because he does it! (John's a super pilot and uses his checklist, so I will to)
 - *Internalization*: I do it because I want to! (Checklists are life-savers and should be followed to the letter)

S-VG 59

k. Coercion

- Basically the opposite of motivation since force others to action by use of threat or intimidation

(1) Command climate

- Commander "A" considers subordinate comments in the decision making process. Subordinates feel they have valuable experience to contribute to accomplishing the mission
- Commander "B" ignores subordinate inputs in reaching his decisions, usually directing them to get on with the job or suffer the consequences. Subordinates are frustrated by their lack of participation in the decision making process
- Student examples

(2) Command pressures

- Subtle (Let's try to get all the birds up for the fly-by)
- Blatant (Don't worry about crew rest; it's just a guideline anyway")

(3) Cockpit pressures

- "We can get under those wires, no problem!"
- "So we're a little short on power; let's give it a try"

S-VG 60

l. Disagreement and differences

- May also be referred to as "Conflict"
- (1) Disagreement and differences are inevitable. Can be caused by differences in personality, values, opinions, or in ways of doing things.
- (2) Conflict is not always "bad"; it can be healthy because it allows expression of differences. Can become bad if handled improperly

-
- (3) Resolution of conflict must center on "what" is right, not "who" is right; don't get involved in finger pointing exercises

06+00

S-VG 61

m. Critical phases of team building (*Student Guide*, Appendix G, p. G-35)

- How does PC do this?
 - Setting the example
 - Leadership principles
 - Constructive criticism
 - After-action reviews (to be discussed later)
- (1) Unit orientation and battle-rostering phase considers factors such as:
 - Unit organization, unit climate, previously formed teams, interpersonal relationships, command relationships
 - Basic flying tasks and cockpit technology (All crewmembers rated and current)
 - Roles of crewmembers and general characteristics of incumbents (PC responsibilities, crew chief's duties)
 - Basic norms of conduct regulating crewmember behavior (PC in charge, P and CE support; Commander is respected)
- (2) Prepermission planning and rehearsal phase
 - First "working" meeting
 - Duties and responsibilities specified
 - Unit procedures: Elaborating, affirming, or attacking

(3) Task execution phase

- High workload periods
- Low workload periods

(4) Crew-level after-action review phase

- Self-critique
- Lessons learned
- Value derived by those with a stake in the mission (short term, long term performance enhancement)
- Value derived by crew in terms of efficiency
- Value derived by individual in terms of professional growth and self-satisfaction

(5) Remain overnight (RON) and temporary duty (TDY) mission considerations

- Fine tune the team
- Destroy the team

S-VG 62

n. Team management problems in the cockpit (*Student Guide*, Appendix G, p. G-55)

(1) Lack of support

- Failure of crewmembers to back each other up, especially during high workload situations

(2) SOP ignored

- Failure to use checklist or other guidance under time or other pressures

(3) Stress problems

- Difficulty in adopting to unusual or emergency situations

Note: Conduct the Stress Practical Exercise. Ensure that sufficient copies of the exercise (Appendix G) are reproduced. Students file the completed exercise in Section 2 of the Student Guide.

Note: Stress Practical Exercise may be done in class or at home, time permitting. If done at home, review the exercise the next day prior to the first hour of instruction.

(4) Judgement problems

- Management of priorities and distractions distort the judgment process

(5) Emotional problems

- Aggression or extreme submissiveness in the aircraft affect personal relations, or where there is a carry-over of domestic worries and conflict to the job

(6) Get-home-itis

- Failure to divert or go around in a high risk situation

(7) Management problems

- A deferral to management authority, for example, expediting departure before the crew is sufficiently prepared

(8) Discipline problems

- Corners are cut and there is inadequate control of operations in the aircraft

(9) Leadership problems

- No delegation of task responsibility or attention to comments and suggestions of fellow crewmembers

(10) Communications problems

- No attention to standardized vocabularies or conversation control

7. Performance Criteria for Basic Quality 1: Establish and Maintain Flight Team Leadership and Crew Climate (see *Student Guide*, Appendix E, Basic Quality 1)

- If team building principles observed, will have built an effective crew. Rating factors and examples of each for Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 63

Rating Factors:

Leadership Style

- Superior* + PC actively establishes an open climate where crewmembers freely talk and ask questions
+ PC considers each crewmember to be an important contributor to mission success

- Acceptable* • PC permits an open climate with some discussion and questioning among crewmembers
• PC acknowledges each crewmember as part of the team

- Very Poor* - PC creates a restrictive climate by means of an authoritarian management style
- Some crewmembers feel ignored by the PC and are reluctant to speak up

S-VG 64

Professional Respect

- Superior* + Each crewmember is valued for their expertise and judgement
+ Rank and experience differences do not influence the willingness of crewmembers to speak up

- Acceptable* • Crewmembers show an acceptable level of professional courtesy to one another
• Rank and experience differences do not induce any obvious conflicts or inhibit communication

-
- Very Poor* - Crewmembers openly or indirectly belittle one another
- Rank and experience differences are an obvious source of conflict and inhibit communication

S-VG 65

Resolving Disagreements

- Superior* + Alternative viewpoints are considered a normal and occasional part of crew interaction
+ Disagreements are handled in a professional manner without involving personal attacks or defensive posturing
- Acceptable* • Some alternative viewpoints are tolerated and they do not lead to obvious disruption of teamwork
• Disagreements do not involve obvious attacks of character or defensive posturing
- Very Poor* - Disagreements exist among the crewmembers, but are rarely surfaced for resolution
- Conflicts may involve personal attacks and result in a disruption of teamwork

S-VG 66

Crewmember Attitudes

- Superior* + PC actively monitors the attitudes of crewmembers and offers feedback when necessary
+ Each crewmember actively displays a proper concern for balancing safety with mission accomplishment
- Acceptable* • PC takes steps to correct obvious displays of improper or hazardous attitudes
• Crewmembers do not display obvious disregard for safety during the mission
- Very Poor* - PC exhibits a hazardous attitude, or tolerates such an attitude in other crewmembers
- Displays of hazardous attitudes by one or more crewmembers may jeopardize flight safety

S-VG 67

8. Illustrations of Crew Coordination Objective 1: Establish and Maintain Team Relationships (see Appendix B and *Student Guide*, Appendix D)

VT 02

Note: Recommend discussing case number 1-3, U-8F Qualification Training Flight, from the Case Study Selection Matrix extract below; show Ketchikan, Alaska, video segment.

Note: Case Study Selection Matrix extract (Appendix B) for Crew Coordination Objective 1 is provided below:

Table B-1. Case Study Selection Matrix (Extract)

Example	Broken Wing	ACFT	ATM Task	Video
1-1	Yes	UH-1N	2009	No
1-2	No	UH-60	2009	No
1-3	No	U-8F	3004	No

Crew Coordination Objective 2: Mission Planning and Rehearsal

Note: Review definition of Crew Coordination Objective 2: To explore, as a crew, all aspects of the assigned mission and analyze each segment for potential difficulties and possible reactions in terms of the commander's intent

- This Crew Coordination Objective has two Basic Qualities:
 - BQ 2: Prepermission planning and rehearsal accomplished
 - BQ 3: Application of appropriate decision making techniques

S-VG 69

Learning Objectives for Hours 7, 8, and 9

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Explain "collective visualization."
2. Describe unique Army aviation environmental factors that make mission planning and rehearsal a necessity.
3. Identify the flight planning and rehearsal steps.
4. Recognize the performance criteria for BQ 2.
5. Determine how BQ 2 and its associated Crew Coordination Elements were involved in Army aviation accidents.

Note: Identify related ATM Crew Coordination Elements:

Coordinate action sequence and timing: Proper sequencing and timing ensures that the actions of one crewmember mesh with the actions of the other crewmembers

S-VG 70A

Basic Quality 2: Prepermission Planning and Rehearsal Accomplished

1. Definition of Basic Quality 2: (Student Handout, p. 1-39)

Prepermission planning includes all preparatory tasks associated with planning the mission. These tasks include VFR flight planning (ATM Task 1001), IFR flight planning (ATM Task 1002), or terrain flight mission planning (ATM Task 1033/2078), performance planning (ATM Tasks 1003 & 1004), assigning crew-member responsibilities (Unit SOP and ATM Task 1000), and all required briefings and brief-backs.

- Discuss collective visualization

Prepermission rehearsal involves the crew collectively visualizing and discussing expected and potential unexpected events for the entire mission. This process requires all crewmembers to think through contingencies and actions for difficult segments, tasks, or unusual events associated with the mission and developing strategies to cope with contingencies.

S-VG 70B

Time available determines how much prepermission planning and rehearsal is completed prior to flight or in the cockpit. Mission changes received in-flight will necessitate in-flight planning and rehearsal.

- Less planning time = higher mission risk

Although the pilot-in-command is responsible for leading mission planning and review, the entire crew should actively participate. For multi-aircraft operations, the air mission commander is responsible and all aircrews should participate.

The overall objective of prepermission planning and rehearsal, from a crew coordination point of view, is to ensure the entire crew understands all the mission requirements and their role in accomplishing the requirements.

S-VG 71

2. Unique Requirements of the Army Flight Environment

- a. Fixed wing critical 11 minutes
 - Three minutes after takeoff
 - Eight minutes during the landing

b. Safety window (*Student Guide*, Appendix G, p. G-123)

- Block of airspace centered on airfield
- Surface to 2000' AGL
- Takeoff to en route climb phase
- Final approach fix (FAF) to taxi
- Small % of total flight time vs 80% of accidents
- Crew procedural vs. mechanical errors
- Workload at peak within window

S-VG 72

c. Rotary wing tactical missions operate within hazardous flight regimes nearly all the time

- Terrain flight (NOE to 100' AHO)
- Short reaction times to emergencies or unexpected events
- Degraded environmental conditions
- Night and NVD flight
- Technique: Rely on well-trained, immediate action procedures, drills, and planning

d. Fatigue causes performance degradation

- Larger deviations are tolerated
- More frequent lapses of attention
- Distraction increases
- Selectivity increases—some tasks neglected
- Timing is off

S-VG 73

- e. High probability crew coordination error operational profiles
- (1) Tactical terrain flight missions at night
 - (2) Cruise phase of terrain flight
 - (3) Crew briefings (failure to assign duties and responsibilities for entire mission)
 - (4) Night proficiency and transition missions
 - (5) Taxi phase of administrative or support missions
 - (6) Landing approach
 - (7) Hovering flight (P not offering assistance to P*)
 - (8) Hovering flight (P* not properly directing clearing assistance)
 - (9) Premission planning (failure to become mutually involved in planning and rehearsal)

S-VG 74

- f. Events present in aviation accident cases
- (1) Sudden loss of visual reference
 - (2) Nuisance malfunctions (Lights, audios, and other distractions)
 - (3) Evasive maneuvers during formation flight
 - (4) NVG descents over low contrast surfaces
 - (5) Approaches into tight LZs with numerous obstacles
 - (6) Maneuvering close to obstacles
 - (7) Wire avoidance
 - (8) Threat evasive maneuvers
 - (9) Inadvertent IMC

3. Flight Planning and Rehearsal (FM 1-400, TC 1-201, TC 1-204, Unit SOP)

a. Flight planning

- (1) Acquire or update mission information (OPORD, FRAGO, Aircrew Mission Briefing). Clarify mission requirements, commander's intent and seek additional guidance as required. Verify when mission is complete.
- (2) Determine actions, duties, and mission responsibilities (unit SOP).
 - Routine
 - Nonroutine
- (3) Collect and analyze information pertaining to all aspects of the mission (METT-T). Coordinate with supported unit(s).
- (4) Plan the mission.
 - Plan the flight
 - Determine chain of command
 - Determine threat suppression requirements
 - Determine mission specific equipment
 - Fratricide and rules of engagement considered
- (5) Visualize and actively rehearse the mission to assess risks, identify potential problem areas, and develop alternative courses of action.
- (6) Conduct crew briefing to review and discuss the plan (ATM Task 1000).
 - Entire crew should participate

S-VG 76

b. The flight planning sequence

- (1) Conduct map & aerial photo reconnaissance
- (2) Review NOTAMs and enemy/friendly reports
- (3) Assess METT-T and radio navigation considerations
- (4) Select mode(s) of terrain flight
- (5) Select movement technique(s)
- (6) Select routes
 - Compute and determine mission requirements; e.g., fuel, ammo, special equipment
 - Annotate map or overlay
- (7) Complete performance planning
 - Weight & balance (ATM Task 1003)
 - Power requirements (ATM Task 1004)
 - Fuel consumption & endurance (ATM Task 1004)

S-VG 77

c. The rehearsal sequence

- (1) Analyze overall mission; define requirements
- (2) Break the mission into functional segments (e.g., SP to FLOT, RP to LZ, etc.)
- (3) Visualize "flying through" each segment; consider flight corridors, LZ times, special equipment use
- (4) Identify segments where time pressure, communication requirements, navigation demands, threat exposure, etc., are high
- (5) Identify potential problems and assess risk
- (6) Develop strategies

S-VG 78

d. Factors affecting the planning and rehearsal process

- (1) Time available to plan
 - Premission vs. in-flight
- (2) Type of mission; e.g., routine, repetitive, unusual, single or multi-ship, day, night, or NVD
- (3) Crew's familiarity with current tactical situation, area of operations, unit SOP, and the planning process.
- (4) Completeness and thoroughness of unit SOP
- (5) Experience and proficiency level of the individual crewmembers and the crew itself
 - New unit with new people
 - Established unit with experience
- (6) Information available to the crew
 - Field location
 - Fixed base operations

S-VG 79

e. Prioritizing the planning and rehearsal process

- (1) Determine time available (before the mission and between segments during the mission) for planning sequence
- (2) Determine critical segments of the mission
- (3) Determine critical information, computations, or actions required for planning or rehearsal
- (4) Delegate planning responsibilities

-
- (5) Rehearse critical segments
 - (6) Brief results to all concerned

S-VG 80/81A/81B

Note: Conduct Planning Practical Exercise. Ensure that sufficient copies of the exercise (Appendix G) are reproduced. Students file the completed exercise in Section 2 of the Student Guide.

- Divide class into teams of 2 to 6 crewmembers, depending on class size. (Keep crews intact during the practical exercise.)
- Refer students to exercise scenario handout. Have teams read the general situation.
- Allow ten minutes for each team to complete the practical exercise.
- Have each team brief the class on its results. (If there are time constraints, obtain a class consensus on the highest priority items.)
- Discuss results and resolve differences.

S-VG 82

f. Planning and rehearsal benefits for aircrews

- (1) Increases understanding of mission requirements
 - Commander's intent
 - Contingencies or problems
 - Alternatives or solutions
- (2) Prepares crewmembers to anticipate other crewmember's needs and assist each other ("two-challenge" rule)
- (3) Improves crew's ability to establish and maintain proper lead time and to maintain overall mission situational awareness
 - Internal requirement lead times
 - External requirement lead times

- (4) Improves synchronization, both internally and externally (effective integration of all crewmembers and aircrews in support of the plan; enhances sequence and timing of actions)
- (5) Facilitates the decision making/problem solving process
- (6) Reduces risk

4. Performance Criteria for Basic Quality 2: Prepermission Planning and Rehearsal Accomplished

- If the prepermission planning and rehearsal guidance has been observed, will have enhanced the crew's capability to safely perform the mission. Rating factors and examples of each for Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 83

Rating Factors:

Prepermission Flight Planning

<i>Superior</i>	+ PC actively insures that all actions, duties, and mission responsibilities are partitioned and clearly assigned to specific crewmembers + Each crewmember is actively involved in the mission planning process to insure a common understanding of mission intent and operational sequence + Planning activities are prioritized to insure that critical items are addressed within the available planning time
<i>Acceptable</i>	• No obvious assignments are overlooked regarding critical actions, duties, or mission responsibilities • All crewmembers have a general understanding of mission intent and operational sequence; each crewmember participates at least minimally in the planning process • Planning activities are generally prioritized within the available time; no major component of the mission overlooked
<i>Very Poor</i>	- One or more critical actions, duties, or mission responsibilities are overlooked during the prepermission planning process - One or more crewmembers have an inadequate or incorrect understanding of mission intent or operational sequence due to lack of involvement in planning process

- Little attention is given to prioritizing planning activities within the available planning time; some components of the mission are neglected

S-VG 84

Permission Rehearsal

- Superior* + Alternative courses of action are identified in anticipation of potential changes in METT-T factors; crew is fully prepared to implement contingencies as necessary
- + Crewmembers mentally rehearse the entire mission by visualizing and discussing potential problems, contingencies, and responsibilities
- Acceptable* • Some attention is given to identifying alternative courses of action; crew can react to changes in METT-T factors, but some additional planning will be required
- Crewmembers give some attention to discussing potential problems, contingencies, and responsibilities; they do not mentally rehearse all critical flight segments or sequences
- Very Poor* - Little or no attention is paid to identifying alternative courses of action; changes in METT-T factors would require substantial replanning by crewmembers
- Crew fails to discuss or rehearse critical flight segments and sequences; they begin the mission with marginal understanding or agreement concerning potential problems, contingencies, or responsibilities

S-VG 85

In-Flight Replanning and Rehearsal

- Superior* + PC actively insures that crewmembers take advantage of low workload periods to rehearse upcoming flight segments
- + Crewmembers continuously review remaining flight segments to identify required adjustments; planning consistently keeps ahead of critical lead times
- Acceptable* • Crewmembers engage in some in-flight rehearsal of up-coming flight segments; no major coordination problems arise that can be attributed to a failure to rehearse
- Crewmembers occasionally review remaining flight segments to identify required adjustments; planning generally keeps ahead of critical lead times

-
- Very Poor* - Little or no attention is given to in-flight rehearsal of up-coming flight segments; coordination problems can be attributed to a failure to rehearse
- Through inattention, crewmembers frequently fall behind in anticipating required adjustments as the mission progresses; in-flight planning consistently appears rushed

S-VG 86

5. Illustrations of Basic Quality 2: Pre-mission Planning and Rehearsal Accomplished (see Appendix B and *Student Guide*, Appendix D)

VT 03

Note: Recommend discussing case number(s) 2-1, AH-1G VFR Cross-Country Flight, and 2-2, CH-54 Support Mission, from the Case Study Selection Matrix extract on page 3-71; show CH-54 support mission video segment and stress crew error aspects of the case.

S-VG 87

Learning Objectives for Hours 7, 8, and 9 (Cont.)

6. Define decision making and identify the key decision maker.
7. Identify the correct decision-making technique for a given situation.
8. Explain the hazardous thought patterns and their countermeasures.
9. Recognize the performance criteria for BQ 3.
10. Determine how BQ 3 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 88

Basic Quality 3: Application of Appropriate Decision Making Techniques

6. Definition of Basic Quality 3: (Student Handout, p. 1-49)

Decision making is the act of rendering a solution to a problem and defining an action plan. It must involve risk assessment. The quality of decision making and problem solving throughout the planning and execution phases of the mission is based on the information available, time urgency, and level of involvement and information exchange among crewmembers. The crew's ability to apply an appropriate decision making technique based on these criteria has a major impact on the manner and quality of their resultant actions. Although the entire crew should be involved in the decision making and problem solving process, the pilot-in-command (PC) is the key decision maker.

S-VG 89

7. Decision Making Models or Style

Two contrasting models or styles are available: analytical decision making and automatic, or pattern-recognition, decision making. Each style may be appropriate depending on the available time and other situational factors including levels of risk.

a. Analytical style

- (1) Useful in dealing with structured problems
- (2) Systematic approach
- (3) Thorough--more data taken into account
- (4) More time consuming

b. Automatic style

- (1) Based on prior training and experience
- (2) Influenced by premission planning and rehearsal
- (3) Useful in dealing with unstructured problems
- (4) Quick and creative but little time for consultation
- (5) May not consider all data

S-VG 90

c. The classic (analytical) decision making process (FM 22-100)

- (1) Identify the problem
 - Common error to identify wrong problem or wrong causes of a problem
 - Tendency increases as levels of fatigue and stress increase
- (2) Gather information
 - Encourage open discussion
 - Avoid premature judgement
- (3) Develop alternative courses of action
 - Stress generation of ideas
 - Encourage advocacy and assertiveness

-
- (4) Analyze and compare courses of action
 - Anticipate change
 - Think of and prepare for "what ifs"
 - Look for unanticipated risk
 - (5) Make a decision; select a course of action
 - PC makes final decision
 - Be flexible and prepared for change
 - (6) Make a plan
 - Communicate to crew
 - Assign tasks and priorities
 - (7) Implement and evaluate the plan
 - Monitor for task overload
 - Make changes as needed
 - (8) Examples
 - Route planning, fuel management, gear problems, heating and cooling problems

S-VG 91

- d. Automatic (pattern-recognition) decision making process
 - (1) Identify the problem
 - Confronted with situation
 - Encounter a choice point

-
- (2) Recognize familiarity of the situation
 - Previous experience and training
 - Planning and rehearsal
 - (3) Generate and evaluate options through mental simulation (one at a time)
 - (4) Implement first plausible option
 - (5) Inform the crew (announce actions)
 - (6) Examples
 - Emergencies, acquired by threat, hostile fire, casualties

S-VG 92

- e. Key differences between the two styles
 - (1) Driven by time available
 - (2) Information gathering
 - Analytical: Yes; Automatic: No
 - (3) Developing alternatives
 - Analytical: Many; Automatic: Few
 - (4) Selecting alternatives
 - Analytical: Best; Automatic: First

S-VG 93

- f. Application of decision style
 - (1) Each is appropriate, depending on the time and circumstances
 - (2) All crewmembers should be allowed input to the decision making process when time permits (ATM Crew Coordination Element #4: Offer assistance)

-
- (3) All decisions and actions should be announced to other crewmembers
(ATM Crew Coordination Element #3: Announce actions)

S-VG 94

g. Importance of decision making process on crew coordination

- (1) It supports the goal of crew coordination
 - Get the crew to work together
 - Use all available resources
 - Make the best decision
- (2) Achieves synergy
 - Sum of team effort greater than the sum of individual efforts
 - Group decisions better than individual
- (3) Fosters an environment of good communication and leadership

S-VG 95

8. Hazardous Attitudes that Impede the Decision-making Process

a. Anti-authority

- Don't like people telling them what to do
- Resentful of rules, regulations, procedures
- Likely after deciding to separate from Army
- Antidote: Follow the rules. *They are usually right.*

b. Impulsivity

- Need to do something immediately
- Don't stop to consider consequences
- Antidote: Not so fast! *Think first.*

-
- c. Invulnerability
 - Accidents only happen to others
 - More likely to take a chance
 - Antidote: *It could happen to me!*
 - d. Macho
 - Try to prove they are better than others
 - Take risks to impress others
 - Need for dominance or superiority
 - Ego gratification
 - Antidote: *Taking chances is foolish!*
 - e. Resignation
 - Think "What's the use?"
 - Attribute outcome to good/bad luck
 - Leave decisions to others
 - Can result from overbearing PC
 - Antidote: *I'm not helpless! I can make a difference.*
 - f. "Get-there-itis"
 - Desire to reach destination at any cost
 - Blocks awareness of hazards
 - Antidote: *Nothing will happen if I don't get there as planned. There's always another day.*

- g. Overconfidence in another crewmember
 - Could be the halo effect
 - Possibly swayed by reputation
 - Generally not a good assumption
 - Antidote: *My fellow crewmembers are not infallible.*

S-VG 96

Note: Conduct the Hazardous Thought Pattern Practical Exercise. Ensure that sufficient copies of the exercises (Appendix G) are reproduced. Students file the completed exercises in Section 2 of the Student Guide.

Note: Hazardous Thought Pattern exercises may be done in class or at home, time permitting. If the exercises are done at home, review them the next day prior to the first hour of instruction.

9. Performance Criteria for Basic Quality 3: Application of Appropriate Decision Making Techniques (see *Student Guide*, Appendix E, Basic Quality 3)
 - If we have correctly applied the decision making techniques available, the chances of having selected effective courses of action which take advantage of the crew's experience is greatly enhanced. Rating factors and examples of each for Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 97

Rating Factors:

High Time Stressed Decisions

Superior	+	Crewmembers consistently rely on a pattern-recognition decision process to produce timely responses; deliberation is minimized, consistent with available decision time
	+	Crewmembers consistently display an ability to focus on only the most critical factors influencing their choice of response
	+	Crewmembers efficiently prioritize their specific information needs, consistent with available decision time

-
- Acceptable* • Crewmembers generally avoid excessive deliberation when it is inconsistent with the time urgency of the decision; decisions meet minimal time requirements
- Crewmembers generally address the most critical factors, but may be occasionally distracted by secondary issues
 - Crewmembers generally request only information that is obtainable within the available decision time
- Very Poor* - Crewmembers display an inflexible decision style, frequently engaging in excessive deliberation; delayed decisions frequently compound the difficulties faced by the aircrew
- Crewmembers may lose focus and become distracted by secondary factors
 - Crewmembers delay critical decisions by seeking information that is unattainable within the available decision time

S-VG 98

Moderate/Low Time Stress Decisions

- Superior* + Crewmembers consistently rely on an analytical decision process to produce high quality decisions; deliberation is encouraged, consistent with available decision time
- + Crewmembers consistently consider all important factors influencing their choice of action, seeking the most unbiased decision possible
 - + Crewmembers consistently seek out all available information relative to the factors being considered
- Acceptable* • Crewmembers generally engage in some deliberation, avoiding decisions that appear to reflect impulsive or hazardous attitudes
- Crewmembers generally address the important factors influencing their choice of action, avoiding obvious decision biases or gaps in logic
 - Crewmembers generally seek out the most important information relative to the factors being considered
- Very Poor* - Crewmembers display an inflexible decision style, frequently responding in an impulsive manner with little or no deliberation; impulsive decisions frequently compound the difficulties faced by the crew
- Crewmembers overlook one or more important factors influencing their choice of action; one or more types of decision biases are evident in their thinking
 - Crewmembers fail to seek out one or more important pieces of available information relative to the factors being considered

S-VG 99

10. Illustrations of Basic Quality 3: Application of Appropriate Decision Making Techniques (see Appendix B and *Student Guide*, Appendix D)

VT 04/VT 05

Note: Recommend discussing case number(s) 2-9, UH-60A Fast Rope Demonstration, and 2-6, UH-1H Rappelling Accident, from the Case Study Selection Matrix below; show UH-60 fast rope and UH-1H rappelling video segments.

Note: Case Study Selection Matrix extract (Appendix B) for Crew Coordination Objective 2 is provided below:

Table B-1. Case Study Selection Matrix (Extract)

Example	Broken Wing	ACFT	ATM Task	Video
2-1	No	AH-1G	1035	No
2-2	No	CH-54	2016	Yes
2-3	No	OH-6A	1023	No
2-4	No	UH-1H	—	No
2-5	No	UH-1H	1068	No
2-6	No	UH-1H	—	Yes
2-7	No	UH-1V	2081	No
2-8	No	UH-60A	2010	No
2-9	No	UH-60A	2010	Yes
2-10	No	UH-60A	2003	No
2-11	No	UH-60	1028	No

Crew Coordination Objective 3: Establish and Maintain Workload Levels

Note: Review definition of Crew Coordination Objective 3: To manage and execute the mission workload in an effective and efficient manner with redistribution of task responsibilities as the mission situation changes

- This Crew Coordination Objective has two Basic Qualities:
 - BQ 4: Prioritize actions and distribute workload
 - BQ 5: Management of unexpected events

S-VG 101

Learning Objectives for Hour 10

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Identify the two factors than must be avoided to achieve effective workload management.
2. Explain the importance of task prioritization on workload management.
3. Recognize the performance criteria for BQ 4.
4. Determine how BQ 4 and its associated Crew Coordination Elements were involved in Army aviation accidents.

Note: Identify related ATM Crew Coordination Elements:

Direct assistance: A crewmember will direct assistance when he cannot maintain aircraft control, position, or clearance

Offer assistance: A crewmember will offer assistance when he sees that another crewmember needs help

Coordinate action sequence and timing: Proper sequencing and timing ensures that the actions of one crewmember mesh with the actions of the other crewmembers

S-VG 102

Basic Quality 4: Prioritize Actions and Distribute Workload

1. Definition of Basic Quality 4: (Student Handout, p. 1-58)

This Basic Quality measures 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.

S-VG 103

2. Prioritizing Actions and Distributing Workload

a. Importance of prioritizing actions and distributing workload (workload management)

- (1) Errors relating to this quality accounted for 35% of the crew coordination errors**
- (2) Many Army aviation accidents and incidents occur during periods of high workload**
 - Terrain flight cruise**
 - Hover**
 - Approach and landing**
- (3) Four of the six types of crew coordination errors identified in the ATM relate to this Basic Quality (para 1-3b, TC 1-210)**
 - Failure to direct assistance**
 - Failure to offer assistance**
 - Failure to assign crew responsibilities**
 - Failure to sequence actions**
- (4) Mismanagement of workload results in degraded mission performance**

S-VG 104

- b. Workload in the Army's complex, dynamic flight environment
- (1) *Mental* versus mechanical
 - (2) *High* versus Low workload
 - (3) Classification of tasks
 - Critical tasks
 - Require immediate attention
 - Consequence is disastrous
 - Examples such as in-flight fire, loss of power or fuel, out of limit sensings
 - Important tasks
 - Respond as soon as possible
 - Could become critical
 - Examples such as loss of engine (multiengine aircraft), system loss (hydraulic)
 - Routine tasks
 - Handled in turn
 - No serious impact
 - Could become important
 - Examples such as caution or advisory light conditions

S-VG 105

c. Causes of high workload

- (1) Poor planning and rehearsal**
 - Failure to assign responsibilities
- (2) Unexpected events**
 - Emergencies, material failures
- (3) Weather and the environment**
 - Inadvertent IMC, reduced visibility, insufficient illumination
- (4) ATC**
 - Clearance changes just prior to takeoff, holding
- (5) Cockpit design**
 - Field of view limitations, design and location of controls and switches can confuse
- (6) Mission complexity**
 - NVD required, multi-ship, tactical situation
- (7) Crew endurance**
 - Noncompliance with guidance

S-VG 106

d. Effects of high workload

- (1) Difficulties in achieving good performance**
 - Lower standards
 - More little errors
 - Erratic performance

-
- (2) Difficulty with aircraft control
 - (3) Uncertainty/indecision/discomfort
 - (4) Lose normal scan
 - Tunnel vision
 - Fixation
 - (5) Temporal distortion
 - No sense of time or space
 - (6) Difficulty communicating
 - Voice pitch can indicate stress

S-VG 107

e. Managing high workload

- Situational awareness level high; adrenaline flowing
- (1) Delegate
 - New ATM tasks (ex: 1016 - Perform Hover Power Check; 1081 - Perform Nonprecision Approach; 2079 - Perform Terrain Flight Navigation)
 - Unit SOP
 - Crew mission briefing (ATM Task 1000)
 - (2) Prioritize (critical tasks first)
 - Aircraft control
 - Obstacle clearance

-
- (3) Expand time available
 - Preemption and in-flight planning
 - Slow down/climb higher
 - (4) Monitor
 - Each other
 - Critical flight parameters

S-VG 108

- f. Effects of low workload
 - Situational awareness level low; mind wandering
- (1) Inattention
- (2) Drowsiness/boredom
- (3) Complacency
- g. Managing low workload
 - (1) Rehearse and refine next mission segment
 - (2) Recheck weather
 - (3) Review emergency procedures

S-VG 109

- h. Operationally-related distractions
 - (1) Caution and warning lights
 - (2) Conflicting traffic
 - (3) Cockpit conversations or radio traffic

(4) Checklists

- Occasional distraction, but benefits outweigh drawbacks

i. Non-operationally-related distractions

(1) Financial

(2) Medical

(3) Family

(4) Supervisors/Peers

(5) Must cope with non-operationally-related distractions

S-VG 110

j. Dealing with operationally related distractions (maintaining our focus of attention)

(1) Ignore

- During critical points in mission
- Radio traffic

(2) Delay

- Prioritize—do when time allows
- Fire light during landing

(3) Delegate

- Use entire crew
- Complex clearance from ATC

(4) Handle

- Aircraft control and hazard avoidance come first
- Critical tasks

3. Performance Criteria for Basic Quality 4: Prioritize Actions and Distribute Workload (see *Student Guide*, Appendix E, Basic Quality 4)

- Ability to prioritize actions and distribute workload greatly affects mission performance and cockpit climate. Rating factors and examples of Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 111

Rating Factors:

Task Prioritization

- Superior* + Crewmembers are consistently able to identify and prioritize competing mission tasks; flight safety and other high-priority tasks are never ignored; low-priority tasks are appropriately delayed until they do not compete with more critical tasks
- + Crewmembers consistently avoid non-essential distractions; distractions have no impact on task performance
- Acceptable* • Crewmembers are generally able to maintain a focus on flight safety and other high-priority mission tasks; task prioritization is acceptable, but could be improved
- Crewmembers generally avoid non-essential distractions; some distractions arise, but have no impact on flight safety
- Very Poor* - Low-priority tasks are occasionally attended to at the expense of flight safety or other higher priority mission tasks; significant compromises in flight safety occur
- Crewmembers may be distracted by non-essential events and radio traffic; distractions result in compromises in flight safety

S-VG 112

Workload Distribution

- Superior* + PC actively manages distribution of mission tasks to prevent any crewmember from being task overloaded, especially during critical phases of flight
- + Crewmembers are consistently aware of workload buildup on others and react quickly to adjust distribution of task responsibilities

-
- Acceptable* • Distribution of cockpit workload is not optimal, but no serious incidents of task overload occur with any one crewmember
- Crewmembers maintain some awareness of workload buildup on others; workload is adjusted before serious compromise to flight safety occurs
- Very Poor* - Maldistribution of cockpit workload occurs; task overload of one or more crewmembers may relate significantly to an issue of flight safety
- Crewmembers are generally unaware of workload buildup on others; little or no attempt is made to adjust the distribution of task responsibilities before significant compromises to flight safety occur

S-VG 113

4. Illustrations of Basic Quality 4: Prioritize Actions and Distribute Workload (see Appendix B and *Student Guide*, Appendix D)

Note: Recommend discussing case number(s) 3-3, CH-47D Combining Transmission Failure, and 3-5, OH-58C Night Tactical Mission, from the Case Study Selection Matrix extract on page 3-85.

S-VG 114

Learning Objectives for Hour 10 (Cont.)

5. Define unexpected events.
6. Describe the types of unexpected events and the best ways to prepare for their management.
7. Recognize the performance criteria for BQ 5.
8. Determine how BQ 5 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 115

Basic Quality 5: Management of Unexpected Events

5. Definition of Basic Quality 5: (Student Handout, p. 1-64)

This Basic Quality measures 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.

6. Management of Unexpected Events

S-VG 116

- a. Types of unexpected events

- (1) Malfunctions

- What types of malfunctions would involve crew coordination? (Hydraulic failures, stabilator failures, two-way radio failures)

- (2) Inadvertent IMC

- What crew coordination actions are required for IIMC? (Radio contacts, VHIRP procedures, finding and briefing approach plates)

- (3) Encounters with threat

-
- (4) Sudden loss of visual reference near the ground
 - Whiteout and brownout
 - (5) Unusual environmental conditions
 - Windshear, turbulence, downdrafts
 - (6) Near mid-air collisions
 - (7) Short notice in-flight mission change

S-VG 117

b. Preparing for unexpected events

- (1) Technical and tactical proficiency
 - Knowledge
 - Training
 - Practice
- (2) Pre-mission planning and rehearsal
 - Assigning duties and responsibilities
 - Rehearsing "anticipated" events
- (3) Reminders during in-flight periods of low workload

S-VG 118

c. Coping with unexpected events through interrelated use of all available resources

- (1) Internal resources
 - Aircrew (self and others)
 - Equipment (aircraft systems)
 - Information (maps, checklists, -10)

(2) External resources

- Time (conserve through planning)
- Other aircraft
- Tactical controlling agency
- ATC
- Technical representatives

7. Performance Criteria for Basic Quality 5: Management of Unexpected Events
(see *Student Guide*, Appendix E, Basic Quality 5)

- If the crew is prepared to handle unexpected events, the impact on mission safety, efficiency, and effectiveness will be minimized. Rating factors and examples of Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 119

Rating Factors:

Crew Preparation and Composure

<i>Superior</i>	+ + +	- Crew actions reflect extensive rehearsal of emergency procedures in prior training and premission planning and rehearsal - Crewmember actions and information exchange are highly coordinated with minimal verbal direction from the PC - Crewmembers respond in a composed, professional manner
<i>Acceptable</i>	• • •	- Crew actions reflect consistent understanding of emergency procedures; responses are adequately standardized to avoid significant conflicts or misunderstandings - Crewmember actions and information exchange proceed smoothly, although moderate direction from the PC is necessary - Crew composure is tense, but not flustered
<i>Very Poor</i>	- - -	- Crew actions reflect misunderstanding of emergency procedures; little or no evidence of prior rehearsal during training or premission planning - Crew actions and information exchange require extensive direction from the PC in order to avoid significant conflicts or misunderstandings - Crew composure is disorganized and flustered

S-VG 120

Resource Management

- Superior* + Each crewmember appropriately or voluntarily adjusts individual workload and task priorities with minimal verbal direction from the PC
- + Each crewmember is effectively utilized in responding to the emergency; workload is efficiently distributed
- Acceptable* • Each crewmember appropriately adjusts workload and task priorities, although moderate direction from the PC is necessary
- Each crewmember is utilized in responding to the emergency, with no major maldistributions of workload
- Very Poor* - One or more crewmembers fails to appropriately adjust workload during the course of the unexpected event resulting in a significant compromise to flight safety
- One or more crewmembers is inappropriately utilized or underutilized, resulting in a significant compromise to flight safety or mission performance; other crewmembers experience task overload

S-VG 121

8. Illustrations of Basic Quality 5: Management of Unexpected Events (see Appendix B and *Student Guide*, Appendix D)

VT 06

Note: Recommend discussing case number(s) 3-9, UH-60 NVG Training Flight, from the Case Study Selection Matrix extract on the following page; show Eastern 401 video segment.

