

**TRAINING PROGRAM FOR  
NIGHT VISION GOGGLE DRIVING  
OPERATIONS**

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

**HEADQUARTERS, DEPARTMENT OF THE ARMY**

Training Circular  
No. 21-305-2

Headquarters  
Department of the Army  
Washington, DC, 4 September 1998

## TRAINING PROGRAM FOR NIGHT VISION GOGGLE DRIVING OPERATIONS

### TABLE OF CONTENTS

	<b>Page</b>
<b>PREFACE</b> .....	iii
<b>CHAPTER 1 RISK MANAGEMENT</b> .....	1-1
1-1. GENERAL .....	1-1
1-2. BACKGROUND .....	1-1
1-3. DEFINITIONS .....	1-1
1-4. RISK MANAGEMENT PROCESS .....	1-2
1-5. RISK ASSESSMENT ELEMENTS .....	1-3
1-6. DECISION AID .....	1-7
1-7. RISK CONTROL ALTERNATIVES .....	1-7
1-8. SUPERVISION .....	1-7
1-9. PAYOFFS .....	1-7
SAMPLE RISK ASSESSMENT WORKSHEET FOR DRIVER TRAINING .....	1-8
<b>CHAPTER 2 INSTRUCTIONAL AIDS</b> .....	2-1
2-1. STUDENT REQUIREMENTS .....	2-1
2-2. INSTRUCTOR REQUIREMENTS .....	2-1
2-3. TRAINING FACILITIES .....	2-1
2-4. TRAINING AIDS AND DEVICES .....	2-1
<b>CHAPTER 3 SAMPLE TRAINING SCHEDULE</b> .....	3-1
<b>CHAPTER 4 INSTRUCTIONAL MATERIAL</b> .....	4-1
PRINCIPLES OF NIGHT VISION .....	4-1
NVG GENERAL CHARACTERISTICS .....	4-7
AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I) .....	4-12
AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II) .....	4-16
NVG DRIVING TECHNIQUES AND PROCEDURES .....	4-19
DRIVING WITH NIGHT VISION GOGGLES, PHASE I .....	4-29
DRIVING WITH NIGHT VISION GOGGLES, PHASE II .....	4-32
DRIVING WITH NIGHT VISION GOGGLES, PHASE III .....	4-35

**DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.**

\*This publication supersedes TC 21-305-2, 14 November 1990.

<b>CHAPTER 5</b>	<b>TESTING MATERIALS</b> .....	5-1
	TESTING MATERIALS INDEX.....	5-1
	PRINCIPLES OF NIGHT VISION .....	5-4
	NVG GENERAL CHARACTERISTICS.....	5-8
	AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I).....	5-13
	AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II).....	5-17
	NVG DRIVING TECHNIQUES AND PROCEDURES .....	5-21
	END-OF-COURSE COMPREHENSIVE TEST .....	5-26
	INTERMEDIATE TRAINING OBJECTIVE 1, WRITTEN EXAM ADMINISTRATION.....	5-30
	INTERMEDIATE TRAINING OBJECTIVE 1, WRITTEN EXAMINATION (VERSION I) .....	5-32
	INTERMEDIATE TRAINING OBJECTIVE 1, WRITTEN EXAMINATION (VERSION II).....	5-36
	INTERMEDIATE TRAINING OBJECTIVE 2, DRIVER’S PERFORMANCE TEST (ROAD TEST) INSTRUCTIONS .....	5-41
<b>CHAPTER 6</b>	<b>STUDENT ADVANCE SHEETS</b> .....	6-1
	PRINCIPLES OF NIGHT VISION .....	6-2
	NVG GENERAL CHARACTERISTICS.....	6-3
	AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I).....	6-4
	AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II).....	6-5
	NVG DRIVING TECHNIQUES AND PROCEDURES .....	6-6
	DRIVING WITH NIGHT VISION GOGGLES, PHASE I.....	6-7
	DRIVING WITH NIGHT VISION GOGGLES, PHASE II.....	6-8
	DRIVING WITH NIGHT VISION GOGGLES, PHASE III .....	6-9
<b>APPENDIX A</b>	<b>PAPER COPIES OF VIEWGRAPHS</b> .....	A-1
<b>APPENDIX B</b>	<b>EYE CHARTS</b> .....	B-1
<b>APPENDIX C</b>	<b>RANGE AND SPEED LIMITATION GRAPHS</b> .....	C-1
<b>APPENDIX D</b>	<b>TRAINING MISSION PLANNING AND BRIEFINGS</b> .....	D-1
<b>APPENDIX E</b>	<b>SUPPORT REQUIREMENTS</b> .....	E-1
<b>APPENDIX F</b>	<b>NVG TEST HISTORY FORM</b> .....	F-1
<b>APPENDIX G</b>	<b>NVG ROAD TEST SCORE SHEET</b> .....	G-1
<b>GLOSSARY</b> .....	Glossary-1	
<b>REFERENCES</b> .....	References-1	
<b>INDEX</b> .....	Index-1	
<b>AUTHORIZATION</b>		