Note: Case Study Selection Matrix extract (Appendix B) for Crew Coordination Objective 3 is provided on the following page:

Table B-1. Case Study Selection Matrix (Extract)

Example	Broken Wing	ACFT	ATM Task	Video
3-1	Yes	AH-1F	—	No
3-2	Yes	AH-6	—	Yes
3-3	Yes	CH-47D	—	No
3-4	Yes	CH-47D	—	No
3-5	No	OH-58C	1035	No
3-6	No	OH-58C	2094	No
3-7	No	UH-1	1017	No
3-8	No	UH-1H	2081	No
3-9	No	UH-60	1022	No
3-10	No	UH-60A	2081	No
3-11	No	UH-60	1015	No

Crew Coordination Objective 4: Exchange Mission Information

Note: Review definition of Crew Coordination Objective 4: To establish intra-crew communications using effective patterns and techniques that allow for the flow of essential information between crewmembers

- This objective is critically important to crew coordination. Key words in the definition are: communications, patterns and techniques, and information flow. This Crew Coordination Objective has four Basic Qualities:
 - BQ 6: Statements and directives clear, timely, relevant, complete, and verified
 - BQ 7: Maintenance of mission situational awareness
 - BQ 8: Decisions and actions communicated and acknowledged
 - BQ 9: Supporting information and actions sought from crew

S-VG 123

Learning Objective(s) for Hours 11, 12, and 13

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Identify the components of information transfer.
2. Explain the communication model and barriers to communicating.
3. Identify the factors affecting effective communications.
4. Recognize the performance criteria for BQ 6.
5. Determine how BQ 6 and its associated Crew Coordination Elements were involved in Army aviation accidents.

Note: Identify related ATM Crew Coordination Elements:

- Refer to the Crew Coordination Model to emphasize that ATM actions are at the core of crew coordination with Basic Qualities as the means to achieve the Crew Coordination Objectives. This Crew Coordination Objective addresses five ATM Crew Coordination Elements:

S-VG 124

Communicate positively: The sender directs, announces, requests, or offers; the receiver acknowledges; and the sender confirms based on the receiver's acknowledgement or action (A complete circuit)

Direct assistance: Crewmember directs assistance when cannot maintain aircraft control, position, or clearance; cannot operate aircraft systems without help; not expected to know what assistance is needed (Ask for help, cross-monitor performance)

Announce actions: All crewmembers must be aware of expected aircraft movements and alert to unexpected individual actions (No surprises!)

Acknowledge actions: Supportive feedback to positively indicate that the message is received and understood (Complete the communication loop)

Be explicit: Crewmembers must avoid terms with multiple meanings ("Right" and "I have it"); misinterpretations cause confusion; avoid indefinite modifiers (*That* tree, a *little* fast)(Don't cause confusion)

VT 07

Note: Show airport segment.

S-VG 125

Basic Quality 6: Statements and Directives Clear, Timely, Relevant, Complete, and Verified

1. Definition of Basic Quality 6: (Student Handout, p. 1-69)

This Basic Quality refers to the completeness, timeliness, and quality of information transfer. It includes the use of standard terminology and the crew's feedback techniques to verify information transfer. Emphasis is on the quality of instructions and statements associated with navigation activities, obstacle clearing activities, and instrument readouts.

- Examples: (1) AH-64 Task 1015: The P will announce "Blocking" to acknowledge the P*'s announcement "Braking."; (2) UH-60 Task 2079: The P* will acknowledge commands issued by the P for heading and airspeed changes

S-VG 126 (Off)

2. Communication Model

a. Communication process

- Communication was a contributor to 41% of the accidents in the USASC/ARI analysis; underlying structure for most Crew Coordination Objectives because need to communicate to establish team relationships, plan, execute, and critique.
- Discussion starter: How do you define communication? The exchange of thoughts or ideas. An idea is born. Before this idea can lead to meaningful action, it must be communicated to others by way of a commonly understood language.
- Discussion starter: What are the elements of communication? Use the communication model to talk through the seven elements listed below.

S-VG 126 (On)

- (1) Transmission of information
 - (2) Receipt of information
 - (3) Interpretation of information
 - (4) Feedback if required
 - (5) Transmit if necessary
 - (6) Acknowledgement of information receipt
 - (7) Confirmation of acknowledgement
- Apply the model to a basic task; for example, the positive transfer of controls--"You have the controls;" "I have the controls;" "You have the controls."

S-VG 127

- b. Barriers to communications (Distort, confuse, interfere, or block the flow of information)
- (1) Physical
 - Noise or static
 - Multiple simultaneous communications
 - Information overload or underload
 - Distractions
 - (2) Mental
 - Mindset or bias
 - Anger or frustration
 - Boredom
 - (3) Word usage
 - Nonstandard words and phrases
 - Complexity
 - Incomplete or ambiguous
 - (4) Interpersonal
 - Lack of confidence
 - Status difference
 - Personal agenda versus task orientation

S-VG 128

Note: Conduct the Communication Practical Exercise. Ensure that sufficient copies of the exercise (Appendix G) are reproduced. Students file the completed exercise in Section 2 of the Student Guide.

-
- Select a student subject to describe the practical exercise outcome (tactical DZ).
 - Have students complete their drawings in response to the student subject's directions.
 - Have students show their drawing to the class to check effectiveness of student subject's directions.
 - File the practical exercise.
- Effective communication requires constant probing and questioning to break down barriers and ensure feedback.

S-VG 129

3. Effective Communications

a. Effective speaking

- (1) Standardized terminology (ATM examples)
 - Refer students to figure in Chapter 6 of the ATM; discuss examples such as Outside, Inside, and Clear
- (2) Avoid local terms and slang
- (3) Use Signal Operating Instructions (SOI) (Voice and digital)
- (4) Position "mike" correctly (Avoid garbled transmissions)
- (5) Concise brevity essential (Be brief and to the point)
- (6) Know what you want to say (Think before you speak)

S-VG 130

b. Effective listening (Listening is hard work; active feedback)

- (1) Attend to sender (Filter out distractors)
- (2) Ask questions if unsure of message (Cost of uncertainty; for example, ATM Task 1094 (AH-64)/2088 (UH-60): Identify major US or allied equipment and major threat equipment)

- (3) Restate message if necessary (Ensure properly understood)
- (4) Acknowledge verbally or by action (Confirm)

S-VG 131

c. Nonverbal communications

- (1) Signals must be standardized and responses closely monitored (Hand and arm signals, FM 21-60: Visual Signals; and unit SOP)
- (2) Words and symbols on forms and maps must be legible, decipherable (Hazard map; PPC)
- (3) Body language (Nods, gestures, eye contact)

S-VG 132

d. Briefings (Two-way communications; refer to logo as continuous activity)

- (1) Crew briefings set the tone for the entire mission (ATM Task 1000 - Crew mission briefing)
 - All crewmembers involved
 - Verify commonality of each crewmember's understanding of the mission
- (2) Passenger briefings extremely important from safety aspect (UH-60 ATM Task 1071 - Security of equipment; TM check list; unit SOP)
- (3) In-flight briefings necessary to provide updated common understanding of the mission for all crewmembers (Situation updates)
- (4) Crew-level after-action debriefings assess crew effectiveness and identify lessons learned to improve future performance (AR 95-1, DA Form 5484-R, Aircrew Mission Briefing, Post-mission Debrief; separate Basic Quality)

S-VG 133

e. Critiques and feedback

- (1) Crew self-critique as mission progresses (An on-going process)

-
- (2) Extremely important upon mission completion (Separate Basic Quality)
 - (3) Not demeaning in nature (Constructive)
 - (4) Task-based, not person-based (What, *not* who)

S-VG 134

f. Aircrew communications

- (1) Pre-mission planning phase (TM Task 1000, Conduct crew mission briefing; understand actions, duties, and responsibilities)
- (2) In-flight phase
 - High workload conditions (Immediate actions, battle drills)
 - Low workload conditions (Review contingencies, confirm situation)
 - Sterile cockpit conditions (NOE flight profile—business only; good operating practice)
 - Irrelevant communications (Low-level flight, team building, esprit)
- (3) Post-mission phase (Crew-level AAR; right, wrong, improvements)
- (4) Inquiry and questioning (Seeking information is a separate Basic Quality)
- (5) Advocacy and assertion (Raise and/or support a point of view, separate Basic Quality)
- (6) Gender considerations (*Student Guide*, Appendix G, p. G-111) (Males tend to seek right solution, females tend to seek situation understanding; Army training moderates these tendencies)
- (7) ATM examples of aircrew communications (Replete with announce and acknowledge; Task 2079 - Perform terrain flight navigation; Task 2083 - Negotiate wire obstacles; Task 2016 - Perform external load operations; Task 1144 - Perform target handover)

4. Performance Criteria for Basic Quality 6: Statements and Directives Clear, Timely, Relevant, Complete, and Verified (see *Student Guide*, Appendix E, Basic Quality 6)

- How do we measure whether statements and directives are clear, timely, relevant, complete and verified? Rating factors and examples of Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 135

Rating Factors:

Adequacy and Timeliness

<i>Superior</i>	+	Call-outs are made on a consistent basis
	+	Statements and directives are consistently offered in a timely manner
<i>Acceptable</i>	•	Call-outs are generally made; no major omissions
	•	Statements and directives are generally offered in a timely manner; no delays that compromise safety or mission
<i>Very Poor</i>	-	Call-outs are frequently ignored; significant compromises to safety or mission
	-	Statements and directives are frequently late, creating additional workload pressure; significant compromises to safety or mission

S-VG 136

Clarity

<i>Superior</i>	+	Crewmembers consistently use standard terminology for all communications
	+	Statements and directives are clear and concise
<i>Acceptable</i>	•	Crewmembers generally use standard terminology; no major misunderstandings
	•	Statements and directives communicate clear messages; ambiguity is generally avoided
<i>Very Poor</i>	-	Crewmembers fail to use standard terminology, resulting in misunderstandings
	-	Statements and directives contain ambiguous references or irrelevant information

S-VG 137

Acknowledgement

- Superior* + Crewmembers actively seek feedback when no acknowledgement from another crewmember
+ Crewmembers consistently acknowledge understanding of intent; consistently request clarification when necessary
- Acceptable* • Crewmembers seek feedback when it appears that another crewmember misunderstands
• Crewmembers generally acknowledge messages and request clarification when necessary; no significant misunderstandings occur
- Very Poor* - Crewmembers disregard the need for feedback; misunderstandings occur between crewmembers
- Crewmembers frequently fail to acknowledge messages; misunderstandings occur

S-VG 138

5. Illustrations of Basic Quality 6: Statements and Directives Clear, Timely, Relevant, Complete, and Verified (see Appendix B; refer students to *Student Guide*, Appendix D)

Note: Recommend discussing case number(s) 4-5, MH-6 NVG Formation Flight, and 4-9, UH-60 NVG Formation Flight, from the Case Study Selection Matrix extract on page 3-105.

S-VG 139

Learning Objectives for Hours 11, 12, and 13 (Cont.)

6. Identify the elements of mission situational awareness.
7. Explain the significance of maintaining mission situational awareness.
8. Describe the group mind.
9. Recognize the performance criteria for BQ 7.
10. Determine how BQ 7 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 140

Basic Quality 7: Maintenance of Mission Situational Awareness

6. Definition of Basic Quality 7: (Student Handout p. 1-75)

This Basic Quality considers the extent to which crewmembers keep each other informed regarding the status of the aircraft and mission completion. This information reporting helps maintain a high level of situation awareness among the flight crew. Information reported includes: (Factors or elements)

- Aircraft position and orientation
- Equipment status
- Personnel status
- Environment and battlefield conditions
- Changes to mission objectives (External support, time)

Crew-wide situation awareness is an essential element of safe flying and effective crew performance.

- Examples: (1) UH-60 Task 2009; P and CE will provide adequate warning to avoid traffic or obstacles; (2) AH-64 Task 2008; When engaged by the enemy, crew will announce the nature and direction of the threat

7. Maintenance of Mission Situational Awareness (Topics to help describe mission situational awareness and how it contributes to effective mission performance)

S-VG 141

- a. Situational awareness influencers (How well the situation is recognized in a demanding flight environment)
 - (1) Experience \
 - (2) Training /
 - (3) Physical flying skills (Highest order of priority)
 - (4) Spatial orientation (Position awareness)
 - (5) Physical and emotional health (Fatigue, visual acuity, mental processes, stress)
 - (6) Attitude (Dedicated, positive effort)

- Some mission situational awareness considerations

S-VG 142

- b. Pattern recognition
 - (1) Instrument orientation (Display profiles, scanning technique, deviations from expected)
 - (2) Flight procedures (Sequence of actions, instrument approach segments, reporting points, reposition to alternate firing point)
- c. In-flight appraisal
 - (1) Crew at same level of awareness (crew's conscious mind)
 - (2) Limited by lowest level of awareness (increase in mission information equals an increase in situational awareness)
 - (3) State of the cockpit and the aircraft
 - For example, threat on or near the landing zone? suppression required? weapon systems selected? land to hover or land to ground?

d. Problem identification and assessment (Experience and training)

(1) Action required (Familiar or unfamiliar situation?)

(2) Time available (Immediate versus deliberate)

(3) Environment (Forgiving versus unforgiving)

S-VG 143

8. Group mind (*Student Guide*, Appendix G, p. G-73) (Crew as an entity, not what the individual is aware of but rather what the crew is aware of)

a. Conscious mind (Open, above board, public domain information)

- Everything known to the collective crew
- Determines crew's level of situational awareness

b. Subconscious mind (Suppressed, private information)

- Essential information not shared
- Limits crew's situational awareness

c. Situational awareness problems

(1) Boredom (Not attentive, contributes to complacency)

(2) Complacency (Disregard, disrespect for situation)

(3) Uncertainty (Vague reading of situation)

(4) Frustration and anger (Withdraw, withhold information)

9. Performance Criteria for Basic Quality 7: Maintenance of Mission Situational Awareness (see *Student Guide*, Appendix E, Basic Quality 7)

- How is maintenance of mission situational awareness rated? Rating factors and examples of each for Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 144

Rating Factors:

Crew Awareness

- Superior* + Crewmembers routinely update each other; changes are highlighted and acknowledged
+ Crewmembers take personal responsibility for scanning the entire flight environment
- Acceptable* • Crewmembers occasionally update each other; no major compromises to safety or mission
• Crewmembers take personal responsibility for notifying others of significant changes
- Very Poor* - Crewmembers disregard keeping each other informed; compromises to safety or mission occur
- Crewmembers confine their attention to their assigned area of scanning responsibility

S-VG 145

Awareness Inhibitors

- Superior* + Crewmembers actively discuss conditions and situations that can compromise situational awareness (e.g., stress, boredom, fatigue)
- Acceptable* • Crewmembers adjust scanning and reporting patterns with changing mission demands
- Very Poor* - Crewmembers appear unaware of factors that can compromise situational awareness; factors affect crewmember scanning

S-VG 146

10. Illustrations of Basic Quality 7: Maintenance of Mission Situational Awareness (see Appendix B; refer students to *Student Guide*, Appendix D)

VT 08

Note: Recommend discussing case number(s) 4-1, AH-1F Inadvertent IMC, and 4-8, UH-60 NVG Formation Flight, from the Case Study Selection Matrix extract on page 3-105; show UH-60 NVG Formation Flight video segment.

S-VG 147

Learning Objectives for Hours 11, 12, and 13 (Cont.)

11. Explain the results of failure to communicate and acknowledge decisions and actions.
12. Describe the value of positive communication and standardized procedures in communicating and acknowledging decisions.
13. Recognize the performance criteria for BQ 8.
14. Determine how BQ 8 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 148

Basic Quality 8: Decisions and Actions Communicated and Acknowledged

11. Definition of Basic Quality 8: (Student Handout, p. 1-79)

This Basic Quality pertains to the extent to which decisions and actions are actually made and announced to the crewmembers after input is solicited from them. Crewmembers should respond verbally or with the appropriate adjustment to 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 operation.

Note: Due to time constraints in certain situations, often there is little or no time for crew input to a decision. In this case, decisions should be acknowledged verbally or through coordinated, preplanned action.

- Examples: (1) UH-60 Task 2086: P* will announce his intent to unmask. The P and CE will acknowledge that they are prepared to execute the maneuver; (2) AH-64 Task 1038: P* will announce intention of a go-around... whether approach will terminate to a hover or to the ground. P will acknowledge use of manual stabilator or any intent to deviate from the approach.

S-VG 149

12. Positive Communication (Quickly and clearly understood, permits timely actions, makes use of a limited vocabulary of explicit terms and phrases; not scripted)

- a. Standardized terminology (Minimum conversation)
 - Standard words and phrases (Minimum of clear, concise terms easily understood and complied with in high workload, dynamic environment) (Chapter 6 of aircraft ATM; unit SOP "flight breakup")
 - Positive command (Slow down; approaching open area)
- b. Nonverbal communications
 - Behavior, actions, control input (Integrated helmet and display sight system (IHADSS))
 - Standard hand-and-arm signals (Not eye-blink, nose-tweak; misinterpreted)

S-VG 150

- c. Accepted procedures
 - (1) Announce transfer of controls (flight, weapon system, etc.)
 - (2) Use two-challenge rule (No acknowledgement, imminent danger, visual illusion or disorientation, situation awareness lockout)
 - (3) Eliminate surprises and enhance teamwork (Go-around, land to ground, alternate LZ)

13. Performance Criteria for Basic Quality 8: Decisions and Actions Communicated and Acknowledged (see *Student Guide*, Appendix E, Basic Quality 8)

- How do we measure that decisions and actions have been communicated and acknowledged? Rating factors and examples of each for Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 151

Rating Factors:

Communication of Decisions and Actions

Superior	+	Crewmembers announce decisions and actions, provide rationale and intentions as time permits
	+	Nonflying crewmember verbally coordinates transfer of controls or inputs before action

-
- Acceptable* • Crewmembers verbally announce decisions and actions; confusion and surprise are avoided
- Nonflying crewmember verbally coordinates transfer of controls or inputs before action
- Very Poor* - Crewmembers may fail to announce decisions and actions; ambiguous body signals or utterances; confusion or surprise exist
- Nonflying crewmember may make unannounced control inputs

S-VG 152

Clarification and Acknowledgement

- Superior* + Crewmembers consistently acknowledge announced decisions or actions, provide feedback on impact on other crew tasks
- + Crewmembers promptly request clarification of decisions or actions, as appropriate
- Acceptable* • Crewmembers generally acknowledge announced decisions or actions; instances of major confusion are avoided
- Crewmembers request clarification of decisions or actions if confusion arises
- Very Poor* - Crewmembers frequently fail to acknowledge announced decisions or actions; confusion arises
- Crewmembers ignore need to clarify actions or decisions; surprise and confusion compromise safety or mission

S-VG 153

14. Illustrations of Basic Quality 8: Decisions and Actions Communicated and Acknowledged (see Appendix B; refer students to *Student Guide*, Appendix D)

Note: Recommend discussing case number(s) 4-2, AH-64 Night Currency Evaluation, and 4-10, UH-60 NVG Formation Flight, from the Case Study Selection Matrix extract on page 3-105.

S-VG 154

Learning Objectives for Hours 11, 12, and 13 (Cont.)

15. Explain the effects of management style on requests for support from other crewmembers.
16. Explain how cockpit climate affects requests for supporting information or actions.
17. Recognize the performance criteria for BQ 9.
18. Determine how BQ 9 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 155

Basic Quality 9: Supporting Information and Actions Sought from Crew

15. Definition of Basic Quality 9: (Student Handout, p. 1-82)

This Basic Quality has to do with the extent to which support information and support actions are sought from the crew by another crewmember, usually the PC. Depending upon the management style and the crew climate, 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

- Examples: (1) UH-60 Task 1032: P* will request assistance in setting the brakes; (2) AH-64 Task 2044: The crew will discuss options for developing the situation.

S-VG 156

16. Factors Influencing Request for Supporting Information and Actions (conditions necessary to openly ask for information or assistance)
 - a. Cockpit climate (Depends on leadership style and crew relationships)
 - (1) Requests versus directives
 - (2) Permit and encourage crewmember perspectives and questions (Viewed as constructive)

- (3) Positive team building (Acceptance vs. rejection of crew inputs)
- (4) Shared understanding of the mission (Enhance situation awareness)

b. Inputs and assistance

- (1) Broad base of available information (Suggestions, recommendations, possible solutions)
- (2) Informed decision making (Use all available information)
- (3) Distribution of tasks (Delegate, ask for help, avoid overload)
- (4) Mission plan common frame of reference (Update and maintain)

S-VG 157

c. Inquiry

- (1) Constructive skepticism (Current situation, opposite of complacency)
- (2) Objective concern—"What" is right not "who" is right (Behavior, not the person; not a natural response)
- (3) Not a challenge to lawful authority
- (4) Searching for information (Something is not right, uneasy with current situation)

17. Performance Criteria for Basic Quality 9: Supporting Information and Actions Sought from Crew (see *Student Guide*, Appendix E, Basic Quality 9)

- How do we measure that supporting information and actions have been sought from the crew? Rating factors and examples of each for Superior, Acceptable, and Very Poor performance of this BQ are as follows:

S-VG 158

Rating Factors:

Solicitation of Crew Input

Superior + Crewmembers are encouraged to raise issues or offer information about safety or mission

- + Crewmembers alert to impending decisions and actions; crewmember information solicited
- Acceptable* • Crewmembers occasionally raise safety or mission issues; no significant compromises
- Crewmembers occasionally solicit information on impending decisions and actions; no significant compromises
- Very Poor* - Crewmembers ignore or stifle input; view inputs as unwelcome; major safety compromises
- Crewmembers do not keep others informed of impending decisions and actions; safety compromises occur

S-VG 159

Solicitation of Crew Assistance

- Superior* + Crewmembers consistently request assistance from others before they become overloaded or must divert their attention from a critical task
- Acceptable* • Crewmembers occasionally request assistance from others when they have become overloaded; no safety compromises arise from task overloads
- Very Poor* - Crewmembers fail to request assistance from others after becoming task overloaded; compromises to safety or mission occur

S-VG 160

18. Illustrations of Basic Quality 9: Supporting Information and Actions Sought from Crew (see Appendix B; refer students to *Student Guide*, Appendix D)

Note: Recommend discussing case number(s) 4-2, AH-64 Night Currency Evaluation; 4-4, AH-64 Tactical Night Movement to Contact; and 4-6, OH-58 NVG Training Flight, from the Case Study Selection Matrix extract on the following page.

Note: Case Study Selection Matrix extract (Appendix B) for Crew Coordination Objective 4 is provided on the following page.

Table B-1. Case Study Selection Matrix (Extract)

Example	Broken Wing	ACFT	ATM Task	Video
4-1	Yes	AH-1F	—	No
4-2	No	AH-64	1035 1106	No
4-3	No	AH-64	1119 2049	No
4-4	No	AH-64	1083	No
4-5	No	MH-6B	2009	No
4-6	No	OH-58C	1035	No
4-7	No	OH-58	1097	No
4-8	Yes	UH-1H	—	No
4-9	No	UH-60A	2081	No
4-10	No	UH-60	2009	Yes
4-11	No	UH-60	2009	No

Crew Coordination Objective 5: Cross-Monitor Performance

Note: Review definition of Crew Coordination Objective 5: To cross-monitor each other's actions and decisions to reduce the likelihood of errors impacting mission performance and safety.

- This Crew Coordination Objective has four Basic Qualities:
 - BQ 10: Crewmember actions mutually cross-monitored
 - BQ 11: Supporting information and actions offered by crew
 - BQ 12: Advocacy and assertion practiced
 - BQ 13: Crew-level after-action reviews accomplished

S-VG 162

Learning Objectives for Hours 14, 15, and 16

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Explain the purpose of cross-monitoring crew performance.
2. Explain the relationship between cross-monitoring of performance and the achievement of tasks done to standard.
3. Describe the importance of, and techniques for, breaking the Error/Judgment Chain.
4. Recognize the performance criteria for BQ 10.
5. Determine how BQ 10 and its associated Crew Coordination Elements were involved in Army aviation accidents.

Note: Identify related ATM Crew Coordination Elements:

S-VG 163

Offer assistance: A crewmember will offer assistance when he sees another crewmember needs help; must never assume that the P* recognizes a hazard or the need for assistance.

Provide aircraft control and obstacle advisories: Crewmembers may need to provide aircraft control information regarding airspeed, altitude, or obstacle avoidance.

S-VG 164

Basic Quality 10: Crewmember Actions Mutually Cross-Monitored

1. Definition of Basic Quality 10: (Student Handout, p. 1-86)

This Basic Quality has to do with the extent to which a crew uses cross-monitoring as a mechanism to avoid errors. Crewmembers are capable of catching each other's errors. Such redundancy is likely to be particularly important when crews are fatigued or overly focused on critical task elements, and thus more prone to make errors.

Note: This Basic Quality does not imply that task responsibilities are not clearly defined or that crewmembers are not technically qualified. It answers the question "To what extent do crewmembers help an individual assigned primary responsibility for a task or action by reviewing the quality of that individual's task execution and alerting him to any mistake noted?"

S-VG 165

2. Reasons for Mutually Cross-Monitoring Crewmember Actions

a. Concern for task accomplishment according to standards

(1) ATM provides task standards

- Involvement of each crewmember in monitoring the need for assistance in coping with terrain, visual conditions, mission, and other stressors
- The P must warn the P* anytime he detects an unexpected deviation from the airspeed or altitude that exceeds the standard; loss of ground reference; or deviation from intended flight path

-
- (2) SOP reflects unit experience; a living document
 - Prescribes local measures for accomplishing specific actions. Is the "institutional memory" of a unit
 - Deviations from unit SOP may be caused by cockpit or command pressures
 - If not assisting, crewmember may be overloaded or incapacitated. How can such conditions be recognized?

S-VG 166

- b. Recognition of information overload
 - (1) No or confused reaction to critical information
 - (2) May require a division of responsibility to reduce information load
 - (3) Remedy: Use of standard terminology assists in reducing information overload

S-VG 167

- c. Recognition of task saturation
 - (1) Confusion with respect to procedures or priorities
 - (2) Forget finer points of task procedures (gear up, flaps up, fuel tank transfers, compass cross-checks, radio calls)
 - (3) Training, and then doing tasks to standard, reduces probability of task overload
 - (4) Remedy: Offer assistance or take controls after verifying lack of response (two-challenge rule not to be taken lightly)

S-VG 168

- d. Recognition or announcement of *incapacitation*; involves more than just task execution—may involve capability to function as a crewmember

(1) Subtle incapacitation

- Latent effects of self-medication, overworking, domestic stress, financial problems
- Crew relationship should tolerate mild or infrequent cases of not being up to par

(2) Gross incapacitation

- Intoxication or "hung-over" not tolerable conditions; require relief and referral to appropriate channels
- Bona fide illness precluding flight, such as severe cold or allergies; referral to flight surgeon

(3) Incapacitation must be resolved

- Situationally dependent; don't let "good ol' boy network" influence decision
- Subtle incapacitations may require a redistribution of duties and responsibilities, especially if transitory (headache, mild cold, mild stress, conflict); redelegate task/mission responsibilities until conditions are overcome
- Gross incapacitations may require mission cancellation, command action (counseling, suspension, FEB) or referral to appropriate activities (Chaplain, Flight Surgeon, Mental Health, Drug and Alcohol)

S-VG 169A/169B

3. Error/Poor Judgment Chain

a. Links in Error/Poor Judgment Chain (Judgment = Applied experience)

- Cues to loss of situational awareness (*Student Guide*, Appendix G, p. G-123)
- Accidents tend to result from a series of errors or events—an error chain; must find the weak link and break

-
- (1) Ambiguity (Two or more sources of information do not agree)
 - Air Florida with engine readouts; flight plan to Atlanta but clearance to Birmingham; mountainous terrain and seat-of-the-pants orientation (go to attitude indicator); student examples
 - (2) Fixation or preoccupation (Focused attention to exclusion of all other activity)
 - Unusual attitude recoveries; flight into terrain; nuisances (Eastern 401); student examples
 - (3) Empty feeling or confusion (Unsure of the state of the aircraft or its condition)
 - Spatial disorientation; diagnosis of emergencies; unfamiliarity with aircraft systems; student examples
 - (4) Violation of minimums (Intentional or unintentional)
 - On IFR approach, referred to as "ducking;" VFR special clearance; NVD illumination requirements; student examples
 - (5) Undocumented procedures (Use or consideration of an undocumented procedure)
 - "Let me show you a real neat maneuver!" return to target in UH-1H; "0" G maneuvers; C-12 ASR approach; student examples
 - (6) Nobody flying the aircraft
 - Eastern 401; student examples
 - (7) Nobody looking out the window
 - UH-60 mid-air at Fort Campbell; UH-60 with P* and P looking aft; student examples
 - (8) Failure to meet targets (hard times not met; locations not found; carelessness; attitude)
 - Safety and mission effectiveness compromised; accidents and mission failures may result; commander's intent violated; student examples

-
- (9) Unresolved discrepancies (do not press for resolution; can repeat with unfortunate results)
 - UH-1N navigation problems; AH-1S NVG brownout; student examples
 - (10) Departure from SOP (Either doesn't know or intentionally deviates from procedure; risky behavior)
 - OH-58A cross-country; AH-1G static display; CH-54 performance check; student examples
 - (11) Failure to establish common understanding of mission between crewmembers (precludes effective cross-monitoring if all crewmembers do not know what is supposed to happen)
 - UH-60 NVG troop insertion mission; UH-1H rappelling accident; student examples

S-VG 170

- b. Must recognize and break error chain as early as possible
 - (1) Recognition is the key element
 - (2) Crew coordination training is a solution
 - (3) Technique for raising the situation awareness level of all crewmembers to the same level

S-VG 171

- c. Other techniques to break error chain
 - (1) Two-challenge rule
 - Not a violation of command authority
 - Agree to use during premission planning so that its use is understood beforehand; e.g., fixation, confusion, task overload
 - Follow standard control transfer procedures if rule is invoked

(2) Positive team building

- Lays the foundation to achieving a cockpit climate supportive of cross-monitoring of performance
- All realize lives are at stake and personal feelings, position, or rank are not to enter the equation (very difficult to do!)

(3) Detailed premission planning and rehearsal

- All crewmembers have the same understanding of the mission through rehearsal activities
- Freedom to invoke the two-challenge rule, avoidance of excessive professional courtesy, and most conservative response should be stressed by PC

4. Performance Criteria for Basic Quality 10: Crewmember Actions Mutually Cross-Monitored (see *Student Guide*, Appendix E, Basic Quality 10)

- If crewmember actions are mutually cross-monitored and the error chain expeditiously broken, the probability of an accident will be significantly reduced. Rating factors and examples of Superior, Acceptable, and Very Poor performance of this BQ are as follows:

S-VG 172

Rating Factors:

Scanning for Crew Performance

- Superior* + Crewmembers acknowledge that crew error is a common occurrence, requiring active involvement of all crewmembers in detecting and breaking the error chains that lead to accidents
- + When errors are noted, the crewmember committing the error is quickly informed and/or assisted in a professional manner
- + Crewmembers are constantly alert for crew errors, assuming responsibility for monitoring their own performance and that of others for errors affecting flight safety or mission effectiveness
- Acceptable* • Crewmembers understand that human errors can occur during the mission, occasionally requiring the monitoring and intervention by all crewmembers

- Crewmembers assume some responsibility for monitoring the performance of others; no significant compromises to flight safety or effectiveness arise from neglect of cross-monitoring
 - When errors are noted, the crewmember committing the error is informed and/or assisted; [however, some improvement is possible in the timeliness or manner of monitoring]
- Very Poor* -
- Crewmembers believe or act as if human error is a rare occurrence
 - Crewmembers assume only the responsibility for monitoring their own performance; significant incidents of crew error remain undetected by others until flight safety or effectiveness is significantly compromised
 - When errors are noted, the crew may use the opportunity to insult or berate the crewmember committing the error

S-VG 173

Two-Challenge Rule

- Superior* +
- + Two-challenge rule is thoroughly discussed by crewmembers prior to execution of mission
 - + Two-challenge rule is effectively implemented, if required, with minimal compromise to flight safety
- Acceptable* •
- Two-challenge rule is acknowledged by crewmembers prior to mission execution
 - Two-challenge rule is implemented, if required, but results in some confusion or tension between crewmembers
- Very Poor* -
- Crewmembers ignore the two-challenge rule, leaving its implementation ambiguously defined
 - Crewmembers fail to implement two-challenge rule when required, resulting in significant compromise to flight safety

S-VG 174

5. Illustrations of Basic Quality 10: Crewmember Actions Mutually Cross-Monitored (see Appendix B and *Student Guide*, Appendix D)

Note: Recommend discussing case number(s) 5-1, AH-1F Hydraulic System Failure, from the Case Study Selection Matrix extract on page 3-132.

S-VG 175

Learning Objectives for Hours 14, 15, and 16 (Cont.)

6. Recognize the definition of BQ 11: Supporting information and actions offered by crew.
7. Explain how the crew's offering of assistance indicates the quality of the working relationship.
8. Recognize the performance criteria for BQ 11.
9. Determine how BQ 11 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 176

Basic Quality 11: Supporting Information and Actions Offered by Crew

6. Definition of Basic Quality 11: (Student Handout, p. 1-92)

This Basic Quality addresses the extent to which crewmembers anticipate and offer support information and support actions to the decision maker, usually the PC, when it becomes apparent that a decision must be made or an action taken.

7. Considerations with Respect to Supporting Information and Actions Offered by Crew

S-VG 177

a. ATM requirement

- (1) Crew Coordination Element 3: A crewmember will provide the assistance or information that has been requested. He also will offer assistance when he sees that another crew member needs help
- (2) Involvement of each crewmember in monitoring the need for assistance of other crewmembers
- (3) Identified as Crew Coordination Error 5 (failure to offer assistance or information) in the USASC/ARI accident analysis

S-VG 178

b. Indicator of effective team building

- (1) ATM requirement may not ensure that required assistance or information is forthcoming
 - "PC chewed me out the last time I told him he was off course!" "I told him he overtorqued the engine, but he called me a liar!" student examples
- (2) Cockpit climate must be supportive of free information exchange and assistance to others; crewmembers asking the tasked crewmember if he needs specific information or an action accomplished prior to the actual requirement is a good indicator of the crew's working relationship
 - Overactive crewmember who is all over the cockpit
 - Interactive crewmember
- (3) Assistance rendered only in the event of precluding loss of life indicates severe interpersonal problems which increases the mission risk factor and works against the continued association of the affected crew
 - Sick call if assigned with certain PC; airline bidding procedures; counseling may be necessary

S-VG 179

c. Techniques to enhance the offering of assistance and information by crewmembers

- (1) Must first build a team using techniques and leadership principles taught earlier in the course
- (2) Employ effective techniques
 - Rules of common courtesy
 - Behavior modification
 - Praise in public; criticize in privacy. No name calling or finger pointing

- Constructive, not destructive, criticism. Use ATM, unit SOP, TMs, or briefing items to identify standards that must be met
- Stronger measures as appropriate; fairness required
- Excessive professional courtesy discouraged. Problem where CWO 2 is PC, unit commander is the P. Relate to Ketchikan accident
- Two-challenge rule in effect. Can also ask if P* would like relief on the controls
- Most conservative response taken. Correct the immediate situation; if have time, analytical decision making techniques may be used to plan ahead

(3) Crew-level after-action reviews accomplished

- Will discuss later, but is a means, given a good working relationship, to getting crewmembers to open up and express dissatisfactions or unrealized expectations. Resolve or defuse in aircraft; don't need to wait until end of mission to review actions or request clarification (Bubba check)
- Consideration and resolution of "gripes" will do much to make each crewmember feel he is part of a team and that he counts as a recognized productive member

8. Performance Criteria for Basic Quality 11: Supporting Information and Actions Offered by Crew (see *Student Guide*, Appendix E, Basic Quality 11)

- If the crew mutually supports one another, the possibility of an accident resulting from task overload should be greatly reduced. Rating factors and examples of Superior, Acceptable, and Very Poor performance for this BQ are as follows:

S-VG 180

Rating Factors:

Anticipation and Offering of Required Information

Superior + Crewmembers consistently anticipate the need to provide information or warnings to PC or pilot on the controls during critical phases of flight

- + Required information and warnings are consistently provided in a timely manner
- Acceptable • Crewmembers provide information or warnings to PC or pilot on the controls when requested; no significant compromises to flight safety or mission performance arise due to failure to offer critical information or warnings
- Required information and warnings are generally provided in a timely manner; no significant compromises to flight safety or effectiveness arise due to lack of timeliness of supporting information or warnings
- Very Poor - Crewmembers fail to provide information or warnings requested by PC or pilot on the controls, or provide information and warnings only reluctantly; significant compromises to flight safety or mission performance may occur as a result
- Required information or warnings, when offered, are late; significant compromises to flight safety and effectiveness may occur as a result

S-VG 181

Anticipation and Offering of Required Assistance

- Superior + Crewmembers consistently anticipate the need to provide task assistance to PC or pilot on the controls during critical phases of flight
- + Required task assistance is consistently provided in a timely manner
- Acceptable • Crewmembers provide task assistance to PC or pilot on the controls when requested; no significant compromises to flight safety or effectiveness arise due to failure to offer critical information or warnings
- Required task assistance is generally provided in a timely manner; no significant compromises to flight safety or mission performance arise due to lack of timeliness of supporting assistance
- Very Poor - Crewmembers fail to provide task assistance requested by PC or pilot on the controls, or provide assistance only reluctantly; significant compromises to flight safety and mission performance may occur as a result
- Required task assistance, when offered, is late; significant compromises to flight safety and effectiveness may occur as a result

S-VG 182

9. Illustrations of Basic Quality 11: Supporting Information and Actions Offered by Crew (see Appendix B and *Student Guide*, Appendix D)

Note: Recommend discussing case number(s) 5-3, AH-1S NVG Training Mission, and 5-6, OH-58D Night Shipboard Landing, from the Case Study Selection Matrix extract on page 3-132.

S-VG 183

Learning Objectives for Hours 14, 15, and 16 (Cont.)

10. Define conditions under which advocacy and assertion could be impractical.
11. Explain the difference between assertive and aggressive behavior.
12. Recognize the performance criteria for BQ 12.
13. Determine how BQ 12 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 184

Basic Quality 12: Advocacy and Assertion Practiced

10. Definition of Basic Quality 12: (Student Handout, p. 1-96)

This Basic Quality concerns the extent to which crewmembers advocate a course of action they consider best, even when it may be in disagreement with others. *Note: Except under extreme emergency conditions, where time is absolutely critical, it is usually in the crew's best interest to hear the full range of options available.*

11. Advocacy and Assertion

S-VG 185

- a. What is advocacy?

- (1) Stronger than a recommendation, which is a positive declaration in favor of a set of possibilities
- (2) Is the obligation to speak out in support of a course of action different than that being planned or followed. Also involves listening to other viewpoints that may be contradictory in nature.

- b. What is assertion?

- (1) To state a position with some force or conviction

-
- (2) The forceful, nonthreatening statement of a belief, feeling, position, or idea concerning a situation with which one is uncomfortable
 - (3) The five-step advocacy process is to:
 - Get the attention of the individual
 - State the concern
 - State the problem
 - Offer a solution, and then
 - Obtain agreement.
 - Major, I don't think we should be out here cruising 500 feet above the trees. Last intel reports indicated heavy ground small arms fire and we're pretty exposed at this altitude. I think we should get down right above the trees, if possible. Don't you think that makes sense?
 - What if assertive statement doesn't work and you are still convinced that the proposed course of action is dangerous? May have to shock rest of crew into reality by a "This is stupid!!!" type of statement.

S-VG 186

c. Importance of advocacy and assertion

- (1) Reduces frustration by allowing the free expression of ideas which crewmembers may be holding back for various reasons
 - Anger and aggression may result from pent up frustration
- (2) Introduces the decision maker to a wider range of options than might be otherwise available
 - Decision maker must be willing to listen and consider input from other crewmembers
- (3) Prevents intimidation by older, more experienced crewmembers where an idea is held to be of value
 - Must guard against professional courtesy; advocate position with conviction. Conflict may otherwise result

-
- (4) Builds team cohesion because crewmembers know their ideas will be heard and considered; they are important to the decision process
 - The willingness on the part of the PC to have his crew express their convictions must be stated upon initial formation of the crew and reinforced on a regular basis
 - (5) Should be fostered; especially in terms of a "devil's advocate" to examine alternative courses of action
 - When ideas are needed, the "Yes" person is not a productive contributor

S-VG 187

d. What advocacy and assertion are not

- (1) Not an attack upon, or disrespect of, command authority or the responsibilities of authoritative positions
 - Must be reiterated that advocacy and assertion are not mutinous behavior. Once the decision is made, all must support
- (2) Not aggressive behavior in that it is not hostile; however, aggressive behavior may result from the frustration of being continually ignored in the decision process

12. Performance Criteria for Basic Quality 12: Advocacy and Assertion Practiced (see *Student Guide*, Appendix E, Basic Quality 12)

- If advocacy and assertion are practiced, the effect on mission safety and performance should be enhanced since the crew has at their disposal a wider range of alternatives to resolve any mission discrepancies. Factors and examples of Superior, Acceptable, and Very Poor performance of this BQ are as follows:

S-VG 188

Rating Factors:

Advocacy

- Superior* + Time permitting, crewmembers consistently provide rationale for their recommended plans and courses of action; a professional atmosphere is maintained
- + Crewmembers consistently request feedback to insure that others have correctly understood their statements or rationale
- + Time permitting, crewmembers practice good listening habits, allowing others to state their rationale before commenting on the recommended plans or courses of action

- Acceptable* • When misunderstanding is apparent, crewmembers provide rationale for their recommended plans and courses of action; some level of objectivity is maintained
- Crewmembers request feedback when it becomes obvious that others have misunderstood their statements or rationale
- Time permitting, crewmembers generally allow others to explain their recommendations before interrupting

- Very Poor* - Crewmembers frequently justify their recommendations on rank or experience level, rather than logic; personality conflicts occasionally result from this behavior
- Crewmembers give little concern to insuring that others have correctly understood their statements or rationale; misunderstandings are permitted to continue
- Crewmembers display a closed mind with regard to accepting recommendations from others; decisions and actions are overly influenced by a crewmember who possesses a dominant personality

S-VG 189

Assertion

- Superior* + PC actively promotes objectivity in the cockpit by encouraging junior crewmembers to speak up regardless of rank or experience level
- + Junior crewmembers do not hesitate to speak up when they disagree with others; junior crewmembers understand that more experienced aviators can occasionally commit errors or lose situational awareness
- + Every crewmember displays a sense of responsibility for adhering to flight regulations, operating procedures, and safety standards

-
- Acceptable* • PC tolerates junior crewmembers to speak up regardless of rank or experience level
- Junior crewmembers voice disagreements when asked; junior crewmembers speak up when they observe obvious errors being committed by more experienced aviators
 - Crewmembers speak up when they believe that flight regulations, operating procedures, or safety standards are being violated
- Very Poor* - PC uses rank or experience factors to impose authoritarian control over other crewmembers
- Crewmembers are generally reluctant to challenge a senior or more experienced aviator, even when they know themselves to be correct; junior crewmembers generally assume that the senior crewmember knows what he is doing, regardless of the facts
 - Crewmembers deny personal responsibility for flight safety, and may allow others to violate known flight regulations, operating procedures, or safety standards because of rank and experience level

S-VG 190

13. Illustrations of Basic Quality 12: Advocacy and Assertion Practiced (see Appendix B and *Student Guide*, Appendix D)

VT 09

Note: Recommend discussing case number(s) 5-5, OH-58A Cross-Country Training Mission, from the Case Study Selection Matrix extract on page 3-132; show Hi Risk Aviator video segment.

S-VG 191

Learning Objectives for Hours 14, 15, and 16 (Cont.)

14. Identify the occasions upon which the crew can review and critique their actions.
15. Differentiate between the crew-level after-action review and the perform after-landing tasks requirements.
16. Conduct a crew-level after-action review using the Crew-Level After-Action Review Checklist.
17. Recognize the performance criteria for BQ 13.
18. Determine how BQ 13 and its associated Crew Coordination Elements were involved in Army aviation accidents.

S-VG 192

Basic Quality 13: Crew-Level After-Action Reviews Accomplished

14. Definition of Basic Quality 13: (Student Handout, p. 1-100)

This Basic Quality has to do with the extent to which the crew reviews and critiques their actions during or following a mission segment, during low workload periods, or during the post-flight debrief.

S-VG 193

15. Crew-Level After-Action Reviews

- a. Must instill practice at individual crew level
- b. Assists in team building
 - (1) Mission accomplishment—final phase
 - (2) Enhances and fine tunes

c. Identify enhancements to:

(1) Unit operations

- What was learned by the unit in terms of improved operations? SOP revised?

(2) Aircrew as a team

- What was learned by the crew in terms of safer and more effective mission performance? Operations advised?

(3) Individual crewmember

- What did I, as a crewmember, learn about crew operations and group dynamics? Do I want to work with this crew again? If not, why not? PC or other crewmembers so advised?

S-VG 194

d. What an after-action review is not:

(1) DA Form 5484-R brief-back

(2) Lecture by the PC

e. What an after-action review is:

(1) Professional discussion of training events or operational missions

(2) Structured review process that allows training participants to discover for themselves what happened, why it happened, and how it can be done better

(3) Compares execution with operational expectations (OPORD/Air Mission Briefing, premission planning goals, mission objectives)

- After having completed the majority of this course on crew coordination, what do you think should be covered by the after-action review?

S-VG 195

f. After-action reviews (FM 25-100, FM 25-101)

(1) Types

- Informal
- Formal

(2) After-action reviews--

- Focus on training, mission objectives, and crew interactions
- Emphasize the meeting of standards (technical and crew coordination)
- Identify important lessons learned (individual, crew, unit)
- Share the lessons among all participants (crew, unit)

S-VG 196

g. After-action review considerations

- (1) Avoid critique or lecture
- (2) Relate events to final results
- (3) Discuss alternative courses of action and possible results
- (4) Avoid nonrelated events
- (5) Do not damage self-esteem or cohesiveness
- (6) Goal is for each crewmember to accurately assess own performance
 - How does this assessment by each crewmember contribute to team building?

S-VG 197

- h. Crew-Level After-Action Review Checklist (Table 3-2, p. 3-127)
(Table 1-2, Student Handout, p. 1-104)
 - Format organizes flow of discussion
 - Provides for review of mission segments and overall mission
 - Stresses actions, decisions, and crew interactions
 - Closes the loop with Operations so that lessons learned are shared with other organizational elements

- 16. Conduct Crew-Level After-Action Review (p. 3-128) (Student Handout, p. 1-105)
 - Use the Crew-Level After-Action Review Checklist.
 - Recommend use of Example 2-9, UH-60 Fast Rope Demonstration (Appendix B), as the model for conducting the AAR. Suggested discussion points begin on page 3-128 and are keyed to the AAR Checklist.
 - Ensure all students participate in the AAR discussions.

Table 3-2. Crew-Level After-Action Review Checklist

1. All crewmembers present.
2. Restate mission objectives.
3. METT-T considerations.
- 4.* Conduct review for each mission segment:
 - a. Restate planned actions/interactions for the segment.
 - b. What actually happened?
 - (1) Each crewmember states in own words.
 - (2) Discuss impacts of crew coordination requirements, aircraft/equipment operation, tactics, commander's intent, etc.
 - c. What was right or wrong about what happened?
 - (1) Each crewmember states in own words.
 - (2) Explore causative factors for both favorable and unfavorable events.
 - (3) Discuss crew coordination strengths and weaknesses in dealing with each event.
 - d. What must be done differently the next time?
 - (1) Each crewmember states in own words.
 - (2) Identify improvements required in the areas of team relationships, mission planning, workload distribution and prioritization, information exchange, and cross-monitoring of performance.
 - e. What are the lessons learned?
 - (1) Each crewmember states in own words.
 - (2) Are changes necessary to:
 - (a) Crew coordination techniques?
 - (b) Flying techniques?
 - (c) SOP?
 - (d) Doctrine, ATM, TMs?
5. Effect of segment actions and interactions on the overall mission?
 - (1) Each crewmember states in own words.
 - (2) Lessons learned?
 - (a) Individual level.
 - (b) Crew level.
 - (c) Unit level.
6. Dismiss crewmembers.
7. Advise Operations of significant lessons learned.
8. Incorporate significant lessons learned in subsequent missions.

* This step may also be accomplished during periods of low in-flight workload to resolve disagreement or to critique significant decisions, actions, and interactions affecting mission performance. In-flight review of a segment does not preclude its coverage during the AAR.

Crew-Level After-Action Review Checklist

1. All crewmembers present. (Yes)
2. Restate mission objectives.
 - To provide a demonstration to the Boy Scouts of a "Fast Rope" troop insertion
3. METT-T considerations.
 - No major impacts
4. Conduct review for each mission segment:
 - a. Restate planned actions/interactions for the segment.
 - Statements should note that no premission planning was accomplished to establish duties, actions, and responsibilities; that despite previous stabilator failures, actions upon such event were not discussed.
 - b. What actually happened?
 - (1) Each crewmember states in own words.
 - Statements to the effect that the aircraft incurred a stabilator failure and crashed.
 - (2) Discuss impacts of crew coordination requirements, aircraft/equipment operation, tactics, commander's intent, etc.
 - Cover requirements of UH-60 ATM Task 1063 (Perform procedures for stabilator malfunction).
 - Point out workload distribution and the consequences of task saturation if procedures not followed.
 - c. What was right or wrong about what happened?

-
- (1) Each crewmember states in own words.
 - Statements to the effect that the PC did not consider the P to be proficient, that the workload was not properly distributed, that a low-level reconnaissance was not properly conducted, that the mission was not properly rehearsed during premission planning to provide for stabilator failures, etc.
 - (2) Explore causative factors for both favorable and unfavorable events.
 - Statements to the effect that an unacceptable condition existed with the assigned aircraft, that a risk assessment was not properly conducted, that premission planning was not properly conducted, etc.
 - (3) Discuss crew coordination strengths and weaknesses in dealing with each event.
 - Statements indicating that crew coordination was virtually nonexistent, that the PC did not appear to trust the P with assisting in the emergency procedures, that the P did not appear to be assertive in participating in the recovery despite previous stabilator failures.
- d. What must be done differently the next time?
- (1) Each crewmember states in own words.
 - Statements to the effect that malfunctioning equipment should not be accepted if possible; that proper premission planning needs to be accomplished; that duties, tasks, and responsibilities need to be clearly assigned and acknowledged; that consideration be given to assigning well-practiced battle-rostered crews to publicly-viewed events; etc.
 - (2) Identify improvements required in the areas of team relationships, mission planning, workload distribution and prioritization, information exchange, and cross-monitoring of performance.
 - Statements should reiterate and clarify points previously covered to improve the operations of the subject crew.
- e. What are the lessons learned?

-
- (1) Each crewmember states in own words.
 - Statements should cover the importance of good crew relationships, premission planning, workload distribution, mission information exchange, and cross-monitoring of performance.
 - (2) Are changes necessary to:
 - (a) Crew coordination techniques?
 - No; but need to practice.
 - (b) Flying techniques?
 - No; but need to follow proper procedures.
 - (c) SOP?
 - Unknown.
 - (d) Doctrine, ATM, TMs?
 - No.

5. Effect of segment actions and interactions on the overall mission?

- (1) Each crewmember states in own words.
 - Statements to the effect that the crew's actions and interactions precipitated an accident and precluded successful performance of the mission.
- (2) Lessons learned?
 - (a) Individual level.
 - Statements should summarize previous comments and indicate what each respondent feels he/she learned from the accident.
 - (b) Crew level.
 - Statements should indicate what each respondent feels that the crew learned about crew coordination from the accident.

(c) Unit level.

- Statements should indicate what each respondent feels that the unit should have learned from the accident in the areas of battle rostering, training, operations, etc.
6. Dismiss crewmembers. (Simulate)
 7. Advise Operations of significant lessons learned.
 - Have aircrews discuss those lessons learned that should be passed to Operations.
 8. Incorporate significant lessons learned in subsequent missions.
 - Discuss how this could be accomplished.
-

S-VG 198

17. Performance Criteria for Basic Quality 13: Crew-Level After-Action Reviews Accomplished (see *Student Guide*, Appendix E, Basic Quality 13)

Ratings Factors:

Critique and Improvement of Crew Performance

Superior	+	Crew critiques major decisions and actions, identifying options and factors that should have been discussed, and outlining ways of improving crew performance in future missions
	+	Critique of crew decisions and actions is conducted in a professional manner; finger-pointing is avoided, with emphasis on education and improvement of crew performance
Acceptable	•	Crew reviews major decisions and actions, focusing on obvious errors, and identifying ways of avoiding those errors in future missions
	•	Critique of crew decisions and actions avoids personality conflicts or other attitudes that would detract from the discovery of improved procedures
Very Poor	-	Crew avoids any discussion of major decisions and actions; obvious errors are ignored with little or no concern about improving crew performance in future missions
	-	After-action reviews consist of finger-pointing; little or no collaborative spirit is exhibited; the crew appears likely to repeat poor performance

18. Illustrations of Basic Quality 13: Crew-Level After-Action Reviews Accomplished (see Appendix B and *Student Guide*, Appendix D)

Note: Recommend discussing case number(s) 1-1, UH-1N NVG Training Flight (USMC), from the Case Study Selection Matrix extract on page 3-51.

Note: Case Study Selection Matrix extract (Appendix B) for Crew Coordination Objective 5 is provided below:

Table B-1. Case Study Selection Matrix (Extract)

Example	Broken Wing	ACFT	ATM Task	Video
5-1	Yes	AH-1F	—	No
5-2	No	AH-1s	1031	No
5-3	No	AH-1S	1038	No
5-4	No	CH-47	2084	No
5-5	No	OH-58A	1035	No
5-6	No	OH-58D	1028	No
5-7	No	UH-1H	1097	No
5-8	No	UH-1H	2096	No
5-9	No	UH-1H	1031	No
5-10	No	C-12	4510	No

17+00/S-VG 200

1. Course Overview
 - Defined crew coordination
 - Described crew coordination training
2. Features of Army Crew Coordination Training
 - Crew Coordination Model
 - Crew Coordination Elements
 - Basic Qualities
 - Crew Coordination Objectives
 - Organized instruction from detailed tasks to broad objectives
 - Ideas from military and commercial aircrew coordination courses
 - Emphasizes team formation, communications, premission planning, rehearsal, and crew-level after-action reviews
 - Multiple decision-making techniques
 - Standardized terminology
 - Hands-on using simulator or aircraft
3. What's new in Army Training and Evaluation of Aircrews
 - Battle-rostering
 - Individual to collective training
 - Situational training exercises
 - Crew readiness level progression
 - Train as fight

-
4. History of Crew Coordination Research and Programs
 - Reviewed crew coordination courses
 - Discussed USASC and ARI aviation accident analysis
 5. Findings from the Rotary Wing Accident Analysis
 - 41% communications failures
 - 35% workload or prioritization failures
 6. Six Categories of Crew Coordination Errors
 - Failure to direct assistance
 - Failure to announce a decision or action
 - Failure to communicate positively
 - Failure to assign crew responsibilities
 - Failure to offer assistance or information
 - Failure to execute actions in proper sequence
 7. Revision of TC 1-210 and ATMs
 - Linked individual, crew, and unit collective tasks
 - Implemented accident analysis findings
 8. Eight ATM Crew Coordination Elements Defined
 - Communicate positively
 - Direct assistance
 - Announce actions
 - Offer assistance
 - Acknowledge actions

-
- Be explicit
 - Provide aircraft control and obstacle advisories
 - Coordinate action sequence and timing

S-VG 201

9. Requirement for Crew Coordination Measurement

- Task-level approach satisfactory for individual evaluations
- Comprehensive approach needed for crew-level evaluations
- Developed Basic Qualities as bridge between ATM tasks and Crew Coordination Objectives

10. Basic Qualities (13)

- Establish and maintain flight team leadership and crew climate
- Pre-mission planning and rehearsal accomplished
- Application of appropriate decision making techniques
- Prioritize actions and distribute workload
- Management of unexpected events
- Statements and directives clear, timely, relevant, complete, and verified
- Maintenance of mission situational awareness
- Decisions and actions communicated and acknowledged
- Supporting information or actions sought from crew
- Crewmember actions mutually cross-monitored
- Supporting information or actions offered by crew
- Advocacy and assertion practiced
- Crew-level after-action reviews accomplished

-
11. Defined Crew Coordination Objectives (5)
 - Establish and maintain team relationships
 - Mission planning and rehearsal
 - Establish and maintain workload levels
 - Exchange mission information
 - Cross-monitor performance
 12. Described the Crew Coordination Model and Functions (Logo)
 - Plan
 - Assess
 - Resolve
 - Execute
 13. Reviewed Each Crew Coordination Objective and Associated Basic Quality in Detail Covering:
 - Definition
 - Supporting instructional information
 - Performance criteria for Superior, Acceptable, and Very Poor Performance
 - Analyzed cases from the Army accident data base and FLIGHTFAX to illustrate the results of failure to observe sound crew coordination principles

S-VG 202

Note: Discuss the Cross-walk Chart (Student Handout, p. 1-113).

Note: Request and answer any questions prior to beginning the academic portion of the Simulator or Flight Training and Evaluation block of instruction.

SIMULATOR OR FLIGHT TRAINING AND EVALUATION

18+00/S-VG 203

Scenario-based mission-oriented simulator or flight training during which the aircrews will apply crew coordination principles under the guidance of an instructor, who will also evaluate their progress. Guidance for preparing scenarios for the simulator or flight periods is located in Appendix F. Evaluation guidance is located in Appendix E of the Student Guide.

S-VG 204

Learning Objectives for Hour 18

Note: Ensure that the scenario or flight training schedule has been prepared prior to conducting this block of instruction.

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Describe the advantages of scenario-based training and the role of the instructor.
2. Define the difference between the grading and rating systems employed in aircrew coordination training.
3. Comply with all requirements specified in the simulator or flight training crew briefing.

S-VG 205

..... Introduction

A one-hour academic block of instruction covering scenarios, grading and rating system, and the crew briefing prior to the actual simulator or flight portion of the course.

1. Scenarios and the Role of the Instructor (Student Handout, p. 1-115)
 - a. Standardized simulator or flight scenarios will be used to ensure uniformity of training
 - b. Instructor will use the Aircrew Coordination Training Grade Slip (discussed later) to record evaluation information during simulator or flight missions. Two of the four missions are training missions; the first (pretraining ride) and fourth (evaluator ride) missions will be formally evaluated.

S-VG 206

2. Crew Coordination Evaluation (*Student Guide*, Appendix E)

- a. Relationship of the Basic Qualities to ATM task grades
 - (1) ATM tasks have incorporated the relevant Crew Coordination Elements
 - (2) ATM task grade will consider aircrew coordination, technical flight skills, and the Crew Coordination Basic Qualities appropriate to the ATM task
 - (3) Performance of each Basic Quality will be assessed on a total mission basis with respect to how the Basic Quality was employed collectively by the crewmembers throughout the several tasks composing the mission
- b. Aircrew Coordination Training Grade Slips
 - (1) Similar to currently fielded grade slips
 - (2) Will discuss grading and rating schemes next

S-VG 207

- c. Introduction of the crew coordination grading scheme for tasks or mission
 - (1) Grade of "S" given for acceptable performance
 - (2) Grades of "S+" and "S-" given for exceptional or less than acceptable performance, respectively
 - (3) Grade of "U" given for unacceptable performance
 - If given for a task, does not render entire flight unsatisfactory
 - If given for a mission, the entire flight was unsatisfactory
 - If given for an evaluation ride, remedial training is required

S-VG 208

- d. Introduction of the Crew Coordination Basic Quality rating scheme
 - (1) Rating of "1" given for "Very Poor" performance
 - (2) Rating of "4" given for "Acceptable" performance
 - (3) Rating of "7" given for "Superior" performance
 - Interpolate for performance between 1 and 4, and 4 and 7

S-VG 209

- e. Importance of training feedback from the instructor (including use of video playback)
 - (1) Positively reinforces behaviors in a timely manner
 - (2) Allows poor behaviors to be analyzed and corrected
 - (3) Videotape (if used) allows one to see oneself as others see them; provides an opportunity for self-critique and assessment that can be reinforced by comments from the crew and the instructor

S-VG 210

- f. Videotaping confidentiality considerations
 - (1) No confidentiality requirements if not videotaped
 - (2) If videotaped, videotape will be used to support the instructor's critique and then reused or erased

S-VG 211

- 3. Simulator or Flight Training Crew Briefing
 - a. Report to the Simulator Facility or flight line per schedule
 - b. Instructor will issue the required planning materials and brief the mission. A total of 1.5 hours is scheduled to brief and plan the mission.

Note: When briefing the mission, instructor should assume the role of the unit operations officer. Where possible, after issuing the planning materials, allow the students to post the routes on their maps before giving the mission briefing. In either case, maximize the amount of time the students have for planning the mission

- c. Simulator or flying time to execute the flight plan is 1.75 hours
- d. Time allotted for the crew-level after-action review is 1.75 hours
- e. In planning the mission, flying the mission, or reviewing the mission, employ all the appropriate crew coordination principles and techniques learned in the classroom
- f. During the premission planning, flight, and crew-level after-action review phases of the mission, the instructor will be observing and evaluating. On the pretraining and first training rides, the instructor will offer advice, make suggestions with respect to crew activities, and answer any crew questions—and remember, there is no such thing as a dumb question. On the second training ride, the crew will be expected to work on its own with minimum intervention by the instructor to offer advice, suggestions, or to answer questions. The third training ride will be evaluated for course completion and, for battle-rostered crews, progression to Crew Readiness Level 1 (optional)
- g. For the pretraining and first and second training rides, the instructor will conduct a critique of the entire mission from premission planning to crew-level after-action review. During this critique, the grades assigned to the ATM tasks performed, the ratings assigned to the Basic Qualities involved, any comments on such grades and ratings, and, if videotaped, the videotape, will be used by the instructor to debrief the crew. Instructors will conduct a standard debriefing for the evaluation mission (third training ride)
- h. During the instructor critique/debriefing, the crew will participate by querying the instructor, advocating certain positions or actions taken, and by asserting themselves whenever they may feel a point should be made or explained. In this light, the critique/debriefing can be viewed as another opportunity to practice the crew coordination principles learned in the classroom. We trust that you will use this opportunity to your crew's advantage.

Note: Answer any questions with respect to the simulator or flight schedule at this time.

S-VG 212

4. Learning Objectives for Simulator or Flight Training (Hours 1 - 20)

- Will now have the opportunity to apply what has been learned in the classroom.

Note: Prior to releasing students to comply with the simulator or flight training schedule, ensure they are aware of the time and place to reconvene should an end-of-course ceremony be planned (optional).

S-VG 1 (2)

..... Simulator or Flight Training

Learning Objectives for Hours 1 through 20

With the aid of classroom notes or furnished doctrinal publications, and while in the classroom, simulator facility, or aircraft, the student, without error, will be able to:

1. Accomplish premission planning and rehearsal.
2. Perform a tactical mission in the simulator or aircraft.
3. Conduct a crew-level after-action review.
4. Employ crew coordination principles during the instructor critique/debrief.

Note: Hours 1 through 5 (Pretraining Ride) precede the Classroom Instruction portion of the Aircrew Coordination Course. Hours 6 through 20 (Training Rides 1 through 3) follow the Classroom Instruction.

Note: The 20 hours recommended for Simulator or Flight Training apply primarily to simulator training. Due to such factors as preflight, travel to the training area, weather, fuel delays, etc., additional hours may be required for flight training to accomplish the objectives of this portion of the Aircrew Coordination Course.

1. Premission Planning and Rehearsal
 - a. Students report to the Simulator Facility or Airfield/Heliport Planning Room per schedule.
 - b. Planning and rehearsal time is 1.5 hours.
 - c. Instructor will issue training materials, brief the mission, observe planning activities, grade appropriate task(s), and rate appropriate basic qualities.
 - d. Students will plan and rehearse the mission using the crew coordination principles learned in the classroom.
2. Simulator or Flight Mission
 - a. Students report to simulator or aircraft per schedule.
 - b. Flying time is 1.75 hours.

-
- c. Students will fly the scenario missions according to plan. They will apply crew coordination principles and techniques throughout each mission, as appropriate. Should questions exist during Training Rides 1 and 2, they are allowed to query the instructor. Should coaching be required, the instructor will provide guidance as necessary.
 - d. During Training Rides 1 and 2, the instructor will instruct, offer advice, make suggestions, and answer questions. During the Pretraining and the Evaluation ride (Training Ride 3), the instructor will observe on a nonintervention basis. For all rides, the instructor will grade appropriate tasks and rate appropriate Basic Qualities.
3. Crew-Level After-Action Review
- a. Students report to the after-action review area per schedule.
 - b. Crew-level after-action review time is 1.75 hours.
 - c. Students will conduct the after-action review in accordance with the Crew-Level After-Action Review Checklist.
 - d. Instructor will observe student activities and rate the AAR and other appropriate Basic Qualities.
4. Instructor Critique/Debriefing
- a. Part of the crew-level after-action review period.
 - b. Instructor critiques entire mission from preplanning to after-action review; uses the grade slip and comment slip to identify instances of good or bad crew coordination.
 - c. If videotape of the mission is available, it is an outstanding training aid and should be used for organizing remarks and in pointing out examples of good or bad crew coordination.
 - d. Encourage crews to challenge remarks, grades, or ratings. Use this occasion as an extension of the opportunity for the crews to further practice their newly acquired crew coordination skills.
 - e. Excuse crew after critique to comply with schedule or planned end-of-course exercise. Turn in grade slips and comment slips to the course director for filing.

Evaluation Procedures and Scenario Development

Evaluation Procedures for Assessing Aircrew Coordination Performance and Guidelines for Developing Scenarios (5 hours)

..... Evaluation of Aircrew Coordination

1. General

- a. Success of the Aircrew Coordination Program is linked to the objectivity of the evaluations.
- b. Evaluations are critically dependent on nonbiased observations of aircrew performance. This is achieved through the use of criterion-referenced standards contained in rating guides.
- c. Both technical flight and crew coordination skills will be evaluated.

2. Organization for Simulator or Flight Scenario Training and Evaluation Conducted During the Aircrew Coordination Course (Section 3)

- a. Instructor Operators (IOs)
 - (1) Full-time IOs should be used where possible for crew coordination simulator training.
 - (2) IOs should be provided aircrew coordination familiarization training prior to supporting the aircrew coordination training courses.
 - (3) IOs should not operate the simulator and evaluate a crew simultaneously.

b. Unit instructors

- (1) IPs should be provided by the participating aviation units to instruct, evaluate, and operate the simulator (full-time IOs not available).
- (2) Where unit assets cannot support required numbers of IPs, UTs may conduct Classroom Instruction and administer the pretraining and two training rides. The evaluation ride (fourth ride) must be evaluated by an IP.
- (3) Where possible, unit instructors should train and evaluate aircrews assigned to their own organization.
- (4) Unit instructors must be trained in aircrew coordination instructional and evaluation techniques prior to conducting simulator or flight evaluation operations for initial or continuation training.

c. Aircrews

- (1) Crewmembers should be battle-rostered and assigned as a crew to perform simulator or flight missions during the Aircrew Coordination Course.
- (2) Where battle rostering is not accomplished, designated Pilots-in-Command (PC) will be paired with pilots from their units with whom they would normally fly.

3. Schedule for Simulator or Flight Scenario Training and Evaluation

- a. Simulator or flight periods, other than the pretraining ride, should not be scheduled prior to completion of the Classroom Instruction portion of the Aircrew Coordination Course (Section 3).
- b. Aircrew reporting time to the Simulator Facility or flight line should be 1.5 hours prior to the mission start time.
- c. Instructors should report at least one-half hour prior to their assigned aircrew.

-
- d. IOs should report at their regularly assigned reporting time (civilian IO) or at least 1/2 hour before the simulator period (military IO).
 - e. Actual schedule will be prepared by the instructor and distributed to the training aircrews.
 - Schedule must be prepared prior to the Simulator or Flight Training and Evaluation portion (Hour 19).
 - Brief attendees on the schedule and post a copy in a prominent location.

4. Duties

a. IO duties

- (1) Operate the simulator.
- (2) Insert preplanned messages and events into the scenario.
- (3) Answer all normal aircrew requests for assistance.
- (4) Standard debrief.

b. Instructor duties

- (1) For simulator periods, coordinate with the IO to select the appropriate scenario.
- (2) Obtain the necessary training materials for the selected scenario and prepare the student packet.
- (3) Meet, greet, and brief the aircrew; issue the student packet of training materials.

-
- (4) Observe and instruct or evaluate the aircrew during their premission planning and rehearsal activities.
 - (5) Observe and instruct or evaluate the aircrew from the jump seat position during the simulator or flight mission; or perform as a crewmember in those aircraft having only two-place seating or no visual-capable simulator.
 - (6) Observe and instruct or evaluate the aircrew during their crew-level after-action review.
 - (7) Using observation notes and a video or audio tape of the mission, if recorded, conduct a review of the simulator or flight period to:
 - (a) Allow and encourage aircrew members to self-critique themselves.
 - (b) Emphasize instances of good aircrew coordination.
 - (c) Constructively point out instances of poor aircrew coordination.
 - (d) Summarize the overall conduct of the mission from the aircrew coordination aspect.
 - (8) Release the aircrew. This completes one training and evaluation cycle.

c. Aircrews

- (1) Complete premission planning using the materials provided in Appendix F (*Student Guide*).
- (2) Plan the simulator or flight mission as it would be planned for an actual mission. Include any mission information provided by the IP during the initial briefing.

(3) Employ crew coordination techniques learned in the classroom during *all* phases of the simulator or flight period.

(4) Participate in the instructor critique of the simulator or flight period. Use this activity to practice the application of crew coordination techniques.

5. Use of the Aircrew Coordination Evaluation Materials

a. Aircrew Coordination Training Grade Slips (Appendix C)

(1) Description

(a) Battle-Rostered Crew Evaluation/Training Grade Slip (DA Form 7121-R)

(b) Aircrew Coordination Training Grade Slip

(2) Expanded grading system

(a) Grade covers individual skills and crew coordination aspects

(b) Grading system uses S+, S, S-, and U

(c) Basic Quality also cited for S- or U

(d) Overall rating of Basic Qualities

(3) Record keeping

(a) Chapter 3

(b) Chapter 8

-
- b. Aircrew coordination evaluation guidance (*Student Guide*, Appendix E)
 - (1) Considerations
 - (2) Guidance
 - (3) Scales
 - (4) Aircrew Coordination Basic Qualities and rating anchors
 - 6. Aircrew Coordination Evaluation Workshop Exercises (Appendix D)
 - a. Experience in using the evaluation tools
 - (1) Aircrew Training Manual (ATM) for standards
 - (2) Grade slips (Appendix C)
 - (3) Evaluation guidance (*Student Guide*, Appendix E)
 - b. Consistent Ratings
 - (1) Objective
 - (2) Behavior-based criteria and rating anchors
 - (3) Guard against norm-referenced excursions
 - c. Aircrew Coordination Evaluation Workshop (2 hours)

7. Evaluation Process (Appendix E)

a. Evaluation specifics

- All aircrew coordination training flights
- Four simulator or aircraft flights

b. Evaluator activities for training and evaluation rides

- Greet crew and explain nature of flight
- Issue mission materials and information
- Instruct (observe) and evaluate mission execution
- Instruct (observe) and evaluate crew-level after-action review
- Debrief
- Finalize all records

..... Evaluation of Aircrew Coordination Continuation Training in Units

1. Evaluation criteria for aircrew coordination continuation training is the same for both initial and refresher training. It is essential that evaluators measure crew coordination skills based on the evaluation guidelines for the Aircrew Coordination Basic Qualities presented in this exportable training package (*Student Guide*, Appendix E).
2. Evaluation of crew coordination requires a conscientious assessment of how well crews perform to successfully accomplish assigned missions.
3. Uniform, objective ratings are crucial to the assessment of the actual crew coordination training status of unit aircrews.
4. Crew performance of ATM tasks and battle drills ties directly into the collective tasks, which make up a unit's ARTEP Mission Training Plan (MTP). Unit commanders should designate specific crew tasks essential to accomplishing unit missions. Crew scores on MTP tasks can help determine the overall level of the unit's crew coordination training.