## PREFACE

This training circular is a guide for commanders and leaders directly responsible for NVG training. It outlines a standardized method of safely training licensed wheeled vehicle operators to drive while wearing either the AN/PVS-5 series or the AN/PVS-7 series NVG.

NVG instructors should thoroughly review this training circular before presenting the instruction. They must know the training standards and mandatory requirements in AR 600-55. They must also know the NVG driving techniques and procedures described in FM 21-305.

The training circular consists of materials addressing three modules of instruction. Chapter 1 defines, describes, and explains risk management as it applies to night vision goggle driving operations. Chapter 4 contains four sections, which provide academic training on night vision, NVGs, and driving techniques. Quizzes, found in Chapter 5, bearing similar titles to the academic sections in the second module are to be used at the end of the respective lessons, to provide instructors and students with a “check-on-learning.” Students must pass the end-of-course comprehensive test (written examination) to enter the next module. Students will receive instruction in actual driving with NVGs in the last four sections of Chapter 4. They must then pass a driver’s performance test (road test).

A sample training schedule is furnished in Chapter 3 as a guide for commanders. This schedule is generic and applies to any Army unit. As such, units must design their own training schedule based on, but not limited to, their own unique training mission requirements, such as indicated below.

- FTXs and ARTEPs.
- Quantities of NVGs available for training availability of training areas.
- The number of soldiers to receive training as well as the number of instructors available to provide training, that is, using an effective student-to-instructor ratio.

The training objective must be to TRAIN TO STANDARDS—NOT TO HOURS.

Students successfully completing the written and performance test will meet the qualification and refresher-training requirements contained in Chapter 8, AR 600-55.

As a rule, the training and examination of drivers should not be decentralized below battalion level. When this training is conducted at battalion level, the best-qualified instructors and assistant instructors are used to the most effective and efficient levels possible. Additionally, units collocated with aviation organizations should draw from the latter’s experience and knowledge of NVGs capabilities and limitations, seeking these units’ assistance in initially establishing a “train-the-trainer” program.

This training circular replaces TC 21-305-2, *Night Vision Goggles, Training Program for Night Vision Goggle Driving Operations*, 14 November 1990.

The proponent for this publication is the US Army Transportation School. Recommended changes to improve this TC are to be submitted on DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) to the Assistant Commandant, US Army Transportation School, ATTN: ATSP-TDI-DX, Fort Eustis, Virginia 23604-5389.

Unless stated otherwise, masculine nouns and pronouns, used in this publication, do not refer exclusively to men.

## CHAPTER 1

### RISK MANAGEMENT

**1-1. GENERAL.** This chapter explains risk management as it applies to night vision goggle driving operations. For more detailed guidance, refer to FM 101-5, Appendix J.

**1-2. BACKGROUND.** Ground vehicle accidents cost the Army millions of dollars each year and significantly reduce mission capabilities. Leaders must develop techniques that will save resources. Because the Army must be prepared to operate worldwide, the training mission has become increasingly demanding and so have the risks inherent in that mission. This increase in risk requires leaders to balance mission needs with hazards involved and make wise risk decisions.

**1-3. DEFINITIONS.** Risk is the possibility of a loss combined with the probability of an occurrence. The loss can be death, injury, property damage, or mission failure. Risk management identifies risks associated with a particular operation and weighs these risks against the overall training value to be gained.

a. **Risk Management.** Risk management is the process of identifying and controlling hazards to protect the force. It is a step-by-step process that provides a framework for analyzing any mission or task. The following are the five steps of risk management:

(1) **Step 1 - Identify Hazards.** Identify hazards to the force. Consider all aspects of current and future situation, environment, and known historical problem areas.

(2) **Step 2 - Assess Hazards.** Assess hazards to determine risks. Assess the impact of each hazard in terms of potential loss and cost based on probability and severity.

(3) **Step 3 - Develop Controls and Make Risk Decision.** Develop control measures that eliminate the hazards or reduce its risk. As control measures are developed, risks are reevaluated until all risks are reduced to a level where benefits outweigh potential cost.

(4) **Step 4 - Implement Controls.** Put controls in place that eliminates the hazards or reduce their risk.

(5) **Step 5 - Supervise and Evaluate.** Enforce standards and controls. Evaluate the effectiveness of control and adjust/update as necessary.

b. **Hazard.** Any real or potential condition that can cause injury, illness, or death of personnel; or damage to or loss of equipment or property.

c. **Risk.** Chance of hazard or bad consequences; exposure to chance of injury or loss. Risk level is expressed in terms of hazard probability and severity.

d. **Exposure.** The frequency and length of time subjected to a hazard.

e. **Probability.** The likelihood that an event will occur.

f. **Severity.** The expected consequence of an event in terms of degree of injury, property damage, or other mission impairing factors (loss of combat power, adverse publicity, and so forth) that could occur.

g. **Controls.** Actions taken to eliminate hazards or reduce their risk.

h. **Risk Assessment.** The identification and assessment of hazards (first two steps of risk management process).

i. **Residual Risk.** The level of risk remaining after controls have been identified and selected for hazards that may result in loss of combat power. Controls are identified and selected until residual risk is at an acceptable level or until it cannot be practically reduced further.

j. **Risk Decision.** The decision to accept or not accept the risk(s) associated with an action.

**1-4. RISK MANAGEMENT PROCESS.** The risk management process uses the following approach:

a. **Identify Hazards.** Look for hazards in each phase of the training or operation.

b. **Assess the Risk.** In assessing risk, ask these questions:

- What type of injury or equipment damage can be expected?
- What is the probability of an accident happening?

NOTE: A low probability of an accident and an expected minor injury equals low risk. A high probability of an accident and an expected fatality equals extremely high risk.

c. **Develop Risk Control Alternatives and Make Risk Decisions.** If you cannot eliminate the risk, then you must control it without sacrificing essential mission requirements. You can control some risks by modifying tasks, changing location, increasing supervision, wearing protective clothing, changing time of operation, and so on. Decisions take several forms:

- Selecting from available controls.
- Modifying the mission because risk is too great.
- Accepting risk because mission benefits outweigh potential loss.

d. **Implement Risk Control Measures.** You must integrate procedures to control risks into plans, orders, SOPs, and training. You must also ensure risk reduction measures are used during actual operations.

e. **Supervise the Operations.** Make sure leaders know what controls are in place, what standards are expected, and then hold those in charge accountable for implementation. This is the point when accident prevention actually happens.

**1-5. RISK ASSESSMENT ELEMENTS.** There are no hard and fast rules for assessing risk. Different training tasks involve different elements that can affect training safety. However, the following seven elements are central to safely completing most driver training tasks when using NVDs:

- Soldier qualification.
- Vehicle type.
- Weather.
- Terrain.
- Supervision.
- Equipment.
- Illumination.

Using matrices that assign a risk level to each of the elements is one way to quickly appreciate the overall risks. The following matrices (Tables 1-1 through 1-7) are examples of risk assessments for seven elements common to driver training missions using NVDs.