1. General (Appendix F)

a. Aircrew coordination training program scenarios

- (1) Focus on the unit's mission essential task list (METL)
- (2) Implement the guidance for crew training contained in TC 1- 210, "Aircrew Training Program, Commanders Guide to Individual and Crew Training," and the appropriate aircraft Aircrew Training Manual (ATM)

(3) Involve battle-rostered crews

(4) Emphasize crew tasks developed as a part of the unit's collective training

b. Scenarios should be conducted in flight simulators, when available. It is highly recommended that the simulator be equipped with video recording capability.

c. Scenarios should include common missions for the type of aviation unit and mission types of aircraft assigned to the unit.

d. Scenarios should include tasks that require the aircrew to coordinate, both internally and externally, to successfully accomplish the mission.

(1) Terrain flight

(2) Threat avoidance

(3) Instrument flight

(4) Weapons engagements

(5) External loads

(6) Emergencies and other abnormal events that emphasize crew coordination rather than individual aviator skills.

-
- e. Simulator or flight scenario training should be conducted within a two-week period following aircrew coordination Classroom Instruction.
 - f. The Aircrew Coordination Training Grade Slip (Appendix C) will be used during scenario training.

2. Simulator and Aircraft Scenarios

- a. Instructors who conduct the aircrew coordination training should develop at least two simulator scenarios or two situational training exercises (STXs) for aircraft without flight simulators.
- b. Each scenario or STX should require approximately 5.0 hours to complete.
 - (1) 1.5-hour premission planning phase
 - (2) 1.75-hour flight phase
 - (3) 1.75-hour crew-level after-action review phase
- c. Unexpected events that require crew coordination should be incorporated into the pre-planned scenarios and STXs within acceptable risk criteria.
 - (1) Inadvertent entry into instrument meteorological conditions and any necessary instrument approaches
 - (2) Aircraft emergencies
 - (3) Nonroutine mission changes

-
- d. Scenarios and STXs should be based on the crawl-walk-run philosophy and should be tailored to the appropriate level of unit proficiency.
 - (1) During the day
 - (2) At night using night vision devices (NVD)
 - (3) In mission-oriented protective posture (MOPP)
 - (4) In electronic warfare (EW) conditions
 - e. If feasible, the scenario periods should be recorded on video and/or audio tape. Aviation maintenance support should be consulted to resolve any airworthiness issues.
 - (1) Prepermission planning phase (videotape)
 - (2) Flight phase (audio or videotape)
 - (3) After-action review phase (videotape)
 - f. STXs conducted in aircraft with two-place configurations will place additional burdens on IPs and UTs
 - (1) Perform duties as evaluators and trainers
 - (2) Perform duties as crewmembers (role-play)

3. Scenario Development Procedures and Materials

- a. Each aircrew coordination training scenario, whether executed in a simulator or in an aircraft, should be well thought through and relevant to the unit being trained.
- b. The following development steps and information sources provide a start point and approach for the scenario developer.
 - (1) Select a common tactical mission(s).
 - (2) Identify unit mission essential tasks.
 - (3) Incorporate activities that emphasize crew coordination.
 - (4) Develop a scenario outline.
 - (5) Identify activity breakpoints and describe the major activities and focus for each scenario segment.
 - (6) Select ATM tasks.
 - (7) Transpose scenario outline to the tactical training area available.
 - (8) Develop OPORD and/or air mission briefing and develop an instructor operator script for simulator scenarios.
- c. Scenario materials
 - (1) Instructors should instill a sense of unit mission and mission planning realism in the aircrew coordination training by providing the scenario-based materials listed in Table 4-1. (See Appendix F for examples of the materials.)

Table 4-1. Scenario Materials

Scenario Item	Student	Instructor	Simulator Operator
OPORD and/or Air Mission Briefing ¹	X	X	X
Scenario Outline		X	X
Scenario Segment Info		X	X
Tactical Map	X	X	X
Approach Plate	X	X	X
Grade Slip		X	
Note:			
1 Provide an instructor operator script for simulator scenarios			

4. Audio-Visual Support

- a. Video and/or audio playback and review of aircrew actions has proven to be a powerful training technique.
- b. It is possible to record the aircrew during all phases of a mission.
- c. The types of audio-visual equipment available to aircrew coordination training instructors will greatly determine the extent to which this training opportunity is realized. The equipment listed in Table 4-2 is representative of what is needed to fully support aircrew coordination training conducted by units in the field.

Table 4-2. Audio-Visual Support

Audio-Visual Equipment, (Quantity), & Approximate cost	Permission Planning	Mission Execution	After Action Review
Video camera w/tripod (1) \$900	X		X
Compact video camera (1-3) \$1,800 each		X ¹	
Video recorder player (1) \$400	X ²	X ²	X ²
Monitor (1) \$200	X ²	X ²	X ²
Audio recorder (1) \$100	X ³	X ³	X ³
Notes: 1 Cockpit location may create air worthiness considerations; requires a multiplexer (screen splitter) to monitor multiple cameras simultaneously 2 Required to record and monitor aircrews 3 Alternative to video camera, VCR, and monitor			

Scenario Familiarization and Evaluation

Scenario Familiarization and Evaluation (6 hours)

..... Scenario Familiarization

1. Sample scenario materials (Appendix F).
2. Main points of each scenario item and intended use by student, instructor, and simulator operator.
3. Simulator or flight schedule for the student instructor crew coordination rides.
4. Comply with simulator or flight schedule.

..... Instructor Practice Evaluations

Note: The simulator or flight training and evaluation schedule shows crew pairings and assignment to either fly or evaluate/operate the simulator for a particular mission.

1. IPs and UTs organized into crews.
2. Simulator or flight training
 - a. 1.5 hours for planning the mission
 - b. 1.75 hours for simulator or flight practice of scenario
 - c. 1.75 hours for crew-level after-action review
3. Evaluations will follow the same process and procedures used for the student evaluation ride ("Run" ride).
4. Trainers will observe instructor crews, evaluators, and operators during premission planning and the after-action review. Trainers will review the evaluators' grades and ratings of the flight and the crew's performance. The trainers will then critique the entire mission to point out areas that require improvement or that were acceptable.

Student Read-Ahead 1

Welcome to the Aircrew Coordination Course!

The mishap described below exemplifies noncompliance with many of the aircrew coordination principles that you will learn about in the Aircrew Coordination Course. More than anything, the example shows that the crewmembers were *not* operating as a CREW!! Rather, the mishap crewmembers fit the mold of what MG Robinson, CG, USAA-VNC, referred to as the "single pilot mentality." Such an approach to flying duties is not acceptable!

Aircrew coordination failures, such as the one shown above, were a major reason for the development of, and your attendance at, the Aircrew Coordination Course. You will be trained to recognize and avoid aircrew coordination failures. Furthermore, you will be taught several techniques to fully utilize your fellow crewmembers' capabilities.

Before you begin your classroom instruction, you will participate in a pre-training ride to prepare you for the type of training missions you can expect. Items necessary for you to plan the flight will be issued shortly.

You will be expected to accomplish pre-mission planning and rehearsal, mission

execution, and a crew-level after-action review for this pretraining ride mission—but without any pressure attributable to evaluation—there is none! So relax and do your best. Use your previous training and experience—and any doctrinal publications that you presently use. Then, during the course, you and your crewmembers will have a common, recent basis for comparing your past performance with your expected performance after you learn the aircrew coordination techniques being taught in the course. We suspect that these

comparisons will be quite interesting—and productive as well!

After your pretraining ride, you will receive another read-ahead and your course training materials. And, subsequent to your classroom instruction, you and your fellow crewmembers, both rated and nonrated, will plan and execute several simulator- or aircraft-based missions derived from your unit mission essential task list (METL). For now, don't worry about what lies ahead—concentrate on the mission at hand.

Any questions you have will be answered by your instructors when the course begins.

On a night, unaided mission over water, the PC assumed the controls at 100 feet AGL and attempted to maneuver underneath a thunderstorm. Without directing the P to assist in monitoring and calling out altitude, the PC began to perform a number of tasks simultaneously: instrument cross checks, radio calls, aircraft control, and reset of the force trim switch. The PC subsequently became task saturated and allowed the aircraft to descend unnoticed into the water.

~ Again, welcome to the Aircrew Coordination Course! ~

Student Read-Ahead 2

Welcome to the Aircrew Coordination Course Classroom Instruction!

As with the example shown on the first read-ahead, this accident exemplifies the "single-pilot" mentality. Besides the obvious lack of crew-based premission flight planning and briefing, the P was guilty of the "Co-pilot Syndrome" and believed his own best interests were being looked after by others—only to be sadly disillusioned. Aircrew coordination training will teach you, as P or PC, to preclude such accidents from happening.

One technique you will learn is the "Two-challenge Rule"—a rule which would have mentally prepared the P in the example to assume the controls from the PC where loss of life was imminent. We must all recognize that we are fallible and where tragedy can result, it is morally unconscionable for us not to act—regardless of who is on the controls. But how did we get to this stage of thinking?

During your classroom instruction, we will cover the history of aircrew coordination, beginning with the commercial airlines' realization that mechanically safe aircraft were crashing for no apparent reason. The US Army Research Institute and the US Army Safety Center later conducted an analysis and found that of 596 Class A, B, and C accidents occurring between FY 84-

89, 15% (88) were due to crew coordination error. Of these 88 accidents, 41% involved communication failures and 36% resulted from workload or prioritization failures. From these accidents, six categories of

aircrew coordination failures were identified:

- ❖ failure of the pilot on the controls to **direct assistance**
- ❖ failure of a crew-member to **announce a decision or action**
- ❖ failure of crew-members to **communicate positively**
- ❖ failure of the PC to **assign crew responsibilities**
- ❖ failure of crew-members to **offer assistance or information**, and
- ❖ failure to perform flight actions in the **proper sequence**.

Despite the fact that neither crew-member was mountain qualified, the PC, who was on the controls, attempted to demonstrate mountain flying tactics on a training mission. In addition, the PC failed to properly complete the PPC for the anticipated flight conditions. Finally, the PC considered the OGE hover check conducted at 6,000 feet MSL to be adequate for predicting available power at the mission altitude of 9,180 feet MSL. While attempting an NOE masking/unmasking maneuver at this higher altitude, the PC lost directional control of the aircraft and permitted it to crash into wooded terrain. The P failed to challenge any of the PC's actions or decisions during this mission.

As a result of these findings, Army aviation officials took several significant actions:

TC 1-210, Aircrew Training Program, and the Aircrew Training Manuals (ATMs) for each mission-type aircraft were rewritten to incorporate the analysis findings, and, concurrently, action was taken to develop the Aircrew Coordination Course, which you are now attending.

The Aircrew Coordination Course embodies several new concepts and models that you will soon be introduced to, such as **Crew**

Coordination Elements, Crew Coordination Objectives, and Basic Qualities.

From the aviation accident analysis discussed above, you will discuss the eight Crew Coordination Elements built into the ATM tasks. These elements are: Communicate positively, direct assistance, announce actions, offer assistance, acknowledge actions, be explicit, provide aircraft control and obstacle advisories, and coordinate action sequence and timing. Sound familiar? Of course they do; they're right out of your ATM!

You will also discuss the Crew Coordination Objectives. These objectives, validated by Army research data on line aviation units, are central to the functions that all crewmembers perform: Plan, Assess, Resolve, and Execute. But what exactly are the Crew Coordination Objectives? They are behaviors to be instilled in each rated and nonrated crewmember. Once instilled, we must then measure achievement of the Crew Coordination Objectives with respect to the ATM tasks—the tasks that form the basis for flight training and evaluation—using the Basic Qualities.

Definitions for each of the Basic Qualities, as well as for the Crew Coordination Elements and Crew Coordination Objectives, will be discussed during your classroom instruction. In preparation for that instruction, the relationship of the Basic Qualities to the Crew Coordination Objectives is shown below:

CCO 1: Establish and maintain team relationships

BQ 1: Establish and maintain flight team leadership and crew climate

CCO 2: Mission planning and rehearsal

BQ 2: Pre-mission planning and rehearsal accomplished

BQ 3: Application of decision making techniques

CCO 3: Establish and maintain workload levels

BQ 4: Prioritize actions and distribute workload

BQ 5: Management of unexpected events

CCO 4: Exchange mission information

BQ 6: Statements and directives clear, timely, relevant, complete, and verified

BQ 7: Maintenance of mission situational awareness

BQ 8: Decisions and actions communicated and acknowledged

BQ 9: Supporting information and actions sought from crew

CCO 5: Cross-monitor performance.

BQ 10: Crewmember actions mutually cross-monitored

BQ 11: Supporting information and actions offered by crew

BQ 12: Advocacy and assertion practiced

BQ 13: Crew-level after-action reviews accomplished

But how do the ATM tasks, Basic Qualities, and Crew Coordination Objectives relate to one another? The Crew Coordination in Army Aviation graphic depicts this relationship (Figure 1). And, the relationship of the Crew Coordination Objectives to the crew cyclical functions is shown in the Crew Coordination Model (Figure 2). We will use these two training aids throughout the course to firmly establish the relationships among the many aircrew coordination components. This is what makes the Army aircrew coordination training different from all other crew coordination courses: We know what the components of aircrew coordination are, how to train aviation personnel in their use, and how to measure them—another subject you will be introduced to during the course.

What other innovative ideas are introduced in the Aircrew Coordination Course? Besides the models and the concepts they depict, we use case studies based on actual Army accidents to analyze aircrew coordination failures. Several of the cases are supported vividly by videotape presentations, which you will analyze in small groups. Case studies are included in Appendix D of your *Student Guide*. But, the major instructional technique that makes this course so effective is the simulator or flight hands-on training, which reinforces the techniques you learned in the classroom before you forget them—as happens in so many other courses!

As mentioned in your first read-ahead, in addition to the pretraining ride, you will

have three rides based on the crawl-walk-run concept. This approach to training will be explained to you during the course and put into practice so that you may experience the benefits of its application.

Practically speaking, what can you do to get the most from the Aircrew Coordination Course? Without exception, be prepared for each day's activities whether they are in the classroom or in the cockpit. In this respect, it's no different from being back in the unit; so the course will not be demanding anything different from you in terms of commitment. Judging from past students, we know you will soon get wrapped up in the subject matter and will probably even begin applying the techniques learned on the job to your personal life as well. So, what can you do to be better prepared? Complete the assigned background reading and practical exercises to be discussed during the following day's instruction. That way you can assist the instructor by keeping up with the accelerated pace demanded by the course. The readings from Appendix G of your *Student Guide* are:

For hours 1-6, pages G-1 to G-54

For hours 7-12, pages G-55 to G-100

For hours 13-18, pages G-101 to G-130

(Complete the PEs as directed by your instructor; i.e., either in class or at home.)

~ Once again, welcome to the Aircrew Coordination Course. Your instructional staff is here to assist you in any way possible. We are committed to making this the best course of instruction you have ever attended; and it is the best because, as other Army aviation crew coordination graduates have stated, "Someday this course will save my life!" ~

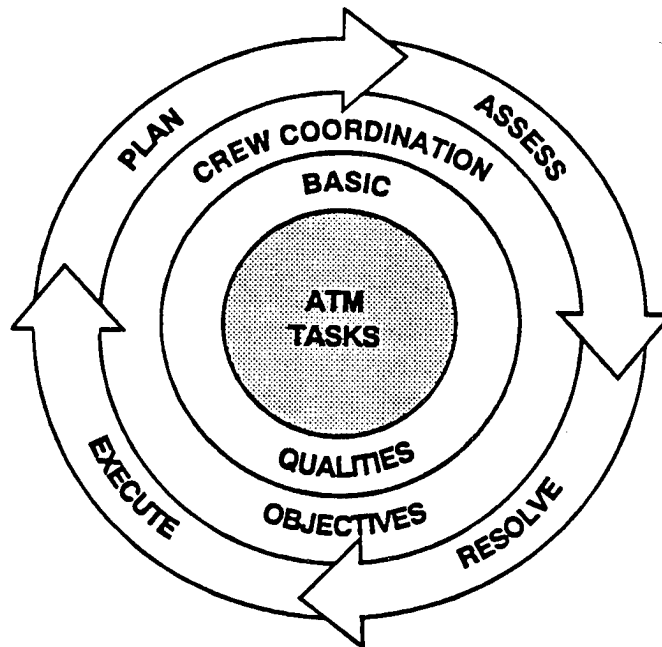


Figure 1. Crew Coordination in Army Aviation Graphic

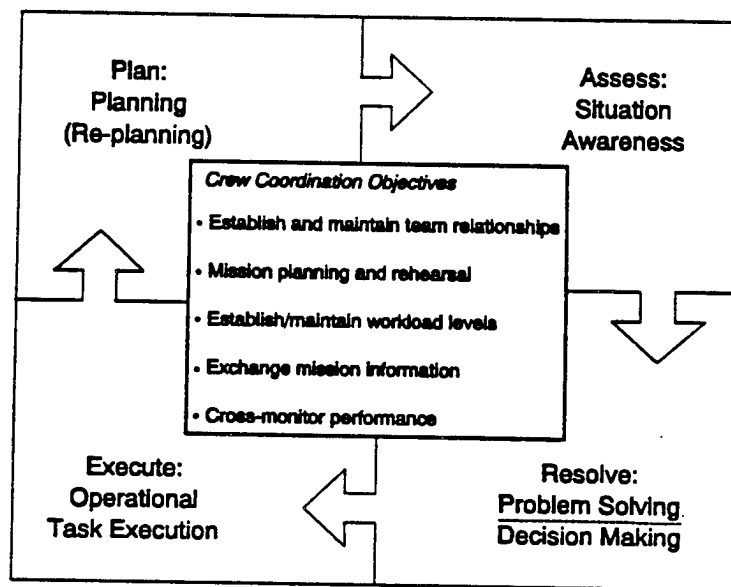


Figure 2. Crew Coordination Model

B

Case Study Discussion Guide

1. General

- a. Aircrew coordination case studies in this appendix support the course outline for the Aircrew Coordination Course (Student Handout, *Student Guide*). For ease of reference in the event an instructor may require additional information from the Army Safety Management Information System (ASMIS), the US Army Safety Center (USASC) accident case number is provided at the end of each narrative. Where a case number is not shown, the narrative is in support of a Broken Wing Award. To obtain information from ASMIS, contact the installation aviation safety office.

(1) To assist the instructor in selecting case studies for discussion, Table B-1 is provided at pages B-4 and B-5. Using the table, the instructor can select cases by Broken Wing award; aircraft mission, design, and series (MDS); ATM task; or by video support. Where video support is available, the word, video, will be shown emboldened at the end of the case narrative following the USASC case number; i.e., **Video**

(2) An acronym list is at page B-48.

- b. Case studies are initially grouped under the five Crew Coordination Objectives. They are further categorized:

(1) Alphabetically by, and numerically within, the MDS of the aircraft involved; i.e., attack (AH-1, AH-64), cargo (CH-47, CH-54, etc.), multimission, observation, utility, and fixed wing.

(2) Within multiple MDS, by USASC case number sequence; e.g., 871122011, 880314010, 900430022, etc., where the case number represents the year (87), month (11), day (22), and order of receipt (011) by ASMIS.

- c. The initial grouping of case studies by Crew Coordination Objectives (e.g., Group 1) represents the first level of analysis in discussing the cases. The Crew Coordination Objectives in order of groupings from one through five are:

- (1) Establish and maintain team relationships
- (2) Mission planning and rehearsal
- (3) Establish and maintain workload levels

-
- (4) Exchange mission information
 - (5) Cross-monitor performance
 - d. The second level of case analysis is to identify the Crew Coordination Basic Quality(ies) that contributed to the crew's performance. The 13 Basic Qualities are:
 - (1) Establish and maintain flight team leadership and crew climate
 - (2) Pre-mission planning and rehearsal accomplished
 - (3) Application of appropriate decision making techniques
 - (4) Prioritize actions and distribute workload
 - (5) Management of unexpected events
 - (6) Statements and directives clear, timely, relevant, complete, and verified
 - (7) Maintenance of mission situational awareness
 - (8) Decisions and actions communicated and acknowledged
 - (9) Supporting information and actions sought from crew
 - (10) Crewmember actions mutually cross-monitored
 - (11) Supporting information and actions offered by crew
 - (12) Advocacy and assertion practiced
 - (13) Crew-level after-action reviews accomplished
 - e. The third level of analysis for each of the case studies is to identify the ATM Crew Coordination Element(s) central to the crew's performance. The eight ATM Crew Coordination Elements are:
 - (1) Communicate positively
 - (2) Direct assistance
 - (3) Announce actions

-
- (4) Offer assistance
 - (5) Acknowledge actions
 - (6) Be explicit
 - (7) Provide aircraft control and obstacle advisories
 - (8) Coordinate action sequencing and timing
- f. The framework described above is the recommended method for analyzing and discussing each case; i.e., discuss the Crew Coordination Objective under which the case falls, the Basic Quality(ies) involved, and the contributing ATM Crew Coordination Element(s). In many instances, cases may not be clearly attributable to a particular grouping; however, this situation should assist in stimulating discussion.
2. The case studies listed in this appendix are provided to the training aircrews in Appendix D of the *Student Guide*; however, the cases are shown in Appendix D without the information about Crew Coordination Objectives, Basic Qualities, or ATM Crew Coordination Elements.
3. Aircrew coordination case studies begin on page B-6 and are presented in the order of the Case Study Selection Matrix provided below.

Table B-1. Case Study Selection Matrix

Example	Broken Wing	ACFT	ATM Task	Video
1-1	Yes	UH-1N	2009	No
1-2	No	UH-60A	2009	No
1-3	No	U-8F	3004	No
2-1	No	AH-1G	1035	No
2-2	No	CH-54	2016	Yes
2-3	No	OH-6A	1023	No
2-4	No	UH-1H	----	No
2-5	No	UH-1H	1068	No
2-6	No	UH-1H	----	Yes
2-7	No	UH-1V	2081	No
2-8	No	UH-60A	2010	No
2-9	No	UH-60A	2010	Yes
2-10	No	UH-60A	2003	No
2-11	No	UH-60	1028	No
3-1	Yes	AH-1F	----	No
3-2	Yes	AH-6	----	No
3-3	Yes	CH-47D	----	No
3-4	Yes	CH-47D	----	No
3-5	No	OH-58C	1035	No
3-6	No	OH-58C	2094	No
3-7	No	UH-1	1017	No
3-8	No	UH-1H	2081	No
3-9	No	UH-60	1022	No
3-10	No	UH-60A	2081	No
3-11	No	UH-60	1015	No
4-1	Yes	AH-1F	----	No

Table B-1. Case Study Selection Matrix (Cont.)

Example	Broken Wing	ACFT	ATM Task	Video
4-2	No	AH-64	1035 1106	No
4-3	No	AH-64	1119 2049	No
4-4	No	AH-64	1083	No
4-5	No	MH-6B	2009	No
4-6	No	OH-58C	1035	No
4-7	No	OH-58	1097	No
4-8	Yes	UH-1H	---	No
4-9	No	UH-60A	2081	No
4-10	No	UH-60	2009	Yes
4-11	No	UH-60	2009	No
5-1	Yes	AH-1F	---	No
5-2	No	AH-1S	1031	No
5-3	No	AH-1S	1038	No
5-4	No	CH-47	2084	No
5-5	No	OH-58A	1035	No
5-6	No	OH-58D	1028	No
5-7	No	UH-1H	2096	No
5-8	No	UH-1H	1017	No
5-9	No	UH-1H	1031	No
5-10	No	C-12	4510	No

GROUP #1: ESTABLISH AND MAINTAIN TEAM RELATIONSHIPS

Example 1-1: UH-1N NVG Training Flight (USMC)

During an NVG multi-aircraft operation (Army ATM Task 2009), a flight of two aircraft were practicing terrain flight navigation. The PC of the lead aircraft was under pressure from collateral duties within the unit. He was also known for his harsh treatment of subordinates. Three weeks earlier, he had a run-in with the CE of his aircraft, accusing him of sabotage when the aircraft had binding controls. The CE reported this to the unit commander who subsequently counseled the PC.

The unit had been bivouacked in harsh conditions and the OPTEMPO was intense for the last 4 months, resulting in evident fatigue among all members of the unit. Unit SOP required the crew of the wing ship of two ship flights to monitor lead's navigation and call a code word over the mission frequency if they detected that lead was deviating from the planned route. On a previous mission, the crew of the wing ship had done this several times to the PC of lead, only to have him reprimand them for breaking radio silence when the mission was over.

On this mission, the crew of the wing ship observed lead once again "flying off the top of the map." After watching lead make two course reversals, then fly off the map again, the crew of wing discussed calling the code word over the mission frequency. The PC of the wing ship said "he just chewed our ass for radio discipline,....let him continue for a few more minutes, then we'll call the code word." Approximately 45 seconds later, wing observed lead impact wires and crash.

Crew Coordination Objective: Establish and maintain team relationships

Crew Coordination Basic Quality: Establish and maintain flight team leadership and crew climate

ATM Crew Coordination Element: Provide aircraft control and obstacle advisories

Example 1-2: UH-60A NVG Troop Insertion Mission

The crew of a UH-60A was participating in a battalion-sized infantry insertion consisting of multiple-ship, multiple-sortie lifts to various LZs. The LZ selected for this insertion was a large, dusty field in which there was a large depression created by a dried-up lake bed.

The PC*, flying chalk #2 in a flight of three (ATM Task 2009), had attended the mission briefing but did not brief the rest of his crew on the mission. The PC* also conducted the preflight and performance planning by himself and didn't brief this information to the crew either. A subsequent interview conducted by the accident investigation board revealed the PC* considered the less experienced P as "virtually useless." This attitude also extended to the other members of the crew.

The flight was in a staggered left formation at 100 feet AGL and 70 knots as flight lead aligned the flight with the inverted "Y" illuminated by chemical lights. On short final, lead browned out and called the flight informing them he was initiating a go-around. The PC* of chalk #2 didn't hear this call and continued an approach to the ground, unknowingly into the 20-foot-deep depression. The CE on the right side of the aircraft saw the rising terrain of the edge of the depression ahead and called, "Pull up! Pull up! Pull up!" three times in succession. The PC* did not immediately respond, and the front of the aircraft struck the terrain followed by the landing gear. The PC* abruptly pulled collective, which resulted in a tail-low ascent to approximately 50 feet AGL.

Thinking the tail rotor had hit the ground, and perceiving a right yaw, the PC* incorrectly diagnosed the aircraft's reaction to be the result of a tail rotor failure. The PC* rapidly lowered the collective, which resulted in a high rate of descent and a hard landing, injuring all 12 persons on board. (USASC Case #900816131)

Crew Coordination Objective: Establish and maintain team relationships

Crew Coordination Basic Quality: Establishment of flight team leadership and crew climate

ATM Crew Coordination Element: Provide aircraft control and obstacle advisories

Example 1-3: U-8F Qualification Training Flight

During a U-8F qualification training flight, the crew was performing flight at minimum controllable airspeed in the landing configuration (ATM Task 3004). It is unknown whether the IP or RSP was on the controls. The IP and the RSP were of equal rank and experience, yet the IP was the RSP's supervisor within the unit.

Witness interviews conducted by the accident investigation board revealed that both the IP and the RSP had several discordant personality traits that isolated them from their peers. The RSP was described as "strong willed; quick to criticize the organization and the pilots in it; and an agitator who provoked arguments and conflicts with fellow pilots." The RSP was also considering divorce from a 10 month marriage. The IP was described as "having an explosive personality; a revengeful attitude; double standards; and an absolute authoritarian image who abhorred being challenged."

The board concluded that during the maneuver (ATM Task 3004), there probably was an aggressive and ongoing verbal exchange between the IP and the RSP that resulted in inadequate attention to the aircraft. The aircraft rolled over and yawed to the left, and entered a left spiral/spin with insufficient altitude to recover. (USASC Case #831019041)

Crew Coordination Objective: Establish and maintain team relationships

Crew Coordination Basic Quality: Establish and maintain flight team leadership and crew climate

ATM Crew Coordination Element: Provide aircraft control and obstacle advisories

GROUP #2: MISSION PLANNING AND REHEARSAL

Example 2-1: AH-1G VFR Cross-Country Flight

The crew of an AH-1G was on a static display mission at a college homecoming celebration. During the day, the PC met a close female friend at the college and spent the afternoon with her. A subsequent interview conducted by the accident investigation board with the female friend indicated that her relationship with the PC was more than casual. The PC's female friend agreed to meet the PC later the same evening after the crew flew back to home base, some 100 miles away. The female friend departed for that city in her automobile shortly before the crew departed the college.

The crew had planned to depart the college and land at a nearby airport where they would refuel, file a flight plan for the return flight, and check the weather. During the mission briefing that morning, the weather was anticipated to deteriorate due to an approaching front. The operations officer emphasized the possibility of adverse weather to the crew and assured them that it was acceptable to remain overnight if the weather made the return flight unwise. By the time the crew arrived at the airport, a light rain was falling. The crew remained in the aircraft as it was refueled. Despite having the time available, the crew did not file a flight plan nor did they obtain a weather update, either in person or by radio with the Flight Service Station at the airport.

When the crew called for takeoff clearance, they were informed by the tower that the airfield had gone IFR. The crew requested and obtained a special VFR departure. A review of the radar flight path revealed the aircraft was flown at an initial altitude of 600 feet AGL, and the flight path followed an interstate highway. Because of gradually rising terrain and deteriorating weather conditions, the flight altitude eventually decreased to approximately 100 feet AGL.

While flying low level at approximately 120 knots (ATM Task 1035), the aircraft struck two 7-strand steel power lines and crashed, killing both crewmembers. The accident investigation board concluded that the PC's relationship with his female friend and the prearranged meeting with her later that evening were factors that impeded the PC's decision making process. (USASC Case #841117011)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality:

- Prepermission planning and rehearsal accomplished
- Application of appropriate decision making techniques

ATM Crew Coordination Element: NA

Example 2-2: CH-54 Support Mission

A CH-54 helicopter was supporting the US Forest Service near a Rocky Mountain resort area. Both the PC* and the P were RL 1, PC qualified aviators. On the morning of the mission, the PC* performed the prepermission planning and the P performed the preflight. Takeoff was at 0715. During the morning, ten successful slingload sorties were completed. Prior to the return trip to home base, which required the lift of a pelletized 6000 pound load, another CE was manifested (resulting in a total crew of 4), and the main and auxiliary fuel tanks were topped off. The departure point was 9,730 feet MSL, the temperature was 81°F, and the DA was 12,187 feet.

Both pilots reviewed performance data, but because the PC* was confident in the aircraft's ability due to previous successful missions with similar loads, the performance data check was cursory. The aircraft weight actually exceeded maximum allowable gross weight limits for the conditions by over 4000 pounds. When external load operations requiring OGE hover power were attempted, (ATM Task 2016) the takeoff was unsuccessful and the aircraft crashed. (USASC Case #890901011) Video

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Prepermission planning and rehearsal accomplished

ATM Crew Coordination Element: Coordinate action sequencing and timing

Example 2-3: OH-6A Static Display/Fly-over Mission

The crew of an OH-6A reported to the unit to participate in one of two Memorial Day static displays/fly-over missions approved by the unit commander. The PC* of one of the OH-6A aircraft outranked the AMC designated by the written mission briefing sheet and arbitrarily appointed himself as AMC. Additionally, the PC* combined the two separate

missions into one mission, again countermanding the approved mission briefing. The P for the mishap aircraft was also current and PC qualified in the OH-6A but did not assist with the premission planning.

During the performance planning for the flight, the PC* failed to consider the additional drag and torque required when flying with the doors off (as stated in the aircraft operator's manual), and consequently underestimated en route fuel consumption by approximately 16-20%. While en route, neither the PC* nor the P completed accurate in-flight fuel consumption checks (ATM Task 1023).

On the final leg of the mission, while over an abandoned airfield but still 10 miles from home base, the low fuel warning light illuminated. The PC* elected to continue to home base; the P said nothing. On a 2-mile final for a straight-in approach, the engine flamed out from fuel starvation, after 3 hours and 10 minutes of logged flight time since initial takeoff. The ensuing autorotation was not entirely successful, resulting in Class C accident damage to the aircraft.

Subsequent examination of the aircraft revealed a total of 14 ounces of fuel remaining in the fuel tanks, with no fuel in the fuel lines or filters. (USASC Case #890529011)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Premission planning and rehearsal accomplished

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance
- Coordinate action sequencing and timing

Example 2-4: UH-1H Troop Transport Formation Flight

The crew of a UH-1H was flying in Chalk #2 position of a flight of three on the return leg of a troop transport formation flight in day, VFR conditions. Shortly after takeoff, flight lead instructed the flight to change formation from a "V" of three to tactical trail with no change in altitude. After the change of formation was directed, the PC* directed the P who had been flying to relinquish the controls. This was the last exchange of dialog in the cockpit until the accident.

The PC* then broke formation, descended to 50-75 feet AGL, and passed by a local recreational lake that was used heavily by water skiers and wind surfers. Without warning, the PC* executed a cyclic climb, described later by witnesses as "very steep." The P, who later admitted he was very concerned about both a wire strike while low level and the possibility of a mid-air with chalk #3, said nothing. At the top of the cyclic climb (altitude approximately 350-400 feet AGL), a return-to-target maneuver was initiated, followed by a 45-50° dive.

At approximately 100 feet AGL, the aircraft was pulled out of the dive and another steep climb was performed, followed by another return-to-target maneuver, and another 45-50° dive. However, during the attempted recovery, the aircraft was leveled but the PC* failed to arrest the aircraft's rate of descent quickly enough to prevent the aircraft from striking the ground. One passenger was killed and four persons were seriously injured as a result of the crash.

The aircraft investigation board discovered that the PC* had a history of "cowboying" the aircraft and had been counseled twice within the previous year for lack of flight discipline. The board concluded that the PC* had a need to take risks to impress others and that this hazardous attitude impeded the PC's* judgment and affected his decision-making process. (USASC Case #840513011)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Application of appropriate decision making techniques

ATM Crew Coordination Element: NA

Example 2-5: UH-1H Support Mission

The crew of a UH-1H was on a routine support mission, in cruise flight at 4000 feet MSL and 100 knots. The P* was flying from the left seat, the PC was navigating. The crew and the passengers began to notice a burning odor, and shortly thereafter a loud crack-type noise was heard from the rear of the aircraft followed by a 10° right yaw and slight pitch-up movement.

The PC* quickly assumed the controls and, without discussing the yaw with the P who had experienced it, informed the crew that he was making an immediate landing. (A subsequent interview with the PC* revealed that he had been a P on a mission several months ago when aircraft problems were encountered. The PC of that flight did not land immediately after he had assessed the emergency. As the P on that flight, he'd felt very uncomfortable with that decision, but was overruled by the PC). The PC* began a

descending right turn to an intended landing area while the P was making MAYDAY calls on all available guard frequencies.

The descent continued until approximately 200 feet AGL, when the PC* started a gradual deceleration and applied power to slow the rate of closure. When this was done, the aircraft began a right turn that the PC* was unable to control with the application of left pedal. The PC* attempted to fly out of the spin by applying right cyclic, but was unsuccessful. The right spin accelerated as collective was applied at 40 feet AGL. After five or six complete right turns and still spinning, the aircraft impacted the ground in a near level attitude, rolled on its left side, and came to rest.

The accident investigation revealed that the aircraft tail rotor drive shaft severed in flight resulting in complete loss of tail rotor thrust. The board also concluded that the PC's* decision was affected by his overriding interest to land the aircraft immediately, even at the expense of correctly diagnosing the emergency (ATM Task 1068), and then applying the correct emergency procedure. (USASC Case #851129011)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Application of appropriate decision making techniques

ATM Crew Coordination Element: NA

Example 2-6: UH-1H Rappelling Accident

The mission of the UH-1H crew was to conduct a rappelling demonstration. As the aircraft arrived and hovered over the drop zone area, the four rappellers threw out their rucksacks, which contained both of their ropes. They assumed the ready position, two on each side of the aircraft, and awaited the "Go" command from the rappel master. When the rucksack of the rappeller located in the left rear of the passenger compartment exited the aircraft, it was not thrown clear of the aircraft structure. Therefore, the rucksack slid down the side of the aircraft, struck the left skid and rolled off, leaving a looped section of the ropes caught over the rear ground-handling wheel mounting bracket on the left skid.

As the rucksack continued to the ground, both ropes deployed in a tangled condition, causing one or two entanglements to form approximately 20 feet below the aircraft. Upon receiving the "Go" command, all rappellers exited the aircraft, but the rappeller in the left rear position became hung up when he reached the point where the ropes were entangled. Ten seconds later, the rappel master checked to ensure that the two rappellers on the right side had reached the ground and began to cut their ropes. He also signaled the CE to do the same on the left side.