NOTE: The factors are arbitrarily weighted. Modify them based on your particular mission and unit.

- Measure soldier qualification risk (Table 1-1) by comparing the level of task difficulty to the soldier's military driving experience using NVDs. Per AR 600-55, licensing for use of NVDs by drivers requires: licensing and currency on the vehicle in which the driver will receive NVD training, completing NVD academic and driving requirements, and successfully completing an NVD driver performance test.

**Table 1-1. Soldier qualification risk value**

<b>SOLDIER QUALIFICATION RISK VALUE</b>		
<b>TASK</b>	<b>DRIVING EXPERIENCE</b>	
	<b>LICENSED OVER 1 YEAR</b>	<b>LICENSED UNDER 1 YEAR</b>
<b>COMPLEX</b>	Moderate	High
<b>ROUTINE</b>	Low	Moderate
<b>SIMPLE</b>	Low	Low

EXAMPLE: A driver licensed on a FMTV for six months, driving off-road with NVDs is a high risk value.

- Measure vehicle type risk (Table 1-2) by comparing the vehicle configuration to the locations of the training tasks.

**Table 1-2. Vehicle type risk value**

<b>VEHICLE TYPE RISK VALUE</b>			
<b>LOCATION OF TRAINING</b>	<b>VEHICLE CONFIGURATION</b>		
	<b>SMALL TRUCKS</b>	<b>STRAIGHT TRUCKS</b>	<b>COMBINATION UNITS</b>
<b>CONVOY</b>	High	High	High
<b>DRIVING COURSE</b>	Low	Moderate	High
<b>MOTOR POOL</b>	Low	Low	Moderate

EXAMPLE: Driving a 5-ton cargo truck in convoy with NVDs would have a high risk value.

- Measure weather risk (Table 1-3) by comparing road conditions with visibility.

**Table 1-3. Weather risk value**

<b>WEATHER RISK VALUE</b>			
<b>ROAD CONDITIONS</b>	<b>VISIBILITY</b>		
	<b>CLEAR</b>	<b>REDUCED</b>	<b>MINIMUM</b>
<b>UNFAVORABLE</b>	Moderate	High	High
<b>ADEQUATE</b>	Low	Moderate	High
<b>FAVORABLE</b>	Low	Moderate	High

EXAMPLE: Driving off-road with NVDs during a heavy rain is a high risk value.



- Measure terrain risk (Table 1-4) by comparing the physical features of the land with the existing road network.

**Table 1-4. Terrain risk value**

<b>TERRAIN RISK VALUE</b>			
<b>TYPE OF TERRAIN</b>	<b>ROAD NETWORK</b>		
	<b>IMPROVED ROADS</b>	<b>SECONDARY ROADS</b>	<b>UNIMPROVED</b>
<b>MOUNTAIN</b>	Moderate	High	High
<b>DESERT/JUNGLE</b>	Low	Moderate	High
<b>FLAT/ROLLING</b>	Low	Low	Moderate

EXAMPLE: NVD training conducted at Fort Bragg, NC, over trails would have a moderate risk value.

- Measure Supervision risk (Table 1-5) by comparing the level of supervision for the task to the task location.

**Table 1-5. Supervision risk value**

<b>SUPERVISION RISK VALUE</b>			
<b>LEVEL OF SUPERVISION</b>	<b>TASK LOCATION</b>		
	<b>MOTOR POOL</b>	<b>TRAINING AREA</b>	<b>OFF ROAD</b>
<b>NOT OBSERVING</b>	High	High	High
<b>OBSERVING</b>	Low	Moderate	High
<b>IN VEHICLE</b>	Low	Low	Moderate

EXAMPLE: A student driving alone, but observed, in a training area would have a moderate risk value.

- Measure equipment risk (Table 1-6) by comparing the NVD to the time (months) since the last semiannual service.