Before the mission, the rappel master briefed the CE that he was to cut the ropes on the left side after the rappelling was complete, but he did not tell the CE to look and be sure all rappellers had reached the ground. The CE had never participated in a rappelling mission before and was, in fact, a last minute replacement for another CE who had rehearsed this mission the day before. The PC did not clearly designate specific duties for the crew before the mission, and he did not ensure that the replacement CE was thoroughly briefed and familiar with the rappelling mission.

On the rappel master's signal, the CE proceeded to cut both sets of ropes on the left side of the aircraft without ensuring that the rappellers had reached the ground. The rappeller who was hung up on the entangled ropes fell over 50 feet to his death. (USASC Case #891014011) Video

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Pre-mission planning and rehearsal accomplished

ATM Crew Coordination Elements:

- Communicate positively
- Be explicit
- Coordinate action sequencing and timing

Example 2-7: UH-1V Night Emergency Medevac Mission

The crew of a UH-1V Medevac aircraft received a call from a hospital emergency room to respond to an automobile accident 8 miles northwest of the airfield. One of the victims was reported to have been thrown from the wreckage and in critical condition. Weather at the airfield was 200 feet scattered, 500 feet overcast, 3 miles visibility, with light rain and fog. Six minutes after receiving the call, the crew had received a special VFR clearance from the tower and departed to the northwest. The aircraft was observed by several witnesses on the ground as "flying very low, just over the treetops," with the searchlight on, at what appeared to be cruise airspeed.

Four minutes after takeoff, during low-level flight (ATM Task 2081), the aircraft struck a large pine tree 59 feet above the ground. Impact forces were estimated in excess of 75 Gs, thereby placing the estimated airspeed at approximately 100 knots. The accident investigation concluded that the PC's decision to fly too fast for the altitude and weather conditions was because of his perceived sense of urgency to accomplish the mission. This

sense of urgency manifested itself in a hazardous attitude to get to the automobile accident site as quickly as possible, at any cost.

The board based this conclusion on the following evidence that indicated the crew's departure was rushed: 1) the P had left behind his survival vest and was flying in tennis shoes rather than regulation flight boots; 2) tools necessary to extract injured persons from wreckages were strewn on the hangar floor near the aircraft's parking spot; and 3) neither the PC's nor the P's pressure altimeter had been set to the correct altimeter setting even though the correct setting had been given to the crew by the tower. (USASC Case #870206021)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Application of appropriate decision making techniques

ATM Crew Coordination Element: NA

Example 2-8: UH-60A NVG Air Assault Raid

During training for an NVG air assault raid, the crew of a UH-60A consisted of the PC*, the P, and the CE. The aircraft was chalk #2 in a flight of three, and the mission was to insert the raiding party via fast-rope rappelling (ATM Task 2010) into an urban environment. The PC* of the mishap aircraft was one of the unit's most experienced pilots, but the CE on the mishap aircraft was inexperienced, as was the AMC who planned the mission and was flying in Chalk #1.

The scenario called for the CE in Chalk #2 to fire live ammunition from his M60 machine gun just prior to the insertion, assist the pilots with obstacle clearance as they hovered in between two buildings, and ensure that the rappelling ropes on both sides of the aircraft were clear prior to departure. During the premission briefing, the AMC did not comply with the unit SOP by requiring two persons on chalk #2 to clear the rappelling ropes. The PC* of chalk #2, who had co-written the SOP, did not call the AMC's attention to this oversight, nor did he adequately review detailed procedures that the CE was to use to ensure that the rappellers were clear of the ropes before departure, even though he knew that the CE was inexperienced.

As a result, the CE became task saturated during the insertion, and in his rush to see if the rappellers were clear of both sides of the aircraft, he looked under the belly of the aircraft from the left side to clear the right side ropes. The CE failed to see that the last rappeller, who had departed the aircraft late, was still on one of the right side ropes. Consequently, the CE gave the clear signal to the PC* who began to depart the LZ. The rappeller eventually lost his grip and fell 130' to his death. (USASC Case #8409142040)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Pre-mission planning and rehearsal accomplished

ATM Crew Coordination Element: Coordinate action sequencing and timing

Example 2-9: UH-60A Fast-Rope Demonstration

A UH-60A was on a routine day mission to perform a fast-rope rappelling (ATM Task 2010) demonstration. The crew received the mission four days in advance and had adequate time to plan the mission. On the day before the mission, the crew flew to the mission site; reconnoitered the jump area; and identified entry and exit routes, obstacles, and forced landing areas. This reconnaissance was performed in the same aircraft that would be used for the actual mission on the next day.

The aircraft had a long-term history of stabilator malfunctions in the automatic mode. During the reconnaissance flight, the crew experienced two stabilator failures, and in both cases, the automatic control switch was reset and the mission continued. On the day of the accident, the crew experienced two more stabilator failures during the flight to the mission site. Despite this history of stabilator failures, the IP* did not plan for a malfunction that could be reasonably expected; that is, he did not assign the P responsibility for assistance in case the stabilator failed during a critical portion of the mission.

During the demonstration, the IP* flying the aircraft from the left seat began a deceleration to the designated hover point. The stabilator caution light and warning horn activated but the P did not provide any assistance during the emergency. Because the IP* had not planned for this likely failure, and because he expected no help from the inexperienced P, he chose to attempt a forced landing within the confines of the field below him rather than terminate at a hover, or slew the stabilator and make a go-around. During the landing, the IP* did not apply adequate collective after the deceleration and the aircraft impacted tail low, rebounded forward, and struck trees with the main rotor system. (USASC Case #880513011) Video

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Accomplishment of premission planning and rehearsal

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Offer assistance

Example 2-10: UH-60A NVG Troop Pickup Mission

The P of the lead aircraft was appointed the AMC for the two-ship NVG troop pickup mission. Because it was the P's first occasion to plan a mission as the AMC, another pilot with only slightly more experience, but who had previously acted as an AMC, assisted the P during the mission planning. On the afternoon of the mission, the P and the other pilot visited the supported ground unit for the air mission briefing. During the briefing, the supported unit requested the pickup at 1800 hours, during EENT. The unit also requested a southwesterly landing direction of 195°. Both these requests went unchallenged and were agreed to by both pilots.

After the briefing, the P and other pilot chose to recon the PZ by ground vehicle, even though there was an aircraft available to do the recon. While in the PZ, the pilots judged the PZ to be large enough to accommodate one UH-60A but, in fact, the PZ was 10 meters less in width than that required by FM 90-4. The flight of two aircraft departed on the mission at 1755 hours. The crews of both aircraft were having difficulty seeing with their AN/PVS 5 NVGs as they flew in a westerly direction, into the residual sunlight during EENT. Upon arrival at the PZ, the lead aircraft, with the P* flying, twice attempted a confined area approach (ATM Task 2003) in the briefed landing direction of 195°, but was unable to complete the approach because the crew's NVGs shut down repeatedly due to residual sunlight.

An attempt was made to land in the opposite direction but was unsuccessful because of obstacles. A fourth attempt was made in the original direction with the crew looking under their NVGs and using the landing light. The P* was able to hover to approximately 10 feet AGL when he asked the PC to take the controls. The PC* continued the descent, clearing to the left with the assistance of the CE. The P was clearing the right. At 6 feet AGL, an impact was heard to the right rear of the aircraft. The PC* departed the PZ and made a precautionary landing at the base camp five kilometers away. All four rotor blades were damaged by the blade strike. (USASC Case #881205031)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Prepermission planning and rehearsal accomplished

ATM Crew Coordination Element: Provide aircraft control and obstacle advisories

Example 2-11: UH-60 Night Administrative Flight

A UH-60 was conducting an unaided, night administrative flight. Shortly after takeoff, at approximately 300 feet AGL, the PC*, flying in the right seat, chose to turn and land the aircraft in a large, open field due to blowing dust that reduced visibility to less than 1.5 miles. While on approach (ATM Task 1028) to the open field, the aircraft hit trees.

The PC* did not assign any specific duties to the P during the prepermission planning as required in Chapter 5, TC 1-204, nor did he request assistance from the P during the approach. The P offered no assistance during the approach, waiting until the crash was inevitable before warning the PC* of danger. (USASC Case #890314011)

Crew Coordination Objective: Mission planning and rehearsal

Crew Coordination Basic Quality: Prepermission planning and rehearsal accomplished

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Offer assistance
- Provide aircraft control and obstacle advisories

GROUP #3: ESTABLISH AND MAINTAIN WORKLOAD LEVELS

Example 3-1: AH-1F Engine Failure

The crew of an AH-1F was returning from a surveillance mission at 800 feet AGL, 125 knots, when they noticed the aircraft was in an uncommanded descent. The PC* made an immediate cross-check of his instruments and noted N_1 , N_2 , and TGT were decreasing. He initiated an autorotation by applying aft cyclic, lowering the collective, and reducing the throttle. The crew then heard a "pop" from the engine compartment and saw N_1 was dropping through 20%. The low RPM audio sounded and the engine oil pressure, engine oil bypass, and engine fuel pump segment warning lights all came on as N_1 continued to drop to zero.

The P, who had been calling out instrument readings while the PC* maintained aircraft control, divided his scan between the instruments and outside the cockpit, in order to provide for obstacle clearance. As the P checked outside, he spotted wires at 12 o'clock and apprised the PC* of the impending hazard. The PC* then executed a 30° left turn, paralleling the wires, and began a deceleration at about 90 feet AGL. At 15 feet he applied collective and terminated the autorotation with minimal damage to the aircraft. During the descent, both pilots smelled smoke, and witnesses on the ground saw black smoke trailing from the engine area.

The emergency was caused by internal engine failure, probably resulting from failure of the No. 3 and 4 bearings.

Crew Coordination Objectives:

- Establish and maintain workload levels
- Cross-monitor performance

Crew Coordination Basic Qualities:

- Management of unexpected events
- Prioritize actions and distribute workload
- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance
- Provide aircraft control and obstacle advisories

Example 3-2: AH-6 Engine Failure

During NVG formation flight at 90 knots and about 30 feet above water, the crew of an AH-6 aircraft heard a "pop" from the rear of the aircraft. A few moments later, the engine chip detector light illuminated. The PC* called flight lead to inform him of the light's illumination and the decision was made for the flight to return to the point of origin. The AH-6, which had been chalk #3 in a flight of three, was maneuvered into the chalk #2 position. This would enable trail to follow chalk #2 down and rescue the crew should the troubled aircraft's engine fail.

After a few minutes of flight with the aircraft again established in free cruise formation, a gradual but constant rise in TOT was noted. The PC* climbed to an altitude of about 75 feet and adjusted the airspeed to 80 knots to give himself adequate time to react if the engine failed. After another 5 minutes, the TOT had risen to 722°C at 36% torque. Engine oil pressure dropped initially to 50 PSI, then continued to drop further. About 5 minutes after the oil pressure dropped, the engine failed.

The PC* responded to the aircraft's left yaw, change in engine noise, and decrease in N_2 and N_r by entering autorotation, knowing that the autorotation would terminate in 2-4

foot seas. While the PC* concentrated on flying the aircraft, the P kept him apprised of N₁, airspeed, and radar altitude. Assisted this way during the autorotation, the PC* flared the aircraft at the correct altitude, dissipating forward airspeed to zero. He applied cushioning pitch to arrive at 2 to 3 feet above the water with zero forward airspeed and low rotor RPM. The aircraft descended vertically into the sea, landing gently on a swell. The PC* applied right lateral cyclic and the rotor slapped the waves, quickly coming to a full stop. The crew immediately exited, swam clear of the sinking aircraft, and were rescued by the trail aircraft.

Crew Coordination Objectives:

- Establish and maintain workload levels
- Cross-monitor performance

Crew Coordination Basic Qualities:

- Management of unexpected events
- Prioritize actions and distribute workload
- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance
- Provide aircraft control and obstacle advisories
- Coordinate action sequencing and timing

Example 3-3: CH-47D Combining Transmission Failure

The crew of a CH-47D was supporting a joint task force and had been flying for about 4.5 hours, slingloading equipment and transporting troops. The aircraft was in cruise flight at about 2,400 feet AGL during the return flight from a resupply mission when the crew chief reported smoke in the aft cabin area. The PC* immediately began a left descending turn to avoid a mountain in his flight path and began searching for a place to land. Within a few seconds, both the PC* and the P detected smoke in the cockpit. The

PC* reported he had sighted a landing area. The P was examining the instruments for an indication of what was causing the smoke.

Finding no indication of a malfunction, the P turned and looked through the companion-way of the aircraft to evaluate the situation. Seeing the entire cabin area was filled with thick smoke, he made two mayday calls, but received no response. The PC* continued a descending left spiral toward the landing area, a corn field one-quarter-mile square surrounded by steep foothills and mountains. The aircraft was still 1,000 feet AGL—only 30 seconds had passed since the smoke was first reported—and the cockpit was engulfed by smoke. Noticing the smoke smelled of rubber, and having found no instrument indications as to the source of the smoke, the pilots acted on the assumption that it was caused by some kind of electrical malfunction.

The P told the PC* that he was killing electrical power, and he turned off both main generators. This left the aircraft without the automatic flight control system, fuel pumps, gyros, and radios. Simultaneously, the PC* placed the aircraft in a left slip, which quickly cleared the cockpit of smoke and increased visibility. As the smoke decreased, both pilots noticed the transmission chip detector light had come on. The crew chief told the pilots the combining gearbox latch and both the left and right lower debris latches had tripped. These indications led the pilots to conclude that the combining transmission was failing. The PC* reduced power to 15% to expedite emergency descent while maintaining a load on the transmission to prevent seizure. The P turned the No. 1 main generator on long enough to make distress calls, then turned it off again.

The aircraft was now about 200 feet above the emergency landing area. The P began calling radar altimeter and airspeed indications to the PC* who was banking the aircraft left to align it with the longest axis of the landing area. The aircraft was descending rapidly, and forward airspeed was about 100 knots. The PC* stated that he would have to begin deceleration or the aircraft would overfly the landing area. The P told the PC* to place the aircraft in a hard right sideslip to dissipate airspeed. When the aircraft was placed in a 40° sideslip, its speed rapidly decreased. At about 70 feet AGL, the aircraft was in a rapid vertical descent with less than 10 knots forward airspeed, and was properly aligned for landing.

The PC* began pulling cushioning power to slow the 1,550- to 1,700-foot rate of descent while the P told the crew and passenger to assume the crash position. As the PC* pulled cushioning power, the cockpit rapidly filled with smoke and the pilots heard a metallic grinding noise from the drive train area. The PC* continued to pull cushioning power while maintaining a landing attitude. Although visibility was reduced because of the smoke, both pilots could see the landing area.

The aircraft landed hard on all four wheels and bounced back into the air. The PC* continued to apply power as the aircraft landed a second time with its aft tires digging into the ground. Feeling the aft landing gear on the ground, the PC* reduced power to

bring the forward landing wheels down. As the forward landing gear contacted the ground, the P placed the engine control levers in the full off position, bringing the aircraft to a stop. The enlisted crew and passenger got out of the aircraft, followed by the pilots after emergency shutdown had been completed.

Aside from the failed combining gearbox, the only damage to the aircraft was a small puncture to the underside where the aircraft had hit a stump during landing.

Crew Coordination Objectives:

- Establish and maintain workload levels
- Exchange mission information
- Cross-monitor performance

Crew Coordination Basic Qualities:

- Management of unexpected events
- Prioritize actions and distribute workload
- Decisions and actions communicated and acknowledged
- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew
- Supporting information and actions sought from crew

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Offer assistance; announce actions
- Provide aircraft control and obstacle advisories
- Coordinate action sequencing and timing

Example 3-4: CH-47D Combining Transmission Failure

The crew of a CH-47D was transporting two external fuel blivets, five passengers, and internal cargo in support of a joint task force. The aircraft was in cruise flight at 2000 feet AGL when the PC* felt and heard a low, grumbling sound throughout the airframe. At the same time, the CE reported thick white smoke coming from the area of the combining transmission.

The PC* began an immediate descent into a valley bounded by steep, tree-covered slopes. Within seconds, smoke began entering the cockpit. The PC* continued his descent, with a 15% power setting, while searching for a suitable landing area. The P armed the cargo hook, turned the transponder to emergency, and made mayday calls on all available radio frequencies. The crew chief had taken a position with the fire extinguisher directly under the combining transmission. Despite the thick smoke and intense heat, he continued to advise the crew on the condition of the failing transmission. The flight engineer was watching the external load through the center cargo hole.

With the aircraft about 1,000 feet AGL, and thick smoke and intense heat permeating the entire aircraft, the PC* committed himself to landing in the valley. The external load was jettisoned, and the flight engineer repositioned himself at the right front cabin door while directing the passengers to prepare for a hard landing. The PC* continued his descent into the valley while performing 40° to 60° angles of bank to avoid intruding terrain where no landing areas were available. The pilots sighted a sloped clearing on the side of the valley that appeared large enough to permit landing. The PC* thought they were too high and too fast to make a landing in the area, but the P suggested sideslipping the aircraft to lose altitude and bleed off airspeed.

During this maneuver, the aircraft was rocked by an explosion from the rear of the fuselage. The transmission cooler fan shaft had sheared and was spinning out of control within the shaft housing. The onset of severe pitch and yaw transients forced both pilots onto the controls. Together, they managed to straighten the aircraft's attitude and pull cushioning pitch before the aircraft hit the ground. All four wheels impacted the sloping terrain, causing the aircraft to bounce about 4 feet into the air before settling to the ground. The pilots ordered everyone off the aircraft and completed an emergency shutdown.

The only damage to the aircraft other than the failed combining transmission was a small puncture of the rear ramp, caused when it was lowered so that the passengers and enlisted crewmembers could egress.

Crew Coordination Objectives:

- Establish and maintain workload levels
- Exchange mission information
- Cross-monitor performance

Crew Coordination Basic Qualities:

- Management of unexpected events
- Prioritize actions and distribute workload
- Decisions and actions communicated and acknowledged
- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew
- Supporting information and actions sought from crew

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Offer assistance
- Announce actions
- Provide aircraft control and obstacle advisories
- Coordinate action sequencing and timing

Example 3-5: OH-58C Night Tactical Mission

The P* of an OH-58C was flying unaided at night, 100 feet AGL over water (ATM Task 1035), in marginal weather, on a combat reconnaissance mission. As the aircraft approached a heavy rain shower, the P* began a left turn to circumnavigate the shower, but the PC directed the P* to turn right. At this time, the PC* assumed the controls, and

without directing the P to assist with the instrument cross-check or other tasks, the PC* began to perform a number of tasks simultaneously.

As the PC* began a descent and reduced airspeed to penetrate the rain shower, he also attempted to make radio calls, reset the force trim, maintain visual contact with lights on the beach, and check the aircraft flight instruments. As a result, the PC* became task saturated and allowed the aircraft to descend unnoticed into the water. (USASC Case #831118041)

Crew Coordination Objective: Establish and maintain workload levels

Crew Coordination Basic Quality: Prioritize actions and distribute workload

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Provide aircraft control and obstacle advisories.

Example 3-6: OH-58C NVG Formation Flight

The PC* of an OH-58C was chalk #1 in a formation of four aircraft flying a tactical terrain flight training mission with NVGs. Immediately after performing an NVG takeoff (ATM Task 2094), the platoon leader in the flight called the PC* of chalk #1 on the radio and advised him to wait for the other aircraft to catch up. The PC* began a 360° turn and directed the P to clear them from the overtaking aircraft.

After completing the turn, the PC* added power to continue a climb to the pre-planned altitude of 200 feet AGL. At this time, the P heard unit operations trying unsuccessfully to contact the platoon leader, and without announcing his intentions to the PC*, he came inside the cockpit and began acting as a radio relay between unit operations and the platoon leader. Without the P to assist in navigating, monitoring instruments and obstacle clearance, the PC* inadvertently lost altitude and airspeed and struck wires. (USASC Case #841107021)

Crew Coordination Objective: Establish and maintain workload levels

Crew Coordination Basic Quality: Prioritize actions and distribute workload

ATM Crew Coordination Elements:

- Communicate positively
- Announce actions
- Provide aircraft control and obstacle advisories

Example 3-7: UH-1 Hovering Over Snow

At the completion of an instrument evaluation mission, the P* was hovering from the right seat (ATM Task 1017) at 10 feet AGL, and 18 knots across a large, unmarked snow covered portion of the airfield, en route to the refueling point. The CP was located in the left seat and the IP was in the jump seat, facing forward. The IP decided to tune the FM radio from the jump seat so he could talk to unit operations. The CP also focused his attention to the radios in order to switch from tower frequency to ground frequency.

Neither the CP nor the IP announced to the P* that their attention was inside the aircraft; thus the P* was completely responsible for maintaining the desired hover altitude with outside references when hovering through the blowing snow. The P* inadvertently misjudged his hover height and allowed the aircraft to descend, contact the ground, and rotate over the nose to an inverted position. (USASC Case #840208011)

Crew Coordination Objective: Establish and maintain workload levels

Crew Coordination Basic Quality: Prioritize actions and distribute workload

ATM Crew Coordination Elements:

- Communicate positively
- Announce actions
- Provide aircraft control and obstacle advisories

Example 3-8: UH-1H Terrain Flight Training Mission

IP* was flying a UH-1H on a day terrain flight training mission to deliver troops and also to provide a local area orientation to a newly assigned, inexperienced P. After picking up the troops at the designated PZ, the IP* proceeded to the LZ in the contour flight mode (ATM Task 2081). The IP* did not assign the P any responsibilities or duties during the pre-mission brief, nor did he direct the P to assist him during the mission. As a result, the IP* became task saturated when he attempted to fly the aircraft, provide obstacle clearance, navigate, and communicate with the supported unit.

Because of the task saturation, the IP failed to anticipate the additional power required when he entered a steep left turn. The aircraft lost altitude and crashed into the trees. (USASC Case #841216011)

Crew Coordination Objective: Establish and maintain workload levels

Crew Coordination Basic Quality: Prioritize actions and distribute workload

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Provide aircraft control and obstacle advisories

Example 3-9: UH-60 NVG Training Flight

The crew of a UH-60 was performing traffic pattern operations (ATM Task 1022) and was on climb-out after takeoff during an NVG proficiency training mission. On crosswind, the PC* noticed the master caution light illuminate and notified the P. He then activated the caution panel kill switch, bringing the panel illumination up to dim, from the NVG-dimmed mode. Both the PC* and the P noticed the number 2 primary servo caution light was illuminated.

As the PC* began a turn to downwind, both pilots came inside the cockpit, checked their collective servo switches, and found them centered. The P had previously expressed a lack of confidence in flying with NVGs, so the PC* continued to fly while he diverted his attention inside the aircraft and attempted to analyze and troubleshoot the emergency. This was in contradiction of the warning in the ATM task description stating that the P* must not allow himself to become fixated on the aircraft instruments because his primary focus should be outside the aircraft.

After an undetermined amount of time, the P noticed the barometric altimeter read 1000 feet MSL (field elevation was 990 feet MSL), told the PC* to "watch the altitude", looked outside the aircraft, and saw the ground illuminated by the aircraft position lights. The PC* looked outside, could see no visual horizon, and began to transition to instrument flight. The aircraft impacted the ground before the PC* could initiate a climb. (USASC Case #870128031)

Crew Coordination Objective: Establish and maintain workload levels

Crew Coordination Basic Qualities:

- Management of unexpected events
- Prioritize actions and distribute workload

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Offer assistance
- Provide aircraft control and obstacle advisories

Example 3-10: UH-60A Terrain Flight Support Mission

The PC* of a UH-60A was conducting terrain flight (ATM Task 2081) and flying low level across the desert at 50 feet AGL, 90 knots. In the rear of the aircraft, the CE was attempting to pass a screwdriver to the AO. This activity distracted the P, who turned to the rear of the aircraft to see what was transpiring. When the P turned, this distracted the PC*, who likewise turned to the rear. Because no one was providing obstacle clearance, an uncommanded descent went unnoticed and the aircraft tailwheel struck the ground. (USASC Case #880616231)

Crew Coordination Objective: Establish and maintain workload levels

Crew Coordination Basic Quality: Prioritize actions and distribute workload

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Provide aircraft control and obstacle advisories

Example 3-11: UH-60 SAR Mission

As part of a daytime SAR mission, the crew of a UH-60 was ground taxiing (ATM Task 1015) to a refueling point, using no ground guide. The PC*, flying from the right seat, chose to park parallel to the refueling pumps, placing them on the left side of the aircraft. The P warned the PC* that the aircraft was getting close to a sign pole located at the pumps. The PC* acknowledged, stated that they would clear the pole, and told the P to lock the tailwheel, thus diverting the P's attention from his primary task of clearing the left side of the aircraft. As the P came inside the aircraft to lock the tailwheel, the main rotor system struck the pole. (USASC Case #880803011)

Crew Coordination Objective: Establish and maintain workload levels

Crew Coordination Basic Quality: Prioritize actions and distribute workload

ATM Crew Coordination Elements:

- Direct assistance
- Provide aircraft control and obstacle advisories

GROUP #4: EXCHANGE MISSION INFORMATION

Example 4-1: AH-1F Inadvertent IMC

During a day cross-country training mission, the crew of an AH-1F entered inadvertent IMC. The PC*, flying from the back seat, continued looking outside the aircraft in an apparent attempt to fly the aircraft back into visual flight rules conditions. The enlisted CM in the front seat immediately focused his attention on the instruments. According to the attitude indicator, the PC* had placed the aircraft in a nose-down, left-bank attitude. The aircraft was descending at 2,500 feet per minute, and the PC* appeared to be in a state of fixation.

At 500 feet AGL, the enlisted CM informed the PC* they were in a dive. The PC* reacted by immediately jerking back the cyclic but was unable to control the aircraft with the use of the instruments. The enlisted CM began speaking calmly to the PC*, talking him through the necessary procedures to regain positive control of the aircraft. He continued talking to the PC*, pointing out deviations in attitude, altitude, and airspeed as they continued to fly IMC and until they were able to land at a nearby airfield. By becoming actively involved in the in-flight emergency, the enlisted CM helped the PC* regain aircraft control during an extremely stressful situation.

Crew Coordination Objectives:

- Exchange mission information
- Cross-monitor performance

Crew Coordination Basic Qualities:

- Maintenance of mission situational awareness
- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew
- Advocacy and assertion practiced

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance
- Provide aircraft control and obstacle advisories

Example 4-2: AH-64 Night Currency Evaluation

An AH-64 IP* was flying NOE (ATM Task 1035) on a night systems currency evaluation. The IP* instructed the CPG to store target coordinates in the FCC (ATM Task 1106). The CPG complied, flipped up his HDU, and consulted his map for the target location. At this time, the aircraft crossed a ridgeline and was put into a slight descent in order to maintain NOE altitude. Concurrently, the PNVs video imagery deteriorated. The IP* came into the cockpit to evaluate the PNVs imagery without directing the CPG to provide obstacle clearance or take aircraft control. Before the IP* determined that the PNVs imagery was no longer suitable for NOE flight, a tree strike occurred. (USASC Case #860430011)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Qualities:

- Decisions and actions communicated and acknowledged
- Supporting information and actions sought from crew

ATM Crew Coordination Elements:

- Communicate positively
- Announce actions
- Direct assistance

Example 4-3: AH-64 Night Gunnery Training Mission

An AH-64 IP* on a night gunnery training mission was performing firing position operations (ATM Task 1119), hovering in excess of 100 feet AGL, using the HAS. The RSP was searching for and identifying targets on the range with the TADS (ATM Task 2049). The IP* attempted to confirm the aircraft heading but could not because the compass light was inoperative. The IP* then released the collective and transferred his left hand to the cyclic in order to free his right hand to check the compass with a flashlight. He did this without communicating to the RSP to either take the controls or cross-monitor aircraft performance.

In so doing, the IP* did not remain focused outside the aircraft and did not announce any maneuver or movement prior to execution as required by the ATM task description for both tasks. As a result, both crewmembers' attention was directed inside the cockpit, away from visual or instrumented altitude cues. When the collective was released, the

aircraft began an uncommanded descent. As the IP* was replacing the flashlight, he noticed indications of a descent in the HMD. The IP* immediately applied collective; however, the main rotor struck trees. (USASC Case #870109061)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Quality: Decisions and actions communicated and acknowledged

ATM Crew Coordination Elements:

- Communicate positively
- Announce actions
- Direct assistance

Example 4-4: AH-64 Tactical Night Movement to Contact

During a tactical night movement to contact mission, with the P* using the PNVs and the CPG using AN/AVS 6 NVGs, inadvertent IMC was encountered. The P* initiated VHIRP (ATM Task 1083) and a 500 FPM climb from an altitude of 250 feet AGL was begun. At that time, the P* removed his hand from the collective to first move the HDU from in front of his right eye. He then turned his head to the left rear to find the pilot's instrument light rheostat. He did this without directing the CPG to assist (i.e., to take the controls or to monitor the flight instruments).

Because of insufficient collective friction, the power began to decrease from 56% to 35%, which resulted in a rate of descent in excess of 1000 FPM. The P* returned his scan to the instrument panel at an altitude of 30 feet AGL, without enough time to reestablish a climb, and the aircraft struck the ground. (USASC Case #870922241)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Qualities:

- Decisions and actions communicated and acknowledged
- Supporting information and actions sought from crew

ATM Crew Coordination Elements:

- Communicate positively
- Announce actions
- Direct assistance
- Provide aircraft control and obstacle advisories

Example 4-5: MH-6B NVG Formation Flight

The crew of an MH-6B was performing NVG multi-aircraft operations (ATM Task 2009) and was chalk #2 in a flight of 2. The flight profile for this leg of the mission required traversing and then descending over a calm lake surrounded by higher terrain. Both pilots were wearing AN/PVS 5 goggles. There was 0% illumination. The UT*, who was concentrating on flying formation off the lead aircraft, began the planned descent from 350 feet AGL in preparation for the landing and instructed the P to announce when the radar altimeter indicated they were at 100 feet AGL.

As the aircraft descended below the surrounding terrain, the UT* lost visual contact with the silhouette of the lead aircraft but could still see its exhaust signature and position lights. The P announced that the radar altimeter indicated 100 feet AGL. The UT*, however, did not respond nor stop his descent. When the P next looked at the altimeter, it read 25 feet AGL and the P communicated this to the UT*. Before the UT* could respond, the aircraft impacted the surface of the lake. (USASC Case #840726011)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Qualities:

- Decisions and actions communicated and acknowledged
- Statements and directives clear, timely, relevant, complete, and verified
- Crewmember actions mutually cross-monitored
- Advocacy and assertion practiced

ATM Crew Coordination Elements:

- Communicate positively
- Acknowledge actions

Example 4-6: OH-58C NVG Training Flight

The crew of an OH-58C was conducting a tactical training flight. The illumination level was 7%, and both pilots were wearing NVGs. The PC* was flying from the left seat, maintaining 10-20 knots at about 20 feet AGL (ATM Task 1035) and was unable to maintain visual contact with the ground because of the lack of ambient light. The PC* perceived he was losing altitude, became very concerned with the situation, and wanted the infrared light on immediately to reacquire visual references.

The PC* erroneously thought it would be quicker to turn the light on himself rather than ask the P to assist. The PC* removed his left hand from the collective and placed it on the cyclic; then moved his right hand to the P's collective and began searching for the landing light switch. During this transfer of controls from one hand to the other, the aircraft entered an uncommanded descent. The crew did not see the ground until contact was unavoidable. Just prior to contact, the PC* increased the P's collective and repositioned both of his hands back to his controls. The PC* continued collective application as the aircraft impacted the ground with sufficient force to dislodge both crewmember's NVGs from their attaching points. The PC* was unable to judge aircraft attitude as the aircraft rebounded into the air. The aircraft impacted a second time in a tail-low, left roll attitude, causing major damage. (USASC Case #880518011)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Quality: Supporting information and actions sought from crew

ATM Crew Coordination Element:

- Communicate positively
- Direct assistance

Example 4-7: OH-58 Day NOE Mission

An OH-58 on a day NOE mission was attempting to hover under high tension wires (ATM Task 1097). When the PC*, flying the aircraft from the right seat, advised the P of his intention to underfly the wires, the P said "OK" and returned his attention to his map. The PC* did not direct the P to provide obstacle clearance from the concrete power pole on the left side of the aircraft. The PC* positioned the aircraft close to the pole and proceeded under the wires. The main rotor system struck the pole, resulting in major damage to the aircraft. (USASC Case #880909011)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Quality: Supporting information and actions sought from crew

ATM Crew Coordination Elements:

- Communicate positively
- Direct assistance
- Provide aircraft control and obstacle advisories

Example 4-8: UH-1H Hydraulic System Failure

The crew of a UH-1H was on the final 20-minute leg of a 2-hour service mission at 500 feet AGL when the master caution and hydraulics caution panel segment warning lights illuminated. Recognizing the stiffness of the cyclic, collective, and tail rotor controls as a hydraulics failure, the PC* slowed the aircraft. The enlisted crewmember, occupying the other pilot's seat, realized that the PC's* attention was focused on controlling the aircraft,

so he assisted by selecting the appropriate radio frequency and ICS position for the PC* to report the emergency. The PC* was directed to a nearby Air Force base to attempt a running landing. Moments later, two of the five passengers aboard reported what they believed to be a fire. The aircraft's cargo doors were closed, and a fine red mist was forming inside the aircraft. The PC* realized the passengers were being sprayed with hydraulic fluid, which was causing a burning sensation in their eyes and on their skin.

Flight to the Air Force base would take about 20 minutes, and recognizing the high toxicity of the hydraulic mist, the PC* elected to attempt a running landing to an alkali lake bed. Because of the extreme stiffness in the controls, the PC* directed the enlisted CM to assist him in manipulating them. Together, they successfully accomplished the emergency landing, saving the aircraft and reducing their passengers' exposure to a chemical hazard.

Crew Coordination Objectives:

- Exchange mission information
- Cross-monitor performance

Crew Coordination Basic Qualities:

- Crewmember actions mutually cross-monitored
- Supporting information and actions sought from crew
- Supporting information and actions offered by crew

ATM Aircrew Coordination Elements:

- Communicate positively
- Direct assistance
- Offer assistance
- Provide aircraft control and obstacle advisories

Example 4-9: UH-60A NVG Interdiction Mission

A UH-60A was on an over-water, NVG interdiction mission, on a zero-illumination night. The crew was being vectored to a target boat at 60 knots and 50 feet AGL. While performing a climbing left turn to avoid over-flying the target, the PC* in the left seat

experienced vertigo and announced to the P, "I've had it, you got the controls." The P* assumed the controls, leveled the aircraft, and stopped the climb at 300 feet AGL.

The P* did not interpret the PC's announcement to mean that the PC was incapacitated and, therefore, not able to provide any assistance in instrument cross-check or obstacle clearance. The PC was looking at the floor in an attempt to regain his orientation. The P* resumed the mission by initiating a left descending turn intending to level at 50 feet AGL. He made a power application at approximately 100 feet AGL in anticipation of reaching his desired altitude and continuing terrain flight (ATM Task 2081). The PC, still incapacitated, looked up and noticed the altimeter passing through first 50 feet AGL, then 38 feet. The PC announced each of these altitudes and then applied collective as the aircraft continued to rapidly descend through 28 feet, but the aircraft was descending too fast to avoid impact with the water. (USASC Case #8611110305)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Quality: Statements and directives are clear, timely, relevant, complete, and verified

ATM Crew Coordination Elements:

- Communicate positively
- Be explicit

Example 4-10: UH-60 NVG Formation Flight

The P* of a UH-60 was performing a night, multi-aircraft NVG mission (ATM Task 2009) and was approaching a reporting point at 200 feet AGL. The IP in the right seat did not announce his decision to cease his obstacle clearance responsibility on the right side of the aircraft and come inside the cockpit to change radio frequencies. As a result, no other crewmember assumed obstacle clearance responsibilities to the right front, and the aircraft struck another UH-60** that was approaching the same reporting point from the right front. (USASC Case #880308012) Video

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Qualities:

- Maintenance of mission situational awareness
- Decisions and actions communicated and acknowledged

ATM Crew Coordination Elements:

- Communicate positively
- Announce actions

**IP in left seat of second UH-60 committed similar crew coordination error.

Example 4-11: UH-60 NVG Formation Flight

A UH-60 P*, flying from the right seat, was performing multi-aircraft operations (ATM Task 2009) at night, using NVGs. The accident aircraft was chalk #4 in a staggered left trail formation of 7. The formation began a left descending turn just past a ridgeline when the P* announced, "I have lost the aircraft." The P* actually still saw chalk #3, but had lost visual contact with chinks #1 and #2, which passed behind the instrument panel.

The PC, inside the aircraft making a radio call, misinterpreted this nonspecific announcement to mean that the P* had lost sight of chalk #3. Consequently, he took control of the aircraft, decelerating and sliding the aircraft to the left as he attempted to reacquire chalk #3. Because both pilots' attention was focused on reacquiring the other aircraft, no one was providing obstacle clearance as required in the ATM task description and the PC* unknowingly lost altitude, striking trees at 20 feet AGL. (USASC Case #880805021)

Crew Coordination Objective: Exchange mission information

Crew Coordination Basic Qualities:

- Statements and directives clear, timely, relevant, complete, and verified
- Maintenance of mission situational awareness

ATM Crew Coordination Elements:

- Communicate positively
- Be explicit

GROUP #5: CROSS-MONITOR PERFORMANCE

Example 5-1: AH-1F Hydraulic System Failure

During an NVG training mission, two AH-1F helicopters departed a local heliport en route to an airfield. Because of threatening weather conditions, the pilots of both aircraft decided to return to base and conduct closed traffic pattern training. The lead aircraft gained spacing from the second aircraft, made a normal approach to the middle of the runway, and was beginning a takeoff as the second aircraft made its approach.

On climbout, the lead aircraft pilots heard a loud popping sound and saw the master caution and No. 1 hydraulic pressure segment warning lights illuminate. The P* transferred the controls to the PC, who leveled the aircraft and notified the tower of the emergency. The second aircraft cleared while the PC* and the P began executing dash 10 checklist procedures for a hydraulics failure below 40 knots. The PC* tried to circle to land, but due to loss of hydraulic pressure, the pedals became unmanageable. The PC* then decided to extend the downwind leg and attempt a run-on landing above 50 knots. Visibility was poor, and the PC* requested that the intensity of the runway lights be turned up; however, the tower was unable to comply.

On final, the PC* executed a run-on landing as the P continuously updated altitude, airspeed, and rate of descent. The team effort allowed the PC* and P to make a safe run-on landing at 50 knots.

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Qualities:

- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance
- Provide aircraft control and obstacle advisories

Example 5-2: AH-1S NVG Training Flight

The crew of an AH-1S was conducting an NVG training flight. After a routine flight to the NVG training area, the P*, flying from the rear seat, performed several NVG confined area approaches (ATM Task 1031) with no difficulty. However, since take off, the ambient light level dropped from 17 millilux to 3.5 millilux because of increasing cloud cover. Additionally, the aircraft's infrared searchlight was inoperative. The P transferred the controls to the UT*, who then attempted to perform an approach into the same LZ, but terminated with a go-around when he lost visual reference with the ground.

The UT* chose to try the approach again. As the aircraft descended below the approach barriers, both the UT* and the P lost visual contact with the intended touchdown point. The aircraft had developed a high rate of descent and a steep approach angle that went undetected until both pilots regained visual contact with the ground at about 10 feet AGL. The P, rather than assist the UT* by monitoring and calling out airspeed, altitude, and torque during the approach, directed his scan out of the cockpit. The UT*, not knowing how much power was being used and concerned about overtorqueing the aircraft, was too restrained with collective application and did not arrest the descent adequately to avoid a hard landing. (USASC Case #81219051)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Qualities:

- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew

ATM Crew Coordination Element: Offer assistance

Example 5-3: AH-1S NVG Training Mission

The PC* of an AH-1S was attempting a terrain flight approach (ATM Task 1038) using AN/AVS 6 NVGs, to a dusty landing area. During the first approach, the crew experienced a brown-out and a go-around was made. The PC encouraged the P* to try the approach again in order to build the P*'s confidence; however the PC did not offer any advice or information to the P* on techniques to avoid the brownout condition or what to do if it occurred again. On the second attempt, the brown-out was more severe, and the PC* assumed the controls too late and overtorqued the aircraft when flying out of the brown-out. (USASC Case #881212041)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Quality: Supporting information and actions offered by crew

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance

Example 5-4: CH-47 NVG Training Mission

During an NVG tactical training mission, a CH-47 IP* was making a terrain flight approach (ATM Task 2084) to the water with an intended level-off at 50 feet AGL. The crew was wearing AN/PVS 5 NVGs, and there was 0% moon illumination. The IP* stated "he wanted another set of eyes to monitor the altimeter" and the P assumed he was the object of the request because he was seated in the left seat and the only crew-member other than the IP* with access to a radar altimeter (another aviator receiving training was seated in the companionway). The P noticed the altimeter passing through 78 feet AGL but failed to notify the IP*. The IP* continued the descent until the aircraft contacted the water at approximately 70 knots. (USASC Case #870615011)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Qualities:

- Statements and directives clear, timely, relevant, complete, and verified
- Supporting information and actions offered by crew

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance
- Provide aircraft control and obstacle advisories

Example 5-5: OH-58A Cross Country Training Mission

The PC* of an OH-58A was performing terrain flight (ATM Task 1035), flying approximately 5 feet above the surface of a lake at 90-100 knots. Because of a materiel problem, the A series of this helicopter design was restricted to 400 feet AGL minimum altitude.

The PC* had been the subject of 6 OHRs in the past year, all for hazardous or high risk flying techniques. The PC's* reputation in the unit was one of a "hot dog"; one that had, and would, deviate from standard practices whenever the opportunity presented itself. The PC* was also described as one who "did not take constructive criticism well; one who became very defensive when approached about his hazardous flying."

The P outranked the PC*, and was, in fact, the acting unit commander. The P told the PC* he was flying too low, but rather than increase the altitude, the PC* responded by asking the P a question that directed his attention to the map. Seconds later, the aircraft impacted the water. (USASC Case #80614011)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Qualities:

- Crewmember actions mutually cross-monitored
- Advocacy and assertion practiced

ATM Crew Coordination Element: Provide aircraft control and obstacle advisories

Example 5-6: OH-58D Night Shipboard Landing

An OH-58D was attempting a night NVG shipboard landing (ATM Task 1028) during a proficiency training mission. The landing deck already contained another OH-58 which had just landed, and which was on the left side of the approaching aircraft. The IP*, seated in the right seat, attempted to maneuver onto the deck without assistance in obstacle clearance from the P. The aircraft drifted into the main rotor blades of the parked aircraft. The P, in the left seat, failed to offer assistance in obstacle clearance, despite his location in the left seat, closest to the obstacle. TC 1-204 states that non-flying crewmembers should provide information to the pilot flying concerning obstacle avoidance, altitude, airspeed, and approach angle. (USASC Case #881019011)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Quality: Supporting information and actions offered by crew

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance

Example 5-7: UH-1H NVG Training Mission

The crew of a UH-1H was returning to an airfield to refuel following an NVG training mission. Because of communication problems between the aircraft and the tower, the crew was executing an expedited approach and an abbreviated traffic pattern that resulted in a steeper than normal approach angle. Because the NVG approach (ATM Task 2096) was being shot to an extremely dark area on the airfield, the PC* was using what he thought were the navigational lights of an OH-58 on the ground as a reference for the approach. The lights were actually those of the trail UH-60A of a two-ship formation that was sitting on the ground in the sod area waiting to enter the refuel point.

During the approach, the PC* became fixated on the lights and did not notice that the aircraft's rate of closure was excessive. The P was not performing P duties as required by the unit SOP (i.e., calling out airspeed, altitude, and power during the approach); rather, he was preoccupied by tuning the radio to the ground control frequency. On very short final, the PC* realized that his rate of closure was excessive and abruptly applied right aft cyclic in an attempt to decelerate and avoid the UH-60A on the ground. The maneuver was too late and the tail rotor of the UH-1H struck the main rotor system of the UH-60A causing major damage to both aircraft. (USASC Case #860813011)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Qualities:

- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew

ATM Crew Coordination Element: Offer assistance

Example 5-8: UH-1H Service Mission

The P* of a UH-1H on a day service mission was hovering (ATM Task 1017) in a formation along a taxiway with a 9-knot tailwind. The aircraft was chalk #2 of a flight of four. When chalk #1 came to a stationary hover, the PC noticed the P* was experiencing difficulty in halting the forward motion of the aircraft, and the aircraft continued closing on chalk #1. The P*, thinking he had reached the aft cyclic stop, lost his composure and applied an excessive amount of collective pitch that caused the aircraft to climb to a height of 40-50 feet.

During this maneuver, the PC did not offer assistance to P* and only when the maneuver became severe did the PC assume the aircraft controls (unannounced), but only briefly. After the PC released the controls (again unannounced), the P* once again lost control of the aircraft, and crashed without any further attempts by the PC to regain aircraft control. (USASC Case #840817011)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Quality: Supporting information and actions offered by crew

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance

Example 5-9: UH-1H Day Service Mission

The crew of a UH-1H was performing a day service mission to several outlying sites belonging to the supported unit. As the aircraft approached the field site, the P* initiated a confined area approach (ATM Task 1031) to the intended landing area, which was designated by four built-up concrete pads. The P* selected one of the pads for landing and planned the approach to terminate on the ground in anticipation of blowing dust.

The approach was terminated somewhat short, with the front portion of the landing skids on the pad, and the rear portion of the skids overhanging the aft edge of the pad. Calculations later proved that the aircraft CG was 16 inches to the rear of the aft edge of the concrete pad. The CE noticed this situation and directed the P* over the intercom to "move it forward," but did so in a tone of voice that did not break through the P*'s concentration. The PC had intentionally not made a comment to the P* during the approach because he thought he had been offering too many suggestions to the P* during previous missions that day and didn't want the P* to think he was "riding" him.

When the P* abruptly lowered the collective, the aircraft rocked back over the 19 inch drop-off and the tail skid struck the ground. The P* then applied full forward cyclic and increased collective as the PC* came on the controls. The aircraft became airborne, yawed right then left, assumed a nose-low attitude, and struck the ground hard, flattening the skids and skidding forward 14 feet. (USASC Case #870401171)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Qualities:

- Crewmember actions mutually cross-monitored
- Supporting information and actions offered by crew
- Advocacy and assertion practiced

ATM Crew Coordination Elements:

- Communicate positively
- Offer assistance
- Be explicit

Example 5-10: C-12 ASR Approach

A C-12 was initiating an instrument approach to an IFR airfield during a service mission. Because of thunderstorms near the ILS final approach course, approach control offered the crew an ASR approach (ATM Task 4510) instead. This approach was not published in DOD FLIP and, therefore, was not authorized for Army aircraft; however, the crew decided to accept the approach. The P*, flying from the left seat, had not flown an ASR approach for over a year, and when the MDA was given by approach control, he immediately began a gradual descent to that altitude. Additionally, the approach controller erroneously gave the crew an MDA that was 300 feet lower than the actual MDA.

Because the crew had no FLIP for this approach, they were unable to confirm the MDA and catch the controller's error. The PC knew the aircraft was descending, but because he was intent on looking for the airport environment, he lost situational awareness and did not realize the P* was continuing his descent below the assigned altitude. The aircraft flew into trees approximately six miles from the runway, resulting in damage to the wings, horizontal stabilizer, and lower fuselage. (USASC Case #890729011)

Crew Coordination Objective: Cross-monitor performance

Crew Coordination Basic Quality: Supporting information and actions offered by crew

ATM Crew Coordination Element: Coordinate action sequencing and timing

ACRONYM LIST

AA	Assembly Area	IFR	Instrument Flight Rules
ACE	Aircrew Coordination Evaluation	ILS	Instrument Landing System
AGL	Above Ground Level	IMC	Instrument Meteorological Conditions
AMC	Air Mission Commander	IP	Instructor Pilot
AO	Aerial Observer	LZ	Landing Zone
ASR	Area Surveillance Radar	MDA	Minimum Descent Altitude
ATM	Aircrew Training Manual	MSL	Mean Sea Level
CE	Crew Chief/Engineer	NOE	Nap Of the Earth
CG	Center of Gravity	OHR	Operational Hazard Report
CM	Crewmember	PC	Pilot in Command
CP	Copilot	PNVS	Pilot's Night Vision System
CPG	Copilot/Gunner	PSI	Pounds per Square Inch
DA	Density Altitude	PZ	Pickup Zone
DOD	Department of Defense	RL	Readiness Level
EENT'	End Evening Nautical Twilight	RSP	Rated Student Pilot
FCC	Fire Control Computer	SAR	Search and Rescue
FE	Flight Engineer	SOP	Standing Operating Procedures
FLIP	Flight Information Publications	TADS	Target Acquisition/ Designation System
FM	Frequency Modulated; Field Manual	TGT	Turbine Gas Temperature
FPM	Feet Per Minute	TOT	Turbine Operating Temperature
G	Gravitational Force	UT	Unit Trainer
HAS	Hover Augmentation System	VFR	Visual Flight Rules
HDU	Helmet Display Unit	VHIRP	Vertical Helicopter Instru- ment Recovery Procedures
HMD	Helmet Mounted Display		
ICS	Intercommunication System (Intercom)		

Any pilot or copilot duty position abbreviation followed by () indicates that person was on the controls, flying the aircraft.

Aircrew Coordination Training Grade Slips

This appendix describes the grade slips and expanded grading system for aircrew coordination training.

Note: Blank grade slips are located at the back of this section for use in the simulator or aircraft. The blank grade slips are also located in the Reproducible Box so that you may reproduce them as needed.

Aircrew Coordination Training Grade Slips

The Battle-Rostered Crew Evaluation/Training Grade Slip (DA Form 7121-R) is used to record aircrew coordination training results and comments. Complete the form as instructed in the Aircrew Training Manual (ATM) with two exceptions:

- Substitute the Aircrew Coordination Training Grade Slip, described below, for the list of crew tasks.
- Use the expanded grading system, described below, to grade the overall flight as S+, S, S-, or U.

The Aircrew Coordination Training Grade Slip is a modification of the Maneuver/Procedure Grade Slip published in the ATM for each aircraft. Modifications include:

- Separate lines for each crewmember's name and duty position (for example, PC, PI, CPG, CE).
- More space in the grade block to permit multiple entries. *Note: For emergency procedures, enter the abnormal or emergency situation in the Aircrew Coordination Training Grade Slip (some emergency procedure ATM tasks are preprinted) and grade it the same as any task.*
- An expanded grading system using S+, S, S-, or U.
- A look-up table of Crew Coordination Basic Qualities (short titles) at the bottom of each page.
- Space for a summary rating for each Crew Coordination Basic Quality.

Identified as the Aircrew Coordination Training Grade Slip, this grade slip currently is to be used only for initial and refresher aircrew coordination training.

Expanded Grading System

The grading system (letter grade) for aircrew coordination training is a modified version of the current Satisfactory (S) or Unsatisfactory (U) system. As always, the evaluator decides the grade. The grade should include both individual skill requirements and aircrew coordination aspects of each ATM task. To help identify aircrew coordination strengths and weaknesses, the satisfactory grade is further broken out into satisfactory plus (S+), satisfactory (S), and satisfactory minus (S-). Grading guidance for aircrew coordination training is as follows:

For the Aircrew Coordination Grade Slip:

- Enter the grade for the ATM task (S+, S, S-, or U) in the grade (GR) block.
- If the grade is S+, make an entry in the comment section of the Battle Rostered Crew Evaluation/Training Grade Slip.
- If the grade is S- or U *due to aircrew coordination*, enter the number of the contributing Crew Coordination Basic Quality (1, 2, . . . 13) in the ATM task grade block (for example, S- 2,5). **Option:** Include Basic Quality numbers for both positive and negative crew coordination behaviors by using a "+" or "-" sign next to each Basic Quality number (for example, S +7, +10).
- If aircrew coordination is not a contributor to the grade for the ATM task, enter the letter grade only (S+, S, S-, or U).
- Enter a summary rating (1, 2, . . . 7), described in the Aircrew Coordination Training Evaluation Guide (*Student Guide*, Appendix E), for each Crew Coordination Basic Quality in the grade block at the bottom of the last page.

For the Battle-Rostered Crew Evaluation/Training Grade Slip:

- Enter an overall grade (S+, S, S-, or U) for the flight at the bottom of the Battle-Rostered Crew Evaluation/Training Grade Slip.
- Examples of completed grade slips are at Figures C-1 to C-4.
- Example of a completed Evaluator Worksheet is at Figure C-5.
- Blank grade slips are located after Figure C-5.

Note: If a grade of "U" is given for unacceptable performance for a specific task, it does not render the entire flight unsatisfactory.

BATTLE-ROSTERED CREW EVALUATION/TRAINING GRADE SLIP					
For use of this form, see Aircraft ATM; the proponent agency is TRADOC					
BATTLE-ROSTERED CREW EXAMINEES/ TRAINEES	NAME		RANK		
	PC: Dorman, Mark A.		CW2		
	PI: Parker, Lloyd R.		CW2		
	NONRATED CREW MEMBERS				
	DUTY SYMBOL	NAME	RANK		
	CE	Sullivan, Clifford R.	SGT		
UNIT: CCO, 5-101 AVN, Ft. Campbell KY 42223					
EVALUATOR/ INSTRUCTOR	NAME		RANK		
	Richard, John G.		CW3		
UNIT: CCO, 5-101 AVN, Ft. Campbell KY 42223					
CREW DATA					
TOTAL BATTLE-ROSTERED CREW HOURS			DATE DESIGNATED A BATTLE-ROSTERED CREW:		
4			1 SEP 92		
PURPOSE: EVALUATION (TRAINING)					
TIME TODAY: 2.0			CUMULATIVE TIME:		
TYPE AIRCRAFT: LH-60 FS					
CREW TASK 1		D/N/NVD	CREW TASK 6		D/N/NVD
CREW TASK 2		D/N/NVD	CREW TASK 7		D/N/NVD
CREW TASK 3		D/N/NVD	CREW TASK 8		D/N/NVD
CREW TASK 4		D/N/NVD	CREW TASK 9		D/N/NVD
CREW TASK 5		D/N/NVD	CREW TASK 10		D/N/NVD
DAY	NIGHT	WX	SIMULATOR	NVG	NVS
EVALUATOR/INSTRUCTOR RECOMMENDATIONS					
☐ (ISSUE) (VALIDATE) CREW QUALIFICATIONS					
☐ (SUSPEND) (REVOKE) CREW QUALIFICATIONS					
☐ REQUIRES ADDITIONAL (FLIGHT) (ACADEMIC) (SIMULATION DEVICE) TRAINING					
☒ SEE BACK FOR COMMENTS					
I HAVE DEBRIEFED THE EXAMINEES/TRAINEES AND INFORMED THEM OF THEIR STATUS.					
EVALUATOR'S/INSTRUCTOR'S SIGNATURE: <u>John G. Richard</u>					
WE HAVE BEEN DEBRIEFED BY THE EVALUATOR/INSTRUCTOR AND UNDERSTAND OUR CURRENT STATUS.					
PC'S SIGNATURE: <u>Mark A. Dorman</u>					
PI'S SIGNATURE: <u>Lloyd R. Parker</u>					
NONRATED CREW MEMBER'S SIGNATURES: <u>Clifford R. Sullivan</u>					
OVERALL GRADE FOR THIS FLIGHT IS: <u>8 U NA</u> DATE: <u>1 SEP 92</u>					

DA FORM 7121-R, MAR 92

Figure C-1. Example of Completed Battle-Rostered Crew Evaluation/Training Grade Slip (page 1)

MANEUVER/PROCEDURE GRADE SLIP FOR UH-60 RCM					
For use of this form, see Aircrew Coordination Exportable Training Package and TC 1-212					
PC <u>Dorman, MARK A.</u>			Date <u>15 Sep 72</u>		
PI <u>Parker, Lloyd R.</u>					
Instructor or evaluator will sign in the first unused block.					
NO	MANEUVER/PROCEDURE	GR	NO	MANEUVER/PROCEDURE	GR
1	CREW MISSION BRIEFING	S	27	EMERGENCY EGRESS	/
2	VFR PLANNING	/	28	EMERGENCY PROCEDURES	S
3	IFR FLIGHT PLANNING	/	29	HAND AND ARM SIGNALS	/
4	DD FORM 305-4	/	30	FUEL SAMPLE	/
5	DA FORM 6701-R	S	31	PASSENGER BRIEFING	/
6	PREFLIGHT INSPECTION	/	32	INSTRUMENT TAKEOFF	/
7	BEFORE-STARTING ENGINE THROUGH AIRCRAFT SHUTDOWN	S-9/11	33	RADIO NAVIGATION	S
8	ALSE OPERATION	/	34	HOLDING PROCEDURES	/
9	GROUND TAXI	S	35	UNUSUAL ATTITUDE RECOVERY	/
10	HOVER POWER CHECK	46/10	36	RADIO COMMUNICATION PROCEDURES	/
11	HOVERING FLIGHT	S	37	PROCEDURE FOR TWO-WAY RADIO FAILURE	/
12	VMC TAKEOFF	S	38	NONPRECISION APPROACH	S
13	TRAFFIC PATTERN FLIGHT	S	39	PRECISION APPROACH	/
14	FUEL MANAGEMENT PROCEDURES	S	40	INADVERTENT IMC/WHIP	S
15	PILOTAGE AND DEAD RECKONING	S	41	COMMAND INSTRUMENT SYSTEM OPERATIONS	/
16	ELECTRONIC-AIDED NAVIGATION	S	42	A/C SURVIVABILITY EQUIPMENT	S
17	VMC APPROACH	S	43	MARK XII IFF SYSTEM	/
18	ROLL-ON LANDING	S	44	CONFINED AREA OPERATIONS	/
19	SLOPE OPERATIONS	/	45	PINNACLE OR RIDGELINE OPERATION	/
20	AIRCRAFT REFUELING	S	46	FM RADIO HOMING	/
21	POSTFLIGHT INSPECTION	/	47	EVASIVE MANEUVERS	S-57
22	SIMULATED ENGINE FAILURE AT ALT	/	48	MULTIAIRCRAFT OPERATIONS	S
23	SIMULATED ENGINE FAILURE AT	/	49	RAPPELLING OPERATIONS	/
24	DEGRADED AFCS	/	50	INTERNAL RESCUE-HOIST OPERATIONS	/
25	ECU LOCKOUT OPERATIONS	/	51	PARADROP OPERATIONS	/
26	STABILATOR MALFUNCTION PROC	/	52	STABILITY OPERATIONS	/
AIRCREW COORDINATION BASIC QUALITIES					
1. CREW CLIMATE	2. PLAN REHEARSE	3. DECISION TECH	4. WORK LOAD	5. UNEXP EVENTS	6. INFO XFER
7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MON-ITOR	11. INFO OFFERED	12. ADVOC/ASSERT
13. AAR					

AIRCREW COORDINATION TRAINING GRADE SLIP

Figure C-3. Example of Completed Aircrew Coordination Training Grade Slip (page 1)

MANEUVER/PROCEDURE GRADE SLIP FOR UH-60 RCM													
NO	MANEUVER/PROCEDURE	GR	NO	MANEUVER/PROCEDURE	GR								
53	EXTERNAL LOAD OPERATIONS	5	79										
54	INTERNAL LOAD OPERATIONS	5	80										
55	AERIAL RADIO RELAY	5	81										
56	ACTIONS ON CONTACT	5	82										
57	TERRAIN FLIGHT MISSION PLANNING	5	83										
58	TERRAIN FLIGHT NAVIGATION	5	84										
59	TERRAIN FLIGHT	5	85										
60	WIRE OBSTACLES	5	86										
61	MASKING AND UNMASKING	5	87										
62	TERRAIN FLIGHT DECELERATION	5	88										
63	MAJOR US/ALLIED AND THREAT EQUIPMENT IDENTIFICATION	5	89										
64	TACTICAL COMMUNICATION PROCEDURES AND ECCM	5	90										
65	TACTICAL REPORT	5	91										
66	QUICK FIX MISSION	5	92										
67	FLAT TURN/VCALIBRATED FLIGHT	5	93										
68	ORAL EVALUATION	5	94										
69	<i>John A. Richards</i>	5	95										
70			96										
71			97										
72			98										
73			NOTES: ☐ NVD MANEUVER ☐ INSTRUMENT MANEUVER ☐ STANDARDIZATION MANEUVER ENTER S+, S, S-, OR U IN GRADE BLOCK. IF GRADE IS S- OR U DUE TO AIRCREW COORDINATION INCLUDE UP TO TWO BASIC QUALITY NUMBERS. S- 2.5										
74													
75													
76													
77													
78													
AIRCREW COORDINATION BASIC QUALITIES													
1. CREW CLIMATE	2. PLAN RE-HEARSE	3. DECISION TECH	4. WORK LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MON-ITOR	11. INFO OF-FERED	12. ADVOC/ ASSERT	13. AAR	
GRADE	4	6	4	4	3	3	3	5	4	3	4	4	4

PAGE 2. AIRCREW COORDINATION TRAINING GRADE SLIP

Figure C-4. Example of Completed Aircrew Coordination Training Grade Slip (page 2)

SEGMENT 1: Prepermission planning

DESCRIPTION: The prepermission planning segment begins when the crew receives the mission briefing and includes all preparatory tasks associated with planning the tactical mission. These tasks include terrain flight mission planning, performance planning, assigning crew member responsibilities, and all required briefings and brief-backs. The segment ends when the crew completes all required briefings and prepares to enter the simulator.

TASK 2078 Perform terrain flight mission planning

GRADE S+ S S- Basic Qualities: ____, ____

NOTES:

TASK 1004 Prepare DA Form 5701-R (UH-60 Performance Planning Card)

GRADE S+ S S- Basic Qualities: ____, ____

NOTES:

TASK 1000 Conduct crew mission briefing

GRADE S+ S S- Basic Qualities: ____, ____

NOTES:

AIRCREW COORDINATION BASIC QUALITIES

1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK- LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS- MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR

Note: Refer to the Crew Coordination Exportable Evaluation Package for guidelines on developing and using Evaluator Worksheets.

Figure C-5. Example Crew Coordination Evaluator Worksheet

BATTLE-ROSTERED CREW EVALUATION/TRAINING GRADE SLIP For use of this form, see Aircraft ATM; the proponent agency is TRADOC					
BATTLE-ROSTERED CREW EXAMINEES/ TRAINEES	NAME		RANK		
	PC: _____				
	PI: _____				
	DUTY SYMBOL	NONRATED CREW MEMBERS NAME		RANK	
	UNIT: _____				
EVALUATOR/ INSTRUCTOR	NAME		RANK		
	UNIT: _____				
CREW DATA					
TOTAL BATTLE-ROSTERED CREW HOURS			DATE DESIGNATED A BATTLE-ROSTERED CREW: _____		
PURPOSE: EVALUATION/TRAINING					
TIME TODAY: _____			CUMULATIVE TIME: _____		
TYPE AIRCRAFT: _____ CREW TASK 1 _____ D/N/NVD CREW TASK 2 _____ D/N/NVD CREW TASK 3 _____ D/N/NVD CREW TASK 4 _____ D/N/NVD CREW TASK 5 _____ D/N/NVD CREW TASK 6 _____ D/N/NVD CREW TASK 7 _____ D/N/NVD CREW TASK 8 _____ D/N/NVD CREW TASK 9 _____ D/N/NVD CREW TASK 10 _____ D/N/NVD DAY NIGHT WX SIMULATOR NVG NVS					
EVALUATOR/INSTRUCTOR RECOMMENDATIONS					
☐ (ISSUE) (VALIDATE) CREW QUALIFICATIONS					
☐ (SUSPEND) (REVOKE) CREW QUALIFICATIONS					
☐ REQUIRES ADDITIONAL (FLIGHT) (ACADEMIC) (SIMULATION DEVICE) TRAINING					
☐ SEE BACK FOR COMMENTS					
I HAVE DEBRIEFED THE EXAMINEES/TRAINEES AND INFORMED THEM OF THEIR STATUS. EVALUATOR'S/INSTRUCTOR'S SIGNATURE: _____ WE HAVE BEEN DEBRIEFED BY THE EVALUATOR/INSTRUCTOR AND UNDERSTAND OUR CURRENT STATUS. PC'S SIGNATURE: _____ PI'S SIGNATURE: _____ NONRATED CREW MEMBER'S SIGNATURES: _____					
OVERALL GRADE FOR THIS FLIGHT IS: S U NA DATE: _____					

[illegible]

MANEUVER/PROCEDURE GRADE SLIP FOR AH-64 AVIATORS

For use of this form, see Aircrew Coordination Exportable Training Package and TC 1-214

P _____

Date _____

CPG _____

Instructor or evaluator will sign in the first unused block of each area trained or evaluated

NO.	STAN EVAL/TRAINING TASKS	GR	NO.	STAN EVAL/TRAINING TASKS	GR							
1	CREW MISSION BRIEFING		37	IHADSS OPERATIONS								
2	PLAN VFR FLIGHT		38	DATA ENTRY PROCEDURES (FS)								
3	DA FORM 5701-R (PPC)		39	ACFT POSITION UPDATE (FS)								
4	PREFLIGHT INSPECTION		40	TARGET STORE (FS)								
5	ENG START, RUN-UP, T/O CKS		41	FIRING POSITION OPS								
6	HOVER POWER CHECK		42	ENGAGE TGT WITH HELLFIRE								
7	NORMAL TAKEOFF		43	ENGAGE TGT WITH ARCS								
8	TRAFFIC PATTERN FLIGHT		44	ENGAGE TGT WITH AWS								
9	FUEL MANAGEMENT PROCEDURES		45	WPNS INITIALIZATION								
10	DOPPLER NAVIGATION (FS)		46	TARGET HANDOVER								
11	BEFORE LANDING CHECK		47	IHADSS TARGET TRACKING								
12	VMC APPROACH		48	ORAL EVALUATION								
13	CONFINED AREA OPERATIONS		49									
14	SLOPE OPERATIONS		50									
15	TERRAIN FLIGHT TAKEOFF		51									
16	TERRAIN FLIGHT		NO.	NIGHT/NVD/EVAL/TRAINING TASKS	GR							
17	NOE DECELERATION		1	CREW MISSION BRIEFING								
18*	TERRAIN FLIGHT APPROACH		2	NVS OPERATIONAL CHECKS								
19	STANDARD AUTOROTATION		3* +	GROUND TAXI								
20	SIM SINGLE ENG FAILURE ALT		4*	HOVER POWER CHECK								
21	SIM SINGLE ENG FAILURE OGE		5* +	HOVERING FLIGHT								
22	SINGLE ENGINE LANDING		6* +	NORMAL TAKEOFF								
23	ECU LOCKOUT OPERATIONS		7	ROLLING TAKEOFF (BS)								
24	TERRAIN FLIGHT NAVIGATION		8 +	TRAFFIC PATTERN FLIGHT								
25	EMERGENCY PROCEDURES		9*	FUEL MANAGEMENT PROCEDURES								
26	VHIRP		10*	PILOTAGE & DEAD RECKONING								
27	MASKING AND UNMASKING (BS)		11*	DOPPLER NAVIGATION								
28	MAJ US/ALLIED/THREAT EQUIP		12* +	VMC APPROACH								
29	ACFT SURVIV EQUIP (BS)		13*	CONFINED AREA OPERATIONS								
30	AFTER LANDING TASKS		14*	SLOPE OPERATIONS								
31	MARK XII IFF SYSTEM		15*	TERRAIN FLIGHT TAKEOFF								
32	TADS OPERATIONAL CHKS (FS)		16*	TERRAIN FLIGHT								
33	TADS BORESIGHTING (FS)		17*	NOE DECELERATION								
34	TADS SENSOR OPERATIONS (FS)		18*	TERRAIN FLIGHT APPROACH								
35	IHADSS BORESIGHT		18* +	SIM SINGLE ENG FAILURE ALT								
36	IHADSS VIDEO ADJUSTMENTS		20* +	SINGLE ENGINE LANDING								
AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLI- MATE	2. PLAN RE- HEARS	3. DECI- SION TECH	4. WORK LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MON- ITOR	11. INFO OF- FERED	12. ADVOC/ ASSERT	13. AAR

AIRCREW COORDINATION TRAINING GRADE SLIP

MANEUVER/PROCEDURE GRADE SLIP FOR AH-64 AVIATORS

NO.	NIGHT/NVG EVAL/TRAINING TASKS	GR	NO.	TRNG/MISSION/ADDITIONAL TASKS	GR							
21*	TERRAIN FLIGHT NAVIGATION		1	DD FORM 365-4								
22*	EMERGENCY PROCEDURES		2	SIM MAX PERF T/O (BS)								
23	UNUSUAL ATTITUDE RECOVERY		3	DECELERATION/ACCEL (BS)								
24*	VHIRP		4	ROLL-ON LANDING (BS)								
25	MASKING & UNMASKING (BS)		5	TERRAIN FLT MISSION PLAN								
26	TADS OPERATIONAL CKS (FS)		6	HIGH SPEED FLIGHT								
27	TADS BORESIGHT (FS)		7	SIM SINGLE ENG FAILURE IGE								
28	TADS SENSOR OPERATIONS (FS)		8	STABILATOR MALF PROCEDURE								
29	IHADSS BORESIGHTING		9	INSTRUMENT TAKEOFF (BS)								
30	IHADSS VIDEO ADJUSTMENTS		10	TWO WAY RADIO FAILURE								
31	IHADSS OPERATIONS		11	PINNACLE OR RIDGELINE OP								
32*	NVG FAILURE (FS)		12	HIGH/LOW G FLIGHT								
33	ORAL EVALUATION		13	EVASIVE MANEUVERS (BS)								
34			14	MULTIAIRCRAFT OPERATIONS								
35			15	CALL FOR/ADJUST IND FIRE								
36			16	VIS SIGNAL TECHNIQUES (FS)								
37			17	LASER SPOT TRACKER OPS (FS)								
NO.	INST EVAL/TRAINING TASKS	GR	NO.	TRNG/MISSION/ADDITIONAL TASKS	GR							
1	CREW MISSION BRIEFING		18	FARP PROCEDURES								
2	IFR FLIGHT PLANNING		19	ACTIONS ON CONTACT								
3	ENG START, RUNUP, T/O CKS		20	ID TARGETS WITH TADS (FS)								
4	FUEL MANAGEMENT		21	SELECT APPROPRIATE WPN SYS								
5	BEFORE LANDING CHECK		22	TGT TRACKING WITH TADS (FS)								
6	SIM SINGLE ENG FAILURE ALT		23	OPERATE ONBD RECORDER (FS)								
7	EMERGENCY PROCEDURES		24	DIVING FLIGHT (BS)								
8	RADIO NAVIGATION		25	TECHNIQUES OF MOVEMENT (BS)								
9	HOLDING PROCEDURES		26	NEGOTIATE WIRE OBSTACLES								
10	UNUSUAL ATTITUDE RECOVERY		27	TACTICAL COMMO AND ECCM								
11	RADIO COMMUNICATIONS PROC		28	TRANS TACTICAL REPORT (FS)								
12	NON PRECISION APPROACH		29	HOVERING FLIGHT								
13	PRECISION APPROACH		30									
14	VHIRP		31									
15	AFTER LANDING TASKS		NOTES: * REQUIRED FOR NVG EVAL + REQUIRED FOR NIGHT EVAL ENTER S+, S, S-, OR U IN GRADE BLOCK. IF GRADE IS S- OR U DUE TO AIRCREW COORDINATION INCLUDE UP TO TWO BASIC QUALITY NUMBERS									
16	ORAL EVALUATION											
17												
18												
AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN RE-HEARSE	3. DECISION TECH	4. WORK LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MON-ITOR	11. INFO OF-FERED	12. ADVOC/ASSERT	13. AAR
G												
R												
A												
D												
E												

S- 2.5

MANEUVER/PROCEDURE GRADE SLIP FOR UH-60 RCM

For use of this form, see Aircrew Coordination Exportable Training Package and TC 1-212

PC _____

Date _____

PI _____

Instructor or evaluator will sign in the first unused block.