**Table 1-6. Equipment risk value**

<b>EQUIPMENT RISK VALUE</b>			
<b>EQUIPMENT</b>	<b>TIME SINCE LAST SEMIANNUAL SERVICE</b>		
	<b>0 TO TWO MONTHS</b>	<b>+2 TO 4 MONTHS</b>	<b>+4 MONTHS</b>
AN/PVS-5 Series	Moderate	Moderate	High
AN/PVS-7 Series	Low	Moderate	High

EXAMPLE: An AN/PVS-5 serviced 3 months ago would have a moderate risk value.

- Measure illumination risk (Table 1-7) by comparing the light level to visibility.

**Table 1-7. Illumination risk value**

<b>ILLUMINATION RISK VALUE</b>			
<b>VISIBILITY</b>	<b>LIGHT LEVEL</b>		
	<b>FULL MOON</b>	<b>HALF MOON</b>	<b>NO MOON</b>
MINIMUM	High	High	High
REDUCED	Moderate	Moderate	High
CLEAR	Low	Low	Moderate

EXAMPLE: Driving in thick fog or dust with any light level would have a high risk value.

NOTE: Additional illumination sources, such as: flares, lights, lightening, and lasers, may adversely affect NVD performance. Additional matrices may be needed to assess the risk posed by these light sources, or other elements not considered in these seven matrices.

After assessing all the risks, the overall risk value can be no lower than the highest risk identified for any one element. A number of moderate risks may equate to a high overall risk. Now is the time to focus on high risk elements and develop controls to reduce risks to an acceptable level. Control examples may include conducting training in a different location or at a different time of day; putting an instructor in the vehicle with the student; waiting for better weather; using a different vehicle; and so on.

**1-6. DECISION AID.** The level of the decision maker should correspond to the level of the risk. The greater the risk, the more senior the final decision maker should be. The matrix shown in Table 1-8 is a proposed decision aid to help determine the leadership decision-making level.

**Table 1-8. Proposed decision aid**

DECISION AID	
RISK	DECISION LEVEL
LOW MODERATE HIGH	SENIOR INSTRUCTOR/NCO COMPANY COMMANDER BATTALION COMMANDER

- a. Moderate risk training warrants complete unit command involvement. For example, a moderate risk in the weather element category indicates the soldiers are more susceptible to cold injuries and require closer supervision or a rescheduling of training. If you cannot reduce the risk level, the company commander should decide to train or defer the mission.
- b. Operations with a high risk warrant battalion involvement. If you cannot reduce the risk level, the battalion commander should decide to train or defer the mission.

**1-7. RISK CONTROL ALTERNATIVES.** The following options can help control risk:

- Eliminate the hazard totally, if possible, or substitute a less hazardous alternative.
- Reduce the magnitude of the hazard by changing tasks, locations, times, and so forth.
- Modify operational procedures to reduce risk exposure consistent with mission needs.
- Train and motivate personnel to perform to standards to avoid hazards.

**1-8. SUPERVISION.** Leaders must monitor the training to ensure risk control measures are followed. You must also monitor the impact of risk reduction procedures when they are implemented to see that they really work. This is especially true of new, untested procedures.

**1-9. PAYOFFS.** Risk management lets you use realistic training scenarios thereby reducing personnel and equipment losses while training. Risk management is consistent with METT-T decision processes and can be used in battle to increase mission effectiveness.

**SAMPLE RISK ASSESSMENT WORKSHEET FOR DRIVER TRAINING**

TRAINING TASK: \_\_\_\_\_

OVERALL RISK LEVEL: \_\_\_\_\_

\_\_\_\_\_ 1. SOLDIER QUALIFICATION

<b>SOLDIER QUALIFICATION RISK VALUE</b>		
TASK	DRIVING EXPERIENCE	
	LICENSED OVER 1 YEAR	LICENSED UNDER 1 YEAR
COMPLEX	Moderate	High
ROUTINE	Low	Moderate
SIMPLE	Low	Low