NO	MANEUVER/PROCEDURE	GR	NO	MANEUVER/PROCEDURE	GR							
1	CREW MISSION BRIEFING		27	EMERGENCY EGRESS								
2	VFR PLANNING		28	EMERGENCY PROCEDURES								
3	IFR FLIGHT PLANNING		29	HAND AND ARM SIGNALS								
4	DD FORM 305-4		30	FUEL SAMPLE								
5	DA FORM 5701-R		31	PASSENGER BRIEFING								
6	PREFLIGHT INSPECTION		32	INSTRUMENT TAKEOFF								
7	BEFORE-STARTING ENGINE THROUGH AIRCRAFT SHUTDOWN		33	RADIO NAVIGATION								
8	ALSE OPERATION		34	HOLDING PROCEDURES								
9	GROUND TAXI		35	UNUSUAL ATTITUDE RECOVERY								
10	HOVER POWER CHECK		36	RADIO COMMUNICATION PROCEDURES								
11	HOVERING FLIGHT		37	PROCEDURE FOR TWO-WAY RADIO FAILURE								
12	VMC TAKEOFF		38	NONPRECISION APPROACH								
13	TRAFFIC PATTERN FLIGHT		39	PRECISION APPROACH								
14	FUEL MANAGEMENT PROCEDURES		40	INADVERTENT IMC/VHIRP								
15	PILOTAGE AND DEAD RECKONING		41	COMMAND INSTRUMENT SYSTEM OPERATIONS								
16	ELECTRONIC-AIDED NAVIGATION		42	A/C SURVIVABILITY EQUIPMENT								
17	VMC APPROACH		43	MARK XII IFF SYSTEM								
18	ROLL-ON LANDING		44	CONFINED AREA OPERATIONS								
19	SLOPE OPERATIONS		45	PINNACLE OR RIDGELINE OPERATION								
20	AIRCRAFT REFUELING		46	FM RADIO HOMING								
21	POSTFLIGHT INSPECTION		47	EVASIVE MANEUVERS								
22	SIMULATED ENGINE FAILURE AT ALT		48	MULTIAIRCRAFT OPERATIONS								
23	SIMULATED ENGINE FAILURE AT		49	RAPPELLING OPERATIONS								
24	DEGRADED AFCS		50	INTERNAL RESCUE-HOIST OPERATIONS								
25	ECU LOCKOUT OPERATIONS		51	PARADROP OPERATIONS								
26	STABILATOR MALFUNCTION PROC		52	STABILITY OPERATIONS								
AIRCREW COORDINATION BASIC QUALITIES												
1 CREW CLI- MATE	2. PLAN RE- HEARSE	3. DECI- SION TECH	4 WORK LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9 INFO SOUGHT	10. CROSS MON- ITOR	11. INFO OF- FERED	12. ADVOC/ ASSERT	13. AAR

AIRCREW COORDINATION TRAINING GRADE SLIP

MANEUVER/PROCEDURE GRADE SLIP FOR UH-60 RCM					
NO	MANEUVER/PROCEDURE	GR	NO	MANEUVER/PROCEDURE	GR
53	EXTERNAL LOAD OPERATIONS		79		
54	INTERNAL LOAD OPERATIONS		80		
55	AERIAL RADIO RELAY		81		
56	ACTIONS ON CONTACT		82		
57	TERRAIN FLIGHT MISSION PLANNING		83		
58	TERRAIN FLIGHT NAVIGATION		84		
59	TERRAIN FLIGHT		85		
60	WIRE OBSTACLES		86		
61	MASKING AND UNMASKING		87		
62	TERRAIN FLIGHT DECELERATION		88		
63	MAJOR US/ALLIED AND THREAT EQUIPMENT IDENTIFICATION		89		
64	TACTICAL COMMUNICATION PROCEDURES AND ECCM		90		
65	TACTICAL REPORT		91		
66	QUICK FIX MISSION		92		
67	FLAT TURN/V-CALIBRATED FLIGHT		93		
68	ORAL EVALUATION		94		
69			95		
70			96		
71			97		
72			98		
73					
74					
75					
76					
77					
78					

NOTES:

◇ NVD MANEUVER
 □ INSTRUMENT MANEUVER
 ○ STANDARDIZATION MANEUVER

ENTER S+, S, S-, OR U IN GRADE BLOCK. IF GRADE IS S- OR U DUE TO AIRCREW COORDINATION INCLUDE UP TO TWO BASIC QUALITY NUMBERS.

S- 2,5

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLI- MATE	2. PLAN RE- HEARSE	3. DECI- SION TECH	4. WORK LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MON- ITOR	11. INFO OF- FERED	12. ADVOC/ ASSERT	13. AAR
G R A D E												

[illegible]

Examinee's/Trainee's Name: _____ **Date:** _____

[illegible]

D

Aircrew Coordination Evaluation Workshop Exercises

1. General

- a. This appendix provides unit instructors with exercises to recognize and evaluate crew coordination during training and evaluation missions. The workshop is designed to provide experience in using the evaluation tools and guidance contained in this exportable training package.
- b. Evaluation of crew coordination requires a conscious assessment of how well crews perform as a unit to successfully accomplish assigned missions. Guidelines for evaluating crew coordination are less objective than other more hands-on measurable tasks, for example, distance or degrees. Thus, evaluation of the crew coordination standards included in each ATM task must adhere to fundamental principles. The method used to evaluate crew coordination must be based on uniform, standardized objectives. It is essential that evaluators measure crew coordination skills based on the evaluation guidelines for the Crew Coordination Basic Qualities presented in this exportable training package (*Student Guide*, Appendix E).
- c. Crew coordination evaluations will identify strengths and weaknesses. Uniform, objective ratings are crucial to the Aircrew Training Program because everyone involved depends on them to assess the actual crew coordination training status of unit aircrews. Using evaluation data, training weaknesses will be identified and addressed through changes to the Aircrew Coordination Course.
- d. In a workshop setting, analysis of actual US Army aviation cases and aircrews will provide the means to reach consensus on the ratings used. During the workshop, either textual, audio, or video case studies may be used to portray the situation or condition to be evaluated. A minimum of three or four case studies are required before a near consensus on the assignment of objective ratings can be expected. If more cases are required, continue but stay within the two hours allocated, if possible.

2. Procedure

- a. Participants will be broken down into groups of 4-5 persons for the purpose of the exercise. One person will be designated by each group to present the group's rating(s) and rationale.

- b. The instructor will present the case study using text (viewgraphs), audio, or video cassette vignette. The workshop focus will progress from a perspective of aircrew coordination at the crew task level to an assessment of Crew Coordination Basic Qualities and overall mission performance.
- c. Using the appropriate ATM, Aircrew Coordination Training Grade Slips, and the Aircrew Coordination Training Evaluation Guide (*Student Guide*, Appendix E), groups will practice evaluating crew coordination performance by:
 - (1) Grading crew performance at the ATM task level. This includes assigning a letter grade of S+, S, S-, or U to the task.
 - (2) Identifying Crew Coordination Basic Qualities that contribute to the task grade. It is important to try to achieve a pattern of agreement on one or two Basic Qualities that contribute to task ratings of S- or U. (See the Notes block of the Aircrew Coordination Training Grade Slip)
 - (3) Assigning a rating to each contributing Crew Coordination Basic Quality. Use the evaluation guidelines to discuss specific ratings. (See the Notes block of the Aircrew Coordination Training Grade Slip.)
 - (4) Assigning a summary rating to all Crew Coordination Basic Qualities. Once a pattern of agreement emerges for rating Basic Qualities by task, practice rating the crew's performance of all 13 Basic Qualities. This rating will be a summary rating for each Basic Quality regardless of whether it contributed to a high or low task grade. (See the bottom of page 2, Aircrew Coordination Training Grade Slip.)
 - (5) Grading the crew on overall mission accomplishment. This is an overall grade for the mission—both flight skills and crew coordination performance. (See the bottom of Battle-Rostered Crew Evaluation/ Training Grade Slip.)

3. Evaluation Exercise Case Studies

- a. Evaluation Case #1 - VFR Flight Planning
 - (1) ATM Task 1001 (Plan a VFR Flight)
 - (2) Situation: PC and P report to planning room and begin the premission planning.

(3) Crew actions

PC obtains publications and weather, checks NOTAMS, and begins laying out the courses for each mission leg. P observes; however, he makes no comments. PC checks the manuals for fuel consumption and determines fuel requirements for mission and reserve. P on his own also computes the fuel requirement and notes PC is off by 200 lbs on the low side. No comment is made because they plan to refuel at an en route FARP anyway. The PC then computes the weight and balance and the PPC. PC then shows the weight and balance, PPC, map, and flight plan to the P and asks if he understands the mission, to which the P says "yes". PC asks the P to file the flight plan and get the weather briefing while he begins to pre-flight the aircraft.

(4) Ratings

(a) What grade do you assign to this task? (S-)

(b) Which Crew Coordination Basic Qualities contribute to the task grade? (#2, #11)

b. Evaluation Case #2 - Before Takeoff

(1) ATM Task 1007 (Perform Engine Start, Run-up, and Before Takeoff Checks)

(2) Situation: Continuation of Evaluation Case #1

(3) Crew actions

PC completes logbook entries, cranks the APU, and, before the P can get settled, begins the start sequence for engine #1, which is unsuccessful. On the second attempt, a "hot start" is in progress but is avoided because the P notices it and quickly initiates abort start procedures. P informs PC that if he wants the engine started, just let him know when and he'll do it. PC takes offense at this remark and says, "that's the way you want it, crank it"; which the P does while the PC closely observes each move. The PC then runs the checklist without waiting for a response from the P, and requests start #2. Again the PC runs the checklist silently and then announces, "I have the controls" and accomplishes the run-up and before-takeoff checks. At this point the PC sets the radio to ground and requests taxi for takeoff instructions. P copies the information and verifies it to the PC who mumbles an acknowledgement. In the interim, one of the passengers deplanes to run back to operations to get his camera. The crew chief says nothing about this since he believes the individual will

return prior to taxi – however, the passenger is detained in operations and the crew chief gets involved in other duties and forgets about him.

(4) Ratings

- (a) What grade do you assign to this task? (S-)
- (b) Which Crew Coordination Basic Qualities contribute to the task grade? (#10, #7)
- (c) What ratings do you assign to the contributing Basic Qualities? (#10, 1; #7, 1)

c. Evaluation Case #3 - Air Movement External Load

- (1) ATM Task 2079 (Perform Terrain Flight Navigation)
ATM Task 2081 (Perform Terrain Flight)
ATM Task 2016 (Perform External Load Operations)

(2) Situation

This is a videotape segment of a UH-60 crew performing terrain flight, terrain flight navigation, and external load operations during a tactical scenario in the UH-60 flight simulator. This segment is about 1 minute and 50 seconds long. The crew is a single aircraft moving a howitzer and ammo bag along a prescribed route in a medium to high threat environment to a friendly unit located near the forward line of troops (FLOT). The pilot-in-command (P) is navigating with a tactical map and is sitting in the left seat. The pilot (P*) is flying from the right seat.

(3) Crew actions

- P: Bank left just a little please.
- P: OK, roll out there.
- CE: Your load is getting real low to the ground.
- P: Yeah, come on up, your 20 feet off the ground now.
- P: There you go. You've got a 40 foot sling.
[Intercom click]
- P: Turn right.
- P: Roll out.
- P: We're looking for a, ah, single mountain up here again and after that were gonna make a left-hand turn sort of inbound towards our LZ.
- P*: Okay.

(4) Ratings

Note: An example of a completed Evaluator Worksheet is located in Appendix C of this guide. Refer to the Crew Coordination Exportable Evaluation Package for guidelines on developing and using Evaluator Worksheets.

-
- (a) What grade do you assign to ATM Task 2079, Perform Terrain Flight Navigation? ()
- (b) Which Crew Coordination Basic Qualities contribute to the task grade? (# , #)
- (c) What ratings do you assign to the contributing Basic Qualities? (# , - ; # , -)

ATM Task 2079 Perform Terrain Flight Navigation

GRADE: S+ S S- U Basic Qualities: ,

Notes:

-
- (d) What grade do you assign to ATM Task 2081, Perform Terrain Flight? ()
- (e) Which Crew Coordination Basic Qualities contribute to the task grade? (# , #)
- (f) What ratings do you assign to the contributing Basic Qualities? (# , - ; # , -)

ATM Task 2081 Perform Terrain Flight

GRADE: S+ S S- U Basic Qualities: ,

Notes:

- (g) What grade do you assign to ATM Task 2016, Perform External Load Operations? ()
- (h) Which Crew Coordination Basic Qualities contribute to the task grade? (#, #)
- (i) What ratings do you assign to the contributing Basic Qualities? (#, -; #, -)

ATM Task 2016 Perform External Load Operations

GRADE: S+ S S- U Basic Qualities: ,

Notes:

- (j) What summary rating do you assign to each of the 13 Crew Coordination Basic Qualities?

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS-MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR
GRADE												

- (k) What rating do you assign for overall mission performance?

OVERALL GRADE FOR THIS FLIGHT IS:

S	U	NA

d. Evaluation Case #4 - Air Movement External Load

- (1) ATM Task 2079 (Perform Terrain Flight Navigation)
ATM Task 2081 (Perform Terrain Flight)
ATM Task 2016 (Perform External Load Operations)

- (2) Situation

This is a videotape segment of a UH-60 crew performing terrain flight, terrain flight navigation, and external load operations during a tactical scenario in the UH-60 flight simulator. This segment is about 2 minutes long. The crew is a single aircraft moving a howitzer and ammo bag along a prescribed route in a medium to high threat environment to a friendly unit located near the forward line of troops (FLOT). The pilot-in-command (P) is navigating with a tactical map and is sitting in the left seat. The pilot (P*) is flying from the right seat.

- (3) Crew actions

P: Watch that tree.

P*: Got it in sight. Be going off to the left of the tree and continuing forward up to 60 or 80 knots, correct?

P: Yep. Time's started.

P*: Okay.

P: Come right. [Pause, threat searches] And bring it down a little bit.

P: We're going to 80 knots.

P*: OK, Continuing through 60 right now.

P: OK, And your drifting a little bit to the left.

P*: I'll go around this tree here and then I'll bring it back to the right .

P: OK.

P*: Coming up on, ah 80.

CE: Looks good at about 60 feet.

P*: OK.

P: And continue your air speed.

P*: OK

P: I've got you about 70.

P: Rolling hills coming up. I got the hill out here. We're generally gonna stay to the right hand side of, ah the rolling hills that'll come up on our left side.

P*: OK

P: So we're looking good.

P*: Doesn't look like there's a whole bunch, a whole bunch, out here to look at.

P: Roger, there's not, we already crossed over the river. Its going to be generally slight rolling terrain up through here.

P*: OK.
P: And, We'll be crossing the river in, ah two clicks going kinda left or left to right.
P*: OK
P: I've got the river in sight over there at 1 o'clock.
P*: OK. I see it up there at 1.
P: Your heading is good though.
P: Ah, come on back to the right.
P*: OK. Looks like we got some trees coming up there at ah, about 11 o'clock, about 3 kilometers .
P: Yeah, we're not gonna want to go out there.
P*: OK
P: Stay on the, ah bottom edge of the, ah rolling hills, you'll see them going up to our left.
P*: OK.
P: OK, This is a good heading here.

(4) Ratings

-
- (a) What grade do you assign to ATM Task 2079, Perform Terrain Flight Navigation? ()
 - (b) Which Crew Coordination Basic Qualities contribute to the task grade? (# , #)
 - (c) What ratings do you assign to the contributing Basic Qualities? (# , _ ; # , _)

ATM Task 2079 Perform Terrain Flight Navigation

GRADE: S+ S S- U Basic Qualities: ,

Notes:

-
- (d) What grade do you assign to ATM Task 2081, Perform Terrain Flight? ()
- (e) Which Crew Coordination Basic Qualities contribute to the task grade? (#_ , #_)
- (f) What ratings do you assign to the contributing Basic Qualities? (#_ , _ ; #_ , _)

ATM Task 2081 Perform Terrain Flight

GRADE: S+ S S- U Basic Qualities: __ , __

Notes:

-
- (g) What grade do you assign to ATM Task 2016, Perform External Load Operations? ()
- (h) Which Crew Coordination Basic Qualities contribute to the task grade? (#_ , #_)
- (i) What ratings do you assign to the contributing Basic Qualities? (#_ , _ ; #_ , _)

ATM Task 2016 Perform External Load Operations

GRADE: S+ S S- U Basic Qualities: __ , __

Notes:

- (j) What summary rating do you assign to each of the 13 Crew Coordination Basic Qualities?

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK-LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS-MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR
GRADE												

- (k) What rating do you assign for overall mission performance?

OVERALL GRADE FOR THIS FLIGHT IS:

S	U	NA

Note: The next three cases (cases 5, 6, and 7) are related in sequence to a single segment of an air assault mission. These cases can be used individually or as a group to practice making crew coordination evaluations. Considering the three cases collectively presents student instructors with more crew interactions than in a single case and adds realism to their practice evaluation of all 13 Crew Coordination Basic Qualities.

e. Evaluation Case #5 - Air Assault Mission Planning and Rehearsal

- (1) ATM Task 2078 (Perform Terrain Flight Mission Planning)
ATM Task 1000 (Conduct Crew Mission Briefing)

- (2) Situation

This is a video segment of a UH-60 crew conducting in-the-cockpit mission planning and rehearsal. This taped segment is about 5 minutes and 10 seconds long. The crew has just repositioned from the FARP and is waiting for other aircraft to lineup for an air assault mission. This is the lead ship of a flight of 5 on a cross FLOT troop insertion mission. A few

minutes earlier, maintenance corrected an engine malfunction that occurred en route to the PZ.

(3) Crew actions

P: The RP is pretty much we follow this ridge line up and over and when that ends that's our RP, and then we cut over to Garfield.
P*: OK.
P*: This is all 100 knots 'till RP inbound, right?
P: Yep 100 knots until RP inbound then we're going to 60 knots.
P*: OK. I've got 21 past right now. Still got about 5 minutes.
P: We do have our weapons and ammo and all that good good stuff.
CE: OK sir. We're all loaded up and I'm in-- strapped in here.
P*: OK we're good to go then huh?
P: I guess.
P*: You did say that all the aircraft are behind us now?
CE: Yes sir. They each started taking troops.
P*: OK.
P*: OK, I'll, got our strobe off there?
P: OK.
P*: Now I'll just wait on the other guys and I've got internal with them.
P: You'll handle internal.
P*: Roger.
P: Anything else I'm not thinking about here? Got the route. Got the time's all set up. I'll keep a running time and a hard time. I've got the distances. When I leave here he wanted me to call at the RP for landing instructions.
P*: Roger that.
P: I don't think, he didn't say call off here did he?
P*: No.
M25: Mike 21, Mike 25, Beacon.
P*: This is M21, roger beacon.
P: Why don't you tell them pitch pull will be in approximately 4 minutes so they can set up for that.
P*: Roger that. Will do. And flight this is lead-pitch pull will be in approximately 4 minutes.
P*: Engines are pretty quick in ECU lock out, wouldn't you say.
[Reference to engine malfunction that occurred en route to the PZ]
P: Yeah, it ah strapped right to. I just had a little bit of trouble identifying. I knew what it was but it wasn't pulling the rotor down but that was because we were going so slow you know.
P*: Yeah.
P: We were getting no torque and that's when I just went to lock out.
P*: Right, Just like failing to the low side there.
P: Yeah, number 2

P*: That's what I was doing. I was looking outside and I was waiting for you to go lockout and then I seen it go "where" and I thought yeah he did it [Chuckle].

P: Yep.

P*: OK, How uh, it would probably be best since we're just sitting here at idle . . .

P: Yeah

P*: I know you, you started that fuel check but you may need to like restart it.

P: Yeah, I'm going to do it right after we take off. I'll just uh, yeah, I'll get a better reading.

P*: OK, I've got uh . . .

P: We, if necessary we can FARP down at, uh, it was Hobbes, right?

P*: Right. FARP is at Hobbes.

P: Yeah, we've got enough for that.

P*: Yep. OK, uh, probably ought to, let's see 3 minutes will be take off.

P*: We still have 1880 on the fuel. We're looking good there. Got plenty to make it down to Hobbes.

P: Rate is 3750. That's all I'm gonna need till I get down to here.

P*: Uh, yep its always...

P: Till I get up to here... up to the 3570.

P*: Right.

P: OK.

P*: OK, I've got 2 minutes.

P*: And, uh, just to reiterate after we pass ACP coming up on number 2 just be sure to remember the guns and the mode 4 there.

P: OK, as far as ADA. We're not going to really run in, yeah we are gonna run into it a little bit here OK.

P*: Roger.

P: So be aware I might have to divert us to the other side of the hills there. We're gonna have some ADA activity and then we're gonna have it again at the LZ.

P*: OK.

(4) Ratings

- (a) What grade do you assign to ATM Task 2078, Perform Terrain Flight Mission Planning? ()
- (b) Which Crew Coordination Basic Qualities contribute to the task grade? (#, #)
- (c) What ratings do you assign to the contributing Basic Qualities? (#, -; #, -)

ATM Task 2078 Perform Terrain Flight Mission Planning

GRADE: S+ S S- U Basic Qualities: __, __

Notes:

- (d) What grade do you assign to ATM Task 1000, Conduct Crew Mission Briefing? ()
- (e) Which Crew Coordination Basic Qualities contribute to the task grade? (#, #)
- (f) What ratings do you assign to the contributing Basic Qualities? (#, -; #, -)

ATM Task 1000 Conduct Crew Mission Briefing

GRADE: S+ S S- U Basic Qualities: __, __

Notes:

- (g) What summary rating do you assign to each of the 13 Crew Coordination Basic Qualities?

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK- LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS- MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR
GRADE												

- (h) What rating do you assign for overall mission performance?

OVERALL GRADE FOR THIS FLIGHT IS:

S	U	NA

f. Evaluation Case #6 – Air Assault Threat Evasion

- (1) ATM Task 2079 (Perform Terrain Flight Navigation)
 ATM Task 2081 (Perform Terrain Flight)
 ATM Task 2008 (Perform Evasive Maneuvers)

(2) Situation

This is a video segment of a UH-60 crew performing terrain flight navigation, terrain flight, and evasive maneuvers during a tactical scenario in the UH-60 flight simulator. This segment is about 50 seconds long. The crew is flight lead for a flight of 5 aircraft moving troops along a prescribed route across FLOT in a medium to high threat environment. The pilot (P) is navigating with a tactical map and is sitting in the left seat. The pilot-in-command (P*) is flying from the right seat.

(3) Crew actions

P*: You got us in this valley just on the back side of the mountain?
P: Roger, it's called Black Hill I believe. Let's slow down—very slow. We've been fast this whole time and we need to slow way down.
P*: Whoa.
P*: OK, We got a forest with a little barn by it.
[Threat Lock on]
P*: Gall dang it! We got, and that's from the front.
P: OK, We need to put some uh, put this forest between it. It's probably a ZSU.
P*: "Ne-er-er." Assess the situation. What else we got?
P: He's off to our right rear.
P: Let's go down this valley and, whoa, slow down.
P*: Ugh.
P: Oh Geese.

(4) Ratings

-
- (a) What grade do you assign to ATM Task 2079, Perform Terrain Flight Navigation? ()
- (b) Which Crew Coordination Basic Qualities contribute to the task grade? (#_ , #_)
- (c) What ratings do you assign to the contributing Basic Qualities? (#_ , _ ; #_ , _)

ATM Task 2079 Perform Terrain Flight Navigation

GRADE: S+ S S- U Basic Qualities: __ , __

Notes:

-
- (d) What grade do you assign to ATM Task 2081, Perform Terrain Flight? ()
- (e) Which Crew Coordination Basic Qualities contribute to the task grade? (#, #)
- (f) What ratings do you assign to the contributing Basic Qualities? (#, ; #,)

ATM Task 2081 Perform Terrain Flight

GRADE: S+ S S- U Basic Qualities: ,

Notes

-
- (g) What grade do you assign to ATM Task 2008, Perform Evasive Maneuvers? ()
- (h) Which Crew Coordination Basic Qualities contribute to the task grade? (#, #)
- (i) What ratings do you assign to the contributing Basic Qualities? (#, ; #,)

ATM Task 2008 Perform Evasive Maneuvers

GRADE: S+ S S- U Basic Qualities: ,

Notes:

- (j) What summary rating do you assign to each of the 13 Crew Coordination Basic Qualities?

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK-LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS-MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR
GRADE												

- (k) What rating do you assign for overall mission performance?

OVERALL GRADE FOR THIS FLIGHT IS:

S	U	NA

g. Evaluation Case #7 – Air Assault Landing Zone Arrival

- (1) ATM Task 2079 (Perform Terrain Flight Navigation)
ATM Task 2081 (Perform Terrain Flight)
ATM Task 1028 (Perform VMC Approach)

(2) Situation

This is a videotape segment of a UH-60 crew performing terrain flight navigation, terrain flight, and VMC approach during a tactical scenario in the UH-60 flight simulator. This segment is about 3 minutes long. The crew is flight lead for a flight of 5 aircraft conducting a cross FLOT troop insertion in a medium to high threat environment. The crew must accurately navigate while avoiding and evading threat to deliver the troops to the correct location at the correct time. The pilot (P) is navigating with a tactical map and is sitting in the right seat. The pilot-in-command (P*) is flying from the left seat. As the segment begins, the crew has just completed a threat evasion maneuver.

(3) Crew actions

[Threat lock on]
P: There he goes.
K12: Check nav left.
[Aircraft jolted by ADA hit]
[Threat lock broken]
P*: Have us on the map?
P: No, I just have our general area.
[Threat lock on]
P: If we keep going...
P*: Which way's the road?
P: It's out to the right side, but we've got threat out there.
P*: OK.
K12: 11 (this is) 12. ACP4 is about a kilometer, ah, out our left door.
P*: Is that what you got?
P: No. We didn't cross the road did we?
P*: I ...
K12: 11 (this is) 12 you are at grid square 5333.
P: That's 11 roger.
P*: OK, I've got the road out here. Now we're looking for the high ground or what?
P: Well, wait till the road turns to right, I mean a hard turn right and then ah go ahead and cross it then turn right so that the road stays on the right side.
P*: OK. You want to give Yankee 13 a call—find out which one we're going to?
P: Alrig...
P*: Here's a hard turn to the right.
P: In a minute. Turn right.
P: You'll see a mountain coming into view as you come around to the right—just stay to just the right side of it.
P*: OK. There's the road coming back.
P: Alright, Turn back to the left.
P: Stop turn. OK, Turn right and decrease airspeed.
P*: Is this the RP?
P: Yes.
P*: Then call.
P: Oh. Yankee 13 this is Kilo 11 we are 2 kilometers southwest.
P*: Sarah
Y13: Kilo 11 (this is) Yankee 13 understand Sarah. Land Luke, I say again land Luke.
P: Alright, She said land Luke, that's what we're planning on.
P*: OK, The road is going to the northeast here.

P: OK, Turn right some more.
K12: 11 (this is) 12, show you just passing ACP4.
P: Yeah, We're in preparation for landing, OK?
P*: No, This can't be right if we're ACP4. We're at the wrong place.

(4) Ratings

-
- (a) What grade do you assign to ATM Task 2079, Perform Terrain Flight Navigation? ()
- (b) Which Crew Coordination Basic Qualities contribute to the task grade? (#, #)
- (c) What ratings do you assign to the contributing Basic Qualities? (#, ; #,)

ATM Task 2079 Perform Terrain Flight Navigation

GRADE: S+ S S- U Basic Qualities: __, __

Notes:

-
- (d) What grade do you assign to ATM Task 2081, Perform Terrain Flight? ()
- (e) Which Crew Coordination Basic Qualities contribute to the task grade? (#, #)
- (f) What ratings do you assign to the contributing Basic Qualities? (#, ; #,)

ATM Task 2081 Perform Terrain Flight

GRADE: S+ S S- U Basic Qualities: __, __

Notes

- (g) What grade do you assign to ATM Task 1028, Perform VMC Approach? ()
- (h) Which Crew Coordination Basic Qualities contribute to the task grade? (# , #)
- (i) What ratings do you assign to the contributing Basic Qualities? (# , _ ; # , _)

ATM Task 1028 Perform VMC Approach

GRADE: S+ S S- U Basic Qualities: _ , _

Notes:

- (j) What summary rating do you assign to each of the 13 Crew Coordination Basic Qualities?

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK-LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS-MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR
GRADE												

- (k) What rating do you assign for overall mission performance?

OVERALL GRADE FOR THIS FLIGHT IS:

S	U	NA

E

Aircrew Coordination Evaluation Process

1. General

- a. Evaluation of aircrew coordination is important to identify strengths and weaknesses in the Aircrew Coordination Training Program.
- b. Aircrew coordination training and evaluation missions are graded exercises. A summary rating (number rating) for each Basic Quality is required on the Aircrew Coordination Training Grade Slip, and an overall grade (letter grade) is required on the Battle-Rostered Crew Evaluation/Training Grade Slip for each flight.
- c. Given the Army's "crawl-walk-run" approach to crew coordination training, the hands-on component of aircrew coordination training consists of four simulator or aircraft flights: one pretraining (crawl), two training (walk, run), and one course completion (run). UTs may evaluate the two training flights but an IP must evaluate the pretraining and course completion flight.
 - The first flight is a pretraining evaluation period to ensure that crewmembers have flown as a crew, to establish a frame of reference for the classroom instruction, and to provide a baseline to compare the crew's post-training performance. During this period, the IP or UT mainly observes the crew's performance, waiting until the crew has finished its after-action review to offer crew coordination techniques as a means to correct weaknesses.
 - Flight two is a training period where the trainer (UT or IP) should interrupt the mission as often as necessary to instruct the crew on their application or misapplication of Crew Coordination Basic Qualities. For example, the trainer may have to coach the crew through premission planning and rehearsal.
 - During the third flight, also a training period, the trainer (UT or IP) observes the crew's performance and interjects comments and instruction whenever major breakdowns in crew coordination occur. The UT or IP should reserve evaluation comments until the period following the crew's after-action review, especially if a videotape is available for use by the crew to undertake a self-critique. Option: Time permitting, a fourth training ride (run) should be considered to permit switching crewmembers, using NVD in the aircraft or simulator, or training in the aircraft vis the simulator.

- The fourth flight is an end-of-course evaluation ride where the IP observes only, reserving comments for the evaluator debrief once the crew completes their after-action review.

- d. The key to effective evaluator ratings for all aircrew coordination training flights is thorough familiarity with, and adherence to, the *Aircrew Coordination Training Evaluation Guide (Student Guide, Appendix E)*. The guide provides stable criterion-referenced measures that are proven to be highly objective. The use of any other rating system may introduce fluctuations, or grade creep, often seen in data based on norm-referenced grading systems.

2. Guidance

- a. Commanders determine the importance of crew coordination in their units. Evaluators implement the Aircrew Coordination Program and set the tone for evaluation sessions by their demeanor. Although a coldly professional and standoffish approach may get the job done, it is contrary to the team approach advocated by crew coordination training. Each individual evaluator and crewmember, rated and nonrated, contributes to the mission; therefore, each one should participate in, and have a voice in, the evaluation session.
- b. An open and frank manner, together with a nurturing style of evaluation, will advance the team approach to mission accomplishment. Evaluators play an essential role in determining whether evaluations contribute positively to each crew's experience base and the effectiveness of unit aircrew coordination training.

3. Evaluation Activities

- a. The evaluator greets the crew and explains the nature of the flight as pre-training, training, or evaluation. The crew will be advised that the information gained from the flight will be used to improve aircrew coordination instruction. As such, each training and evaluation ride is part of an ongoing effort to improve Army aircrew coordination training.

(Note: If video cameras are used to tape the premission planning session, they should be loaded and turned on before the crew enters the mission planning room so that the crew's attention is not diverted to the cameras.)

- b. Evaluators will issue all materials (*Student Guide, Appendix F*) required by the crew to plan the flight per unit SOP and published regulations. The evaluator will complete all identifying information required on the evaluation forms and conduct an oral examination of the crew's working knowledge and understanding of crew coordination (Examination Questions, paragraph 4). The

evaluator will then instruct and observe the crew during their premission flight planning activities. As with other segments of training and evaluation missions, an unsatisfactory grade on crew coordination during the premission planning phase does not terminate the mission.

(Note: If the premission planning and rehearsal portion of the training or evaluation ride is being videotaped, the evaluator must retrieve the tape before moving to the simulator or flight line. Should the simulator or flight portion be videotaped, a videotape should be loaded and the camera(s) turned on before the crew either enters the simulator or begins engine start procedures.)

- c. If the evaluation and training mission is flown in an aircraft or simulator that requires the evaluator to operate as a member of the crew, the evaluator must use judgment when role playing. The evaluator must be fair to both the procedures for evaluation and the crewmember(s) when evaluating the flight and in clarifying or enhancing instructional points. If the mission is flown in an aircraft or simulator not requiring the evaluator to participate as a crewmember, the evaluator will be required only to observe and present instruction as necessary.
- d. During the simulator or flight mission, the evaluator will judge both crew coordination and technical flight skills. The weight placed on either category in determining a maneuver grade on the Aircrew Coordination Training Grade Slips (*Appendix C*) is the evaluator's decision, based on experience. Guidelines for evaluating aircrews are provided in *Appendix E* of the *Student Guide*. As is customary, notes may be kept for use in determining grade slip entries prior to, and for use during, the evaluator's post-flight debriefing.
- e. Evaluators will fill in the grade slips as completely as possible during the training flight. Evaluators may require more time to refer to the *Aircrew Coordination Training Evaluation Guide* (*Student Guide*, *Appendix E*) in completing the Basic Qualities section of the Aircrew Coordination Training Grade Slip. This period of time will be reduced with experience. If more time is needed to complete grade slips and organize debriefing comments, evaluators should not hesitate to place the crew on a short break immediately after their after-action review.

(Note: If the review is being videotaped, it is important that the tape be loaded and the camera turned on before the crew enters the after-action review room. Once the crew completes their after-action review, turn-off the video camera before the evaluator debrief.)
- f. Subsequent to the crew-level after-action review, the evaluator will conduct a comprehensive review of the entire evaluation session from premission planning through after-action review. During this debriefing, the evaluator will point out examples of both good and bad crew coordination. If the mission was

videotaped, video playback may be used as an aid in reviewing the mission. Again, the evaluator's review should provide a positive learning experience for the crew and contribute to their crew coordination knowledge base. Encourage crewmembers to self-evaluate their performance during the evaluator debriefing. Comment on Crew Coordination Basic Qualities rated superior and ask open-ended questions to explore the crew's perception of Basic Qualities rated marginal, poor, or very poor.

- g. Upon completing the review, evaluators will finalize all records and retrieve reusable training materials, including the videotape. If the evaluation mission was videotaped, erase the videotape and return it along with the grade slips to the unit training manager. Training managers maintain the evaluation grade slips in accordance with Section IV, Records, TC 1-210, and the appropriate ATM.
- h. Table E-1 summarizes evaluation actions to include video recording options.

4. Sample Oral Examination Questions

- a. Sample questions provide a basis for evaluators to conduct an oral examination of a crew's working knowledge and understanding of crew coordination. The evaluator should ask each crewmember 2 to 3 questions before issuing the crew their simulator or aircraft mission briefing. Correct responses are in italics.
- b. This sample set of questions is not exhaustive. Evaluators should design additional questions that relate crew coordination to their particular unit (for example, unique missions, local regulations, SOP).

Table E-1. Evaluation Actions

Actions ¹	Video Recording Option
1. Greet the crew and explain the nature of the flight (pretraining, training, evaluation) and the trainer's role	Load the camera in the planning area; turn the camera on when the crew enters the planning area
2. Issue the training materials and complete the crew information section of the evaluation forms; conduct oral examination; brief the mission; evaluate premission planning and rehearsal	Turn the camera off after premission planning and rehearsal; take the tape to the simulator or the flight line
3. Observe and evaluate mission execution during the flight (crewmember or observer); take notes for grade slips and evaluator debrief	Load and turn on the camera/recorder before entering the simulator or aircraft; upon flight completion take the tape to the after-action review area
4. Observe and evaluate the crew-level after-action review; complete the grade slips (declare a short break as required before the debrief)	Load and turn on the camera before entering the after-action review area; turn off the camera before the evaluator debrief
5. Debrief the crew on the entire mission; use open-ended questions to facilitate a crew self-evaluation	Use video playback to emphasize teaching and evaluation points
6. Finalize records and retrieve training materials; issue the read-ahead and assignment sheets; release the crew	Erase the tape(s) and return to the unit training manager
Note: 1 For actions 2, 3, and 4 use the "crawl-walk-run" approach for training flights 2, 3, and 4	

SAMPLE ORAL EXAMINATION QUESTIONS

1. Crew coordination contributes to:

- A. Mission safety
- B. Mission effectiveness
- C. Both A and B
- D. Reduced crew workload

2. According to the 1989 US Army Safety Center and Army Research Institute Study, communications was related to ____ percent of aircraft accidents.

- A. 76
- B. 41
- C. 35
- D. 24

3. What is crew coordination?

Crew coordination is defined as the interaction between crewmembers (communication) and actions (sequence and timing) necessary for flight tasks to be performed efficiently, effectively, and safely. It involves the effective utilization of all available resources—hardware, software, and liveware.

4. The Army Crew Coordination Program outlined ____ Crew Coordination Objectives and ____ Crew Coordination Basic Qualities.

- A. 5, 8
- B. 8, 13
- C. 3, 5
- D. 5, 13

5. Aircrew Training Manuals (ATMs) separate crew coordination tasks from technical flight tasks.

- A. True
- B. False

6. Discuss the Two Challenge Rule.

The key to early response to incapacitation lies in the ability to establish a norm against which the results of incapacitation can be measured. The two-challenge rule provides for automatic assumption of duties from any crewmember who fails to respond to two consecutive challenges. This overcomes our natural tendency to believe the pilot flying must know what he is doing, even as he departs from established parameters.

7. Aircrew coordination applies to rated aviators only.

- A. True
- B. False

8. Good communication and crew coordination are as important as technical flight proficiency for flight safety and mission accomplishment.

- A. True
- B. False

9. Pilots in command should employ the same style of leadership in all situations and with all crewmembers.

- A. True
- B. False

10. Nonrated crewmembers should be actively involved in planning the mission.

- A. True
- B. False

11. An essential element of premission planning is discussing crew responsibilities and required actions for abnormal events.

- A. True
- B. False

12. Thinking through difficult segments, events, and tasks is primarily the pilot in command's responsibility.

- A. True
- B. False

-
13. The pilot in command is solely responsible for leadership of the crew team.
- A. True
 - B. False
14. What are the two contrasting decision making techniques discussed in the Crew Coordination Training Program?
- A. Classical and Modern
 - B. *Analytic and Automatic*
 - C. Theory X and Theory Y
 - D. Structured and Unstructured
15. The pilot in command should use the entire crew to help maintain situation awareness.
- A. True
 - B. False
16. Crewmembers should be aware of other crewmember's workload.
- A. True
 - B. False
17. Cross monitoring other crewmember's performance can help break a series of errors or poor judgements.
- A. True
 - B. False
18. Discuss examples of the types of information to be reported as part of mission situational awareness.
- A. *Aircraft position and status*
 - B. *Equipment status*
 - C. *Personnel status*
 - D. *Environment and battlefield conditions*
 - E. *Changes to mission objectives*

19. Name three of the Five Hazardous Attitudes.

- A. *Anti-Authority*
- B. *Impulsivity*
- C. *Invulnerability*
- D. *Machoism*
- E. *Resignation*

20. A debriefing and after-action review of procedures and decisions after each mission are important for developing and maintaining effective crew coordination.

- A. *True*
- B. *False*

21. A battle rostered crew that is crew coordination trained would have a more favorable risk assessment rating.

- A. *True*
- B. *False*

22. Aircrew coordination training can help offset the risk associated with a non-battle rostered crew.

- A. *True*
- B. *False*

23. The Army Crew Coordination Program seeks to _____ the pilot in command's authority while encouraging the utilization of the entire crew through situational (flight) team leadership.

- A. *Increase*
- B. *Decrease*

24. Who in aviation units is responsible for implementing the commander's crew coordination program?

- A. *Instructor Pilot*
- B. *Unit Trainer*
- C. *Pilot in Command*
- D. *Pilot*

F

Scenario Guidance

1. General

- a. Scenarios developed to support the Aircrew Coordination Training Program should:
 - (1) focus on the unit's mission essential task list (METL),
 - (2) be consistent with the guidance for crew training that is contained in TC 1-210, "Aircrew Training Program, Commanders Guide to Individual and Crew Training," and the appropriate aircraft Aircrew Training Manual (ATM),
 - (3) involve battle-rostered crews, and
 - (4) emphasize crew tasks developed as a part of the unit's collective training program.
- b. Scenarios should be conducted in flight simulators, when available. If flight simulators are not available, or the unit's assigned aircraft have no compatible simulator, scenarios should be conducted in the aircraft.
- c. Scenarios should include common tactical missions for the type of aviation unit undergoing the training (e.g., cavalry, assault, attack, medium lift) and for the specific mission types of aircraft assigned to the unit (e.g., utility, observation, cargo, attack, reconnaissance).
- d. Scenarios should require the aircrew to coordinate, both internally and externally, to successfully accomplish the mission. To that end, the scenarios should incorporate:
 - (1) terrain flight,
 - (2) threat avoidance,
 - (3) instrument flight,
 - (4) weapons engagements,
 - (5) external loads, and
 - (6) emergencies and other abnormal events that emphasize crew coordination rather than individual aviator skills.
- e. Simulator and aircraft scenario training should be conducted within a two-week period following aircrew coordination academic training.

-
- f. The Aircrew Coordination Training Grade Slip in Appendix C (*Instructor Guide*) of this exportable training package will be used to document scenario training.

2. Simulator Scenarios

- a. Instructors who conduct the aircrew coordination training, IPs and UTs, should develop at least two simulator scenarios for use during the training program.
- b. Each scenario period should last approximately 5.0 hours and should consist of a:
 - (1) 1.5-hour premission planning phase,
 - (2) 1.75-hour flight phase, and
 - (3) 1.75-hour crew-level after-action review phase.
- c. When available, pre-planned scenarios developed by the supporting simulator facility can be utilized.
- d. Unexpected events that require crew coordination should be incorporated into the pre-planned scenarios. Example events include:
 - (1) inadvertent entry into instrument meteorological conditions and any necessary instrument approaches,
 - (2) aircraft emergencies, and
 - (3) nonroutine mission changes.
- e. If feasible, the scenario periods should be recorded on video and/or audio tape so that the instructor and aircrew can review them during the crew-level after-action review phase. The premission planning phase could also be videotaped. In addition, cockpit conversations could be recorded during the flight phase using an audio tape recorder. Instructors conducting the training should coordinate with installation audio/visual support personnel to acquire necessary equipment and technical assistance. Small, relatively inexpensive cameras and video recorders added significantly to the training value of simulator sessions during the Aviation Center's aircrew coordination research experience.
- f. Scenarios should be based on the crawl-walk-run philosophy and should be tailored to the appropriate level of unit proficiency. Simulator missions can be conducted:
 - (1) during the day,
 - (2) at night using night vision devices (NVD),
 - (3) in mission oriented protective posture (MOPP), and
 - (4) in electronic warfare (EW) conditions.

3. Aircraft Scenarios

- a. Instructors who conduct the Aircrew Coordination Training Program for aircraft without flight simulators should develop at least two situational training exercises (STXs).
- b. Like the simulator scenarios, each STX should last approximately 5.0 hours and consist of a:
 - (1) 1.5-hour premission planning phase,
 - (2) 1.75-hour flight phase, and
 - (3) 1.75-hour crew-level after-action debriefing phase.
- c. Within acceptable risk criteria, STXs should include unexpected events that require crew coordination. Example events include:
 - (1) inadvertent entry into instrument meteorological conditions and any necessary instrument approaches,
 - (2) aircraft emergencies, and
 - (3) nonroutine mission changes.
- d. STXs should be based on the crawl-walk-run philosophy and should be tailored to the appropriate level of unit proficiency. STXs can be conducted:
 - (1) during the day, and
 - (2) at night using NVD,
 - (3) in MOPP, and
 - (4) in EW conditions.
- e. If feasible, STXs should be recorded on video and/or audio tape so that the instructor and aircrew can review them during the crew-level after-action review phase. The premission planning phase could also be videotaped. In addition, cockpit conversations could be recorded during flight using an audio tape recorder. Instructors conducting the training should coordinate with installation audio/visual support personnel to acquire necessary equipment and technical assistance. The aviation maintenance support organization should also be consulted to resolve any airworthiness issues.
- f. STXs conducted in aircraft with two-place configurations will place additional burdens on IPs and UTs. In addition to performing duties as evaluators and trainers, IPs and UTs will have to perform duties as crewmembers (role-play) to fully exercise the aircrew coordination requirements included in the STXs. Aircraft ATMs state that, "In all phases of instruction and evaluation, the evaluator is expected to perform as a crew member in good faith." Previous experience with the AH-64 Instructor Pilot Course at the U. S. Army Aviation

Center revealed that IPs could successfully perform these duties. As the students gained proficiency, the IPs were able to increase the amount of role-playing during each training flight. The more IPs are able to role-play during an STX, the more training value the crew will receive during the exercise. *"The (student) examinee must know that he is being supported by a fully functioning crew member."*

4. Scenario Development and Materials

- a. Each aircrew coordination training scenario, whether executed in a simulator or in an aircraft, should be well thought through and relevant to the unit being trained. The paragraphs below suggest the steps to take in developing a scenario and list the scenario-related materials that should be provided to the student, IP, and simulator operator, if appropriate.
- b. Developing an effective training scenario can present a challenge, even to the most experienced UT or IP. The following development steps and information sources provide a start point and approach for the scenario developer:
 - (1) Select a common tactical mission(s). (Sources: Unit OPLANs; FMs; ARTEP MTPs; Table F-1, Missions of Army Aviation Aircraft, this appendix)
 - (2) Identify unit mission essential tasks. (Source: Unit operations and training staff)
 - (3) Incorporate activities that emphasize crew coordination. (Sources: TC 1-210; Aircraft ATM; General paragraph this appendix)
 - (4) Develop a scenario outline. (Sources: Sample Scenario, this appendix; simulator facility)
 - (5) Identify activity breakpoints and describe the major activities and focus for each scenario segment. (Sources: FMs; ARTEP MTPs; Sample Scenario, this appendix)
 - (6) Select ATM tasks. (Sources: FMs; Aircraft ATM)
 - (7) Transpose scenario outline to the tactical training area available. (Sources: Unit operations and training staff; simulator facility)
 - (8) Develop OPORD and/or air mission briefing to include an instructor operator script for simulator scenarios. (Sources: AR 95-1; FMs; ARTEP MTPs; Unit SOP; Table F-2, Sample OPORD and Sample Scenario, this appendix; Aircraft ATM; simulator facility)

Table F-1. Missions of Army Aviation Aircraft*

Mission	Roles	Aircraft
Observation Observation helicopters perform visual observation and target acquisition.	- Reconnaissance (route, area, zone) - Security (cover, guard, screen) - Command, control, communications, and intelligence enhancement - Aerial adjustment of field artillery - Surveillance - NBC reconnaissance - Laser designation for precision guided munitions (OH-58D only)	OH-6A, OH-58A, OH-58C, OH-58D, and RAH-66
Attack The primary mission of attack helicopters is to destroy enemy armored, mechanized, and helicopter forces.	- Antiarmor - Antipersonnel - Air combat - Suppression of enemy air defenses - Joint air attack team operations - Joint second echelon attack - Antimateriel - Laser designation for precision guided munitions (AH-64 only)	AF-64, RAH-66, AH-1E, AH-1S, AH-1P, AH-1F, and UH-1M
Utility Rotary Wing Utility helicopters perform a variety of missions to include air assault, air movement, command and control, and MEDEVAC operations. Fixed Wing Utility fixed-wing aircraft are employed to move personnel and equipment and to support commanders and their staffs.	- Air assault and combat assault of combat forces - Air movement of supplies, equipment, and personnel - Aerial evacuation of equipment, casualties, and prisoners of war - Aerial delivery of scatterable mines and sensors - Combat search and rescue - Command, control, communications, and intelligence enhancement - Command, control, communications, and intelligence enhancement - Administration - Liaison - Aeromedical evacuation	UH-1H, UH-1V (MEDEVAC), and UH-60A U-21A, C-12A/C, UV-18A, and C-20

Table F-1. Missions of Army Aviation Aircraft* (Cont.)

Mission	Roles	Aircraft
Cargo Cargo helicopters perform a variety of missions from air movement of combat power to air movement of troops and cargo.	- Air-move combined arms forces and equipment - Emplace field artillery and other fire support assets - Reposition tactical air defense weapons and systems - Perform medical evacuation - Move combat power, troops, logistical supplies, and equipment forward, laterally, and rearward - Perform logistics over-the-shore operations - Air-move conventional, nuclear, and chemical munitions	CH-47A, CH-47B, CH-47C, CH-47D, CH-54A, and CH-54B
Special Electronic Mission Aircraft Special electronic mission aircraft perform a variety of intelligence and electronic warfare operations.	- Process and relay high value intelligence information to maneuver commanders - Provide communications intelligence - Provide electronic collection - Collect, process, and analyze infrared, radar, and photographic imagery - Support deception operations to deceive and deny critical combat information to enemy forces - Provide direction finding, interception, and jamming of communications emitters	EH-1, EH-60, RV/OV-1, RU-21, and RC-12
Special Operations Aviation SOA aircraft perform a variety of missions to support special operations forces.	- Clandestinely penetrate denied enemy areas - Assault, resupply, insert, or extract SOF - Conduct aerial security, reconnaissance, surveillance, and electronic warfare support of special operations missions - Provide airborne command, control, and communications enhancement - Support coordinated and synchronized joint, combined, or host-nation special operations - Perform aircraft strategic self-deployment operations - Perform limited aeromedical evacuation - Perform search and rescue operations - Conduct aerial mine delivery operations - Perform general aviation support missions, as necessary	MH-6, AH-6, MH-60K, and MH-47E

*Source: FM 1-100, Doctrinal Principles for Army Aviation in Combat Operations, February 1989

Table F-2. Sample OPORD

UNCLASSIFIED

OPORD 07-91

REFERENCES: Map Sheet 2317 II

TIME ZONE USED THROUGHOUT ORDER: Local

TASK ORGANIZATION:

TF A/7-101
A/7-101
TM/PFDR

1. SITUATION

a. Enemy Situation:

(1) Terrain: The area of operations is vegetated/desert with rolling hills. Valleys run generally north-south.

(2) Weather: Sunrise 0600, Sunset 2000
Moonrise 2130, Moonset 0445
Percent illumination 30
Temperature +24
Pressure altitude max +500
Winds 240/10
Low ceilings (1000') and decreasing visibility (1.5 miles) throughout the day

(3) Forces: Inf/Ar Bde vic VK 9483 augmented with ADA, FA, and air support.

b. Friendly Situation:

(1) 3rd Inf Bde vic WK 15 65 will conduct a daylight attack to secure the high ground at Objectives Alpha, Vic VK 98 80 and Bravo, Vic 87 77.

2. MISSION: Conduct air assault from PZ CALVIN (WK064 554) with TF 2-505 to destroy Class V storage site Vic VK 87 78 (Objective Charlie) and return to PZ HOBBS (VK 904 544). On order, pick up ammunition (M102 A22 Bag) at PZ HOBBS, deliver to C 1/76 FA at LZ JON (WK 006 676), and return to CALVIN. Be prepared to conduct additional resupply missions from CALVIN.

Table F-2. Sample OPORD (Cont.)

3. EXECUTION:

- a. Concept of the operation: This is a priority mission. The first mission is a five aircraft air assault to destroy an ammunition storage site in conjunction with 3rd Brigade's main attack. TF 2-505 must be in place prior to the main attack. Timing is crucial for this operation. Except for the required radio call at RP1, the air assault mission will be conducted under radio silence. The second mission is a resupply mission for an artillery battery so they can continue to support the attack. Flight corridors will be used for both missions.
- b. Techniques of Movement:
 - (1) Air Assault: From CALVIN to SP1 (LUCY), WK 065 585; Via Corridor 1 to ACP1, WK 035 687; ACP2, WK 029 745; ACP3, WK 010 790; RP1 (LINUS), VK 920 790. See overlay.
 - (2) Resupply: From HOBBS east northeast via corridor 3 to the high ground in grid square 02 59, then north to the Jagst river, then northwest along the river to JON. See overlay.
- c. Fires: C 1/76/M102, Priority of fires (1) 2-505 (2) 3rd Bde
- d. Coordinating Instructions:
 - (1) Assembly area is SUSIE
 - (2) Penetrate FLOT vic ACP2
 - (3) Friendly ADA status/IFF is Tight/Off 1 km prior to FLOT
 - (4) Actions on enemy contact will be reported immediately

4. SERVICE SUPPORT:

- a. Class III, FARP locations at CALVIN, HOBBS
- b. Class V, AA SUSIE and FARP locations at CALVIN, HOBBS

Table F-2. Sample OPOD (Cont.)

5. COMMAND AND SIGNAL:

a. Command

(1) AATF Cdr location - CALVIN

b. Signal

(1) CEOI in effect

(2) Callsigns:

TF 7/101 Avn TOC - P41

2-505 AATF TOC - Y35

C1-76 FA - S21

Team Pathfinder (CALVIN) - C44

Team Pathfinder (HOBBS) - H44

6. SAFETY:

- a. Safety is the primary and overriding consideration.
- b. Reactions to all in-flight and ground emergencies will be IAW unit SOP, aircraft operator's manual, commander's pre-accident plan, and the judgment of the PC.
- c. All crewmembers will be pre-briefed by the PC.

OFFICIAL:

SHEEHAN

CW4, Operations Officer

5. Scenario Materials

Instructors should instill a sense of unit mission and mission planning realism to aircrew coordination training by providing the scenario-based materials shown in Table F-3.

Table F-3. Scenario Materials

Scenario Item	Student	Instructor	Simulator Operator
OPORD and/or Air Mission Briefing ¹	X	X	X
Scenario Outline		X	X
Scenario Segment Info		X	X
Tactical Map	X	X	X
Approach Plate	X	X	X
Grade Slip		X	
Note:			
1 Provide an instructor operator script for simulator scenarios			

6. Audio-Visual Support

- Video and/or audio playback and review of aircrew actions has proven to be a powerful training technique. It is possible to record the aircrew during all phases of a mission (i.e., premission planning and rehearsal, mission execution in the simulator or aircraft, and crew-level after-action review).
- The types of audio-visual equipment available to aircrew coordination training instructors will determine the extent to which this training opportunity is realized.
- The equipment listed in Table F-4 is representative of what is needed to fully support aircrew coordination training conducted by units in the field. Although all of this equipment may not be available at installation audio-visual support centers, the use of even suboptimal equipment configurations will be worth the effort.

Table F-4. Audio-Visual Support

Audio-Visual Equipment, (Quantity), & Approximate cost	Pre-mission Planning	Mission Execution	After- action Review
Video camera w/tripod (1) \$900	X		X
Compact video camera (1-3) \$1,800 each		X ¹	
Video recorder player (1) \$400	X ²	X ²	X ²
Monitor (1) \$200	X ²	X ²	X ²
Audio recorder (1) \$100	X ³	X ³	X ³
Notes: 1 Cockpit location may create air worthiness considerations. Requires a multiplexer (screen splitter) to monitor multiple cameras simultaneously. 2 Required to "live action" record and monitor aircrews. 3 Alternative to video camera, VCR, and monitor.			

7. Sample Scenarios

- a. The sample air assault and air movement scenario provides examples of completed scenario materials for instructors.
- b. Trainers can use this scenario as the end-of-course evaluation ride for instructors.
- c. The scenario, as written, is sufficiently generic for utility and cargo helicopters and, with minor modifications, it can accommodate other platforms.

Sample Scenario Outline
Mission: Air Assault & Air Movement

Segment	Performance Measures	ATM Tasks
1. Prepermission Planning	Mission Planning & Rehearsal Mission briefing/brief-back	2078-Terrain flt msn plan 1004-PPC 1000-Mission brief
2. AA to PZ	Material malfunction (major)	1007-Start/run-up 1016-Hover pwr ck 1018-VMC takeoff 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1068-Emergency 1095-Operate ASE 2008-Evasive maneuvers 1028-VMC approach
3. PZ to LZ to PZ	Navigation (corridors) Time to fly segment Time of arrival Threat avoidance & evasion Material malfunction (minor)	1016-Hover pwr ck 1018-VMC takeoff 2009-Multi-aircraft opns 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1095-Operate ASE 2008-Evasive maneuvers 1028-VMC approach
4. PZ to LZ to PZ	Navigation (corridors) Time to fly segment Threat avoidance & evasion	2016-External load opns 1016-Hover pwr ck 1018-VMC takeoff 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1095-Operate ASE 2008-Evasive maneuvers 1028-VMC approach

Sample Scenario Outline (Cont.)
Mission: Air Assault & Air Movement

Segment	Performance Measures	ATM Tasks
5. PZ to AA	Inadvertant IMC Instrument recovery	1018-VMC takeoff 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1095-Operate ASE 2008-Evasive maneuvers 1083-VHIRP 1076-Radio nav 1081-Non-precision appr

UH-60 Scenario - Segment Information

SEGMENT 1: Prepermission planning

DESCRIPTION: The prepermission planning segment begins when the crew receives the mission briefing and includes all preparatory tasks associated with planning the tactical mission. These tasks include terrain flight mission planning, performance planning, assigning crewmember responsibilities, and all required briefings and brief-backs. The segment ends when the crew completes all required briefings and prepares to enter the simulator.

SEGMENT 2: Movement from the assembly area (AA) to the initial pick-up zone (PZ)

DESCRIPTION: The segment begins when the crew enters the simulator and verifies that initial start and run-up procedures are complete. During this segment, the crew repositions the aircraft from the AA to the initial PZ in preparation for an air movement mission. The segment includes an emergency caused by an aircraft system malfunction which should result in a precautionary landing in the PZ. The segment ends when the crew completes the precautionary landing.

SEGMENT 3: Cross-FLOT air assault mission

DESCRIPTION: The segment begins when the troops have been loaded on the aircraft. It involves moving troops along a prescribed route in a medium-to-high threat environment, delivering them to the LZ, and then returning to the PZ. The crew will act as flight lead for a flight of 5 UH-60 helicopters with no changes in lead or formation. The crew must accurately navigate within prescribed corridors while avoiding and evading threat to deliver the troops to the correct location at the correct time. The segment includes a minor malfunction which will be removed as soon as the crew detects and *verbally recognizes* the malfunction. The segment ends when the crew returns to the PZ.

SEGMENT 4: External load air movement mission

DESCRIPTION: The segment begins when the crew takes off to pick up the external load. It involves moving an external load along a prescribed route in a medium-to-high threat environment to resupply a friendly unit located near the forward line of troops (FLOT). The crew must accurately navigate within prescribed corridors while avoiding and evading threat to deliver the external load to the correct location. The crew then returns to the PZ in preparation for a follow-on mission. The segment ends when the aircraft returns to the PZ.

SEGMENT 5: Movement from the PZ to the assembly area

DESCRIPTION: The segment begins when the aircraft departs the PZ enroute back to the AA. During the flight, the crew encounters an inadvertent entry into instrument meteorological conditions (IMC). The crew must then plan and execute a nonprecision instrument approach to transition back to visual meteorological conditions (VMC). The segment ends when the crew completes a safe landing.

Sample Scenario Air Mission Briefing

Roll Call _____

Time Zone Used: Local

Time Hack: 1630

OPORD References:

Map Sheet 2317 II

Task Organization

TF 7/101:

- a. A/7-101
- b. TM/PFDR

1. SITUATION

a. Enemy Forces

(1) Weather

Ceiling: 1000	Vis: 1.5 miles	Winds: 240/10	Max Temp: +24	Max PA: +500
Max DA: +1000	EENT: 2030	BMNT: 0530	DEW PT: +20	Spread: 4
SR: 0600	SS: 2000	MR: 2130	MS: 0445	% Illum: 30

Weather Warnings/Advisories: Low ceilings and decreasing visibility throughout the day

NOTAMS: VOR, ILS, and PAR out of service at Harris Airfield

- (2) Inf/Ar forces: BDE Vic VK 94 83
- (3) Artillery forces: Unk
- (4) ADA forces: Vic VK 96 75; Vic VK 98 75; Vic VK 86 77; Vic VK 88 67
- (5) Air Support: Unk

Sample Scenario
Air Mission Briefing (Cont.)

b. Friendly Forces

(1) 3rd Inf Bde	Vic WK 15 65 will conduct a daylight attack to secure the high ground at Objectives Alpha, Vic VK 98 80 and Bravo, Vic 87 77.
(2) TF 2-505	Vic WK 06 55
(3) Atk/Cav	2/101 ATK supports cross FLOT air assault

c. Attachments and Detachments Team Alpha Pathfinders

2. MISSION

- a. Conduct air assault from PZ CALVIN (WK 064 554) with TF 2-505 to destroy Class V storage site Vic VK 87 78 (Objective Charlie) and return to PZ HOBBS (VK 904 544).
- b. On order, pick up ammunition (M102 howitzer and A22 Bag) at PZ HOBBS, deliver to C 1/76 FA at LZ JON (WK 006 676), and return to CALVIN. Be prepared to conduct additional resupply missions from CALVIN.

3. EXECUTION

- a. Concept of the operation: This is a priority mission. The first mission is a five aircraft air assault to destroy an ammunition storage site in conjunction with 3rd Brigade's main attack. TF 2-505 must be in place prior to the main attack. Timing is crucial for this operation. Except for the required radio call at RP1, the air assault mission will be conducted under radio silence. The second mission is a resupply mission for an artillery battery so they can continue to support the attack. Flight corridors will be used for both missions.

b. Maneuver

(1) # aircraft by type/unit:	5 UH-60A/A 7/101
(2) Routes/corridors:	See overlay
(3) Objective:	CHARLIE Vic VK 87 78
(4) Times:	TBA
(5) Phasing:	NA

Sample Scenario Air Mission Briefing (Cont.)

c. Fires

- (1) FA unit/type: C 1/76/M102
- Priority of fires: 1. 2-505 2. 3rd Bde
- SEAD information: NA
- (2) Close air support: NA
- ATK/CAV: 2/101 ATK preps LZ 1 minute prior
- Battle positions: NA

QUESTIONS

d. Sub-unit instructions

(1) Crews, duties, freqs, call signs:

<u>Call signs</u>	<u>PC</u>	<u>PI</u>	<u>Aircraft</u>	<u>Duties</u>
M21	Ownship	Ownship	749	Lead/SOP
M22	TBA	TBA	811	Chalk #2/SOP
M23	TBA	TBA	212	Chalk #3/SOP
M24	TBA	TBA	694	Chalk #4/SOP
M25	TBA	TBA	580	Trail/SOP

Internal frequencies: FM1--32.25
VHF--122.7
UHF--242.6

(2) Commo/line-up/take-off times: TBA

e. Staging Plan

(1) PZ location:

<u>SUSIE</u>	<u>CALVIN</u>	<u>HOBBES</u>
WK 155 525	WK 064 554	VK 904 544

(2) PZ times:

NA	TBA	TBA

(3) Route to PZ:

NA (starting point)	Direct from SUSIE	See overlay

Sample Scenario
Air Mission Briefing (Cont.)

(4) PZ markings/control:	None	Inverted Y/ contact C44 3 KMs out	Inverted Y/ contact H44 at RP2
(5) Formation/direction:	NA	NA/270°	Trail/240°
(6) ATK/CAV coord:		NA	
(7) ACL/Cargo/Weight			
Air assault:		11/pax/2640	
Resupply mission:		NA/M102 and A22 bag/5360	
(8) Sling load procedures:		SOP	
(9) Light signals (beacon):		SOP	
(10) Spare aircraft procedures:		SOP	
(11) Special msn equip:		SOP	
f. Air Movement Plan			
(1) Routes			
(a) Air Assault:		SP1 (LUCY), WK 065 585; via corridor #1 to ACP1, WK 035 687; ACP2, WK 029 745; ACP3, WK 010 790; RP1 (LINUS), VK 920 790. See overlay.	
(b) Resupply:		From HOBBS via corridor #3 to the high ground at WK 02 59, then north to the Jagst river, then northwest along the river to JON. See overlay.	
(2) Penetration points:		Cross FLOT vic ACP2.	
(3) Enroute formation/rotor separation/angle:		Free cruise/2-3/30°-45°	
(4) Enroute airspeed:		As required to meet LZ time	
RP inbound:		60 KIAS	
(5) Deception measures:		NA	

Sample Scenario Air Mission Briefing (Cont.)

(6) ATK/CAV mission:	2/101 ATK joins flight after ACP1
(7) Abort criteria:	Three aircraft
(8) Air movement table:	NA
(9) Threat break-up procedures:	SOP
(10) Door guns:	Out at FLOT
(11) Cargo doors:	Open
(12) External lighting:	SOP
(13) Crew chief position:	SOP
(14) Lead change procedures:	SOP
(15) Formation exit procedures:	SOP
(16) Lost contact/in-flight join-up:	SOP
(17) Downed aircraft:	SOP
(18) DAARP/SAR plan:	SOP
(19) SERE plan:	SOP
(20) SEAD plan:	NA

g. Landing Plan

(1) LZ locations:	<u>ION</u> (ext load) WK 006 676	<u>GARFIELD</u> (asslt-pri) VK 894 784	<u>ODIE</u> (asslt-alt) VK 905 773
(2) LZ times:	NA	TBA	TBA
(3) Formation/Direction:	NA/270°	Trail/240°	Trail/240°
(4) LZ markings/control:	None/contact S21 3 KM's out	None/contact Y35 prior to RP1	None/contact Y35 prior to RP1

Sample Scenario Air Mission Briefing (Cont.)

-
- (5) ATK/CAV mission: 2/101 ATK preps LZ 1 minute prior
- (6) Go arounds: SOP
- (7) Takeoff in chalk order when ready; Trail calls formation
- h. Laager Plan: NA
- i. Extraction Plan: NA
- j. Return Air Movement Plan
- (1) Routes
- (a) Air Assault: SP2 (BEETLE), VK 880 750; via corridor #2 to ACP4, VK 873 656; RP2 (SARGE), VK 905 588. See overlay.
- (b) Resupply: From JON southeast via corridor #4 along the Jagst river to CALVIN. See overlay.
- (2) Penetration points: Cross FLOT vic ACP4
- (3) Formation/airspeed: Free cruise/80 KIAS
- (4) ATK/CAV: NA
- (5) LZ locations:
- | | |
|--------------|---------------|
| <u>HOBBS</u> | <u>CALVIN</u> |
|--------------|---------------|
- (6) Formation/direction:
- | | |
|------------|---------|
| Trail/240° | NA/270° |
|------------|---------|
- (7) LZ markings/control:
- | | |
|----------------------------------|-------------------------------------|
| Inverted Y/contact
H44 at RP2 | Inverted Y/contact
C44 3 KMs out |
|----------------------------------|-------------------------------------|
- k. Coordinating Instructions:
- (1) MOPP level/NBC warning status: NA
- (2) Friendly ADA status/IFF: Tight/Off 1 KM prior to FLOT
- (3) Weapon control status: NA
- (4) AD warning status: NA

**Sample Scenario
Air Mission Briefing (Cont.)**

- (5) M60D control status: Free
- (6) Lost commo: SOP
- (7) NVG specific procedures: NA
- (8) VHIRP/IIMC procedures:
 - (a) Base altitude: 2500'
 - (b) Heading: Turn to 090°
 - (c) Airfield: Harris
 - (d) Frequency: 125.4 VHF/391.9 UHF
- (9) Weather decision time/location: 1800/SUSIE
- (10) Debrief location/time: SUSIE/SOP

****QUESTIONS****

4. SERVICE SUPPORT

- a. Class I: Coke and candy machine
- b. Class III:
 - (1) FARP location/marking/diagram: CALVIN & HOBBS
 - (2) FARP frequency/call sign: 37.50/C44 & H44
 - (3) FARP procedures: SOP
- c. Class V: Pick-up 38 cal and bayonets at SUSIE

5. COMMAND AND SIGNAL

- a. Command
 - (1) AATF Cdr's location: CALVIN
 - (2) Avn TF AMC: Chalk #3
 - (3) Internal chain of command: Chalk #3, #1, Trail

Sample Scenario
Air Mission Briefing (Cont.)

b. Signal

(1) Additional call signs and frequencies:

<u>UNIT</u>	<u>FREQ</u>	<u>CALL SIGN</u>
TF 7/101 Avn TOC (SUSIE)	40.40	P41
2-505 AATF TOC (CALVIN)	30.30	Y35
C 1/76 FA (JON)	35.70	S21
Team Pathfinder (CALVIN)	37.50	C44
Team Pathfinder (HOBBS)	37.50	H44

(2) Code Words: SOP

(3) Challenge/Password: Chicken/Lips

MISSION BRIEF BACK

FINAL QUESTIONS

Sample Scenario Instructor Operator Script

1. Crew begins mission from assembly area SUSIE (WK 1550 5250). The simulator should be operating (aircraft running) and all checklist items completed through the Engine Runup check.
2. After taxi, hover, and before takeoff checks have been completed, crew (M21) should call P41 (TF 7-101 Avn TOC) on FM 40.40 departing for PZ CALVIN. P41 should acknowledge this transmission. (Briefing officer will have provided the crew with a time to be at CALVIN)
3. M21 should call C44 (Pathfinders at CALVIN) on FM 37.50 approximately 3 kilometers out for landing instructions. C44 should indicate that the PZ is clear and landing should be made to the west at pilot's discretion, and direct M21 to contact Y35 (2-505 AATF TOC) on FM 30.30 for a mission update after landing.
4. After completing the radio transmission between M21 and C44, initiate the major malfunction (decreasing % RPM R). If M21 fails to call, initiate the malfunction approximately 3 kilometers out from CALVIN.
5. After aircraft has landed, restore all aircraft systems to normal and administratively inform the crew. If required, have crew complete the flight into CALVIN.
6. M21 should call Y35 on FM 30.30. Y35 should inform M21 that the air assault mission is still "as briefed" and will depart CALVIN in 8 minutes Y35 should tell M21 to reposition to the field north of the FARP for formation line-up and provide the following additional information:
 - Current local time
 - Hard LZ time (= current local time + 23 minutes)
 - M21 must call Y35 at the RP (LINUS) for LZ instructions
 - The other four aircraft are inbound to CALVIN and should be on the ground in 3 minutes
 - Line-up and departure heading should be to the north
7. When M21 is in position for formation line-up, I/O, acting as crew chief, will assist with loading of troops and let the crew know when the other aircraft have joined-up.
8. When M21 initiates commo checks, I/O answers in chalk order sequence for all other aircraft in the flight (M22-M25).
9. Once flight is formed on the ground, trail (M25) calls M21 with "Beacon".
10. M21 should call C44 for departure. C44 should indicate that the winds are 240/10 and clear M21 for takeoff to the north at pilot's discretion.
11. M21 should call Y35 just prior to RP1 (LINUS) for LZ instructions. Y35 informs M21 to land at ODIE (alt LZ).

Sample Scenario
Instructor Operator Script (Cont.)

12. As the aircraft departs ODIE, initiate a slow fuel leak in one fuel cell by decreasing fuel quantity approximately 50-100 lbs every 30 seconds. As the malfunction is initiated, transmit "*Sir, I think we just took small arms fire from behind us*" over intercom to let the data collectors know it has been started. As soon as the crew detects the slow leak, stop decreasing the fuel quantity. If the crew has not detected the leak after there is a 500 lb imbalance between fuel cells, stop decreasing the fuel.
13. M21 should call H44 (Pathfinders at HOBBS) on FM 37.50 at RP2 (SARGE) for landing instructions. H44 should indicate that the winds are 240/10 and landing should be made to the southwest at pilot's discretion.
14. On final approach to HOBBS, position external load #67 (M102 howitzer with A22 bag) in the PZ.
15. Once in HOBBS, H44 should position M21 in preparation for the external load mission. If M21 requests fuel, H44 directs M21 to the FARP. Crew chief will assist with refueling and let the crew know when they are ready for the external load mission. Departing the FARP, crew chief takes over and directs aircraft over the load, completes hook-up, and prepares aircraft for takeoff.
16. M21 should call H44 for departure. H44 should clear M21 for takeoff to the northeast at pilot's discretion.
17. Place howitzer on the ground in LZ JON.
18. M21 should call S21 (C 1/76 FA) on FM 35.70 approximately 3 kilometers out of JON for landing instructions. S21 should indicate that the landing direction is generally to the west and instruct M21 to drop the load north of the howitzer on the ground. Crew chief should assist in positioning aircraft and dropping load in JON.
19. If M21 calls S21 departing JON, S21 should acknowledge the call.
20. Vicinity the high ground in grid WK 04 62, decrease visibility until the crew enters inadvertent IMC.
21. Just prior to entry into IMC, turn off the threat.

Sample Scenario

Instructor Operator Script (Cont.)

22. M21 should call Tactical approach control on VHF 125.4 or UHF 391.9 to indicate they are inadvertent IMC. Tactical approach directs a turn for radar identification. After positive identification:

- issue an appropriate heading to the Ryann LOM
- tell the crew to maintain 3000 feet
- provide advance approach information at Harris AAF:
winds 240/10
Runway 20 in use
M800 OVC , 1 mile visibility
altimeter 2993
- advise the crew to expect the NDB 20 approach.

[NOTE: The aircraft should be positioned and/or directed so it takes approximately 5 minutes to reach the Ryann LOM]

23. After verifying that M21 is receiving the Ryann LOM suitable for navigation:

- clear M21 direct to the Ryann LOM
- issue a clearance for the NDB 20 approach
- terminate radar coverage
- direct M21 to report crossing the Ryann LOM outbound.

24. M21 should call tactical approach at Ryann LOM outbound. Tactical approach directs M21 to contact Harris tower at Ryann LOM inbound.

25. M21 should call Harris tower at Ryann LOM inbound. Tower should inform M21 that the winds are 240/10 and they are cleared to land.

26. After M21 lands at Harris, the mission is terminated.

NOTES:

1. If M21 become misoriented during any segment of the tactical flight and transmits "STUMBLE", I/O will act as chalk #2 (M22) and transmit approximate location (grid square).
 2. If M21 makes an obvious wrong turn or deviates off course, I/O will not issue any corrective instructions (i.e., "check nav left/right").
 3. M21 gets one chance at the NDB 20 approach. If they do not break out or miss the approach for any reason, the I/O will terminate the mission.
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