\_\_\_\_\_ 2. VEHICLE TYPE

<b>VEHICLE TYPE RISK VALUE</b>			
LOCATION OF TRAINING	VEHICLE CONFIGURATION		
	SMALL TRUCKS	STRAIGHT TRUCKS	COMBINATION UNITS
CONVOY	High	High	High
DRIVING COURSE	Low	Moderate	High
MOTOR POOL	Low	Low	Moderate

\_\_\_\_\_ 3. WEATHER

<b>WEATHER RISK VALUE</b>			
ROAD CONDITIONS	VISIBILITY		
	CLEAR	REDUCED	MINIMUM
UNFAVORABLE	Moderate	High	High
ADEQUATE	Low	Moderate	High
FAVORABLE	Low	Moderate	High

\_\_\_\_\_ 4. TERRAIN

<b>TERRAIN RISK VALUE</b>			
TYPE OF TERRAIN	ROAD NETWORK		
	IMPROVED ROADS	SECONDARY ROADS	UNIMPROVED
MOUNTAIN	Moderate	High	High
DESERT/JUNGLE	Low	Moderate	High
FLAT/ROLLING	Low	Low	Moderate

\_\_\_\_\_ 5. SUPERVISION

<b>SUPERVISION RISK VALUE</b>			
LEVEL OF SUPERVISION	TASK LOCATION		
	MOTOR POOL	TRAINING AREA	OFF ROAD
NOT OBSERVING	High	High	High
OBSERVING	Low	Moderate	High
IN VEHICLE	Low	Low	Moderate

\_\_\_\_\_ 6. EQUIPMENT

<b>EQUIPMENT RISK VALUE</b>			
EQUIPMENT	TIME SINCE LAST SEMIANNUAL SERVICE		
	0 TO TWO MONTHS	+2 TO 4 MONTHS	+4 MONTHS
AN/PVS-5 Series	Moderate	Moderate	High
AN/PVS-7 Series	Low	Moderate	High

\_\_\_\_\_ 7. ILLUMINATION

ILLUMINATION RISK VALUE			
VISIBILITY	LIGHT LEVEL		
	FULL MOON	HALF MOON	NO MOON
MINIMUM	High	High	High
REDUCED	Moderate	Moderate	High
CLEAR	Low	Low	Moderate

\_\_\_\_\_ OVERALL RISK LEVEL

DECISION AID	
RISK	DECISION LEVEL
LOW MODERATE HIGH	SENIOR INSTRUCTOR/NCO COMPANY COMMANDER BATTALION COMMANDER

APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

Instructions for completion:

1. Enter training task in blank provided.
2. Identify and circle the risk for each element in its risk matrix, enter in blank preceding title for each element.
3. As required, add and use additional risk matrices.
4. Determine overall risk level, enter in overall risk level blanks at the beginning and end of element matrices.
5. Develop and implement risk controls, reassess risk.
6. Use the decision aid to determine the decision/approval level.
7. Training may be approved, deferred, or reassessed. Reassessment will develop and implement risk controls, reassess risk.

## CHAPTER 2

### INSTRUCTIONAL AIDS

#### 2-1. STUDENT REQUIREMENTS.

- a. **Vehicles Per Student.** Vehicle-to-student ratio is 1:2.
- b. **Publications Per Student.**
  - FM 21-305, Manual for the Wheeled Vehicle Driver.
  - TM 11-5855-238-10, Operators Manual, Night Vision Goggles, Ground Use AN/PVS-5 and AN/PVS-5A, AN/PVS-5C, AN/PVS-5D; Aviation Use GM-6 (V) 1 Goggles, GM-6 (V) 2 Goggles.
  - TM 11-5855-262-10-1, Operators Manual, Night Vision Goggles, AN/PVS-7A.
  - TM 11-5855-262-10-2, Operators Manual, Night Vision Goggles, AN/PVS-7B and AN/PVS-7D.

#### 2-2. INSTRUCTOR REQUIREMENTS.

- AR 600-55, The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing).
- FM 21-305, Manual for the Wheeled Vehicle Driver.
- TM 11-5855-238-10, Operators Manual, Night Vision Goggles, Ground Use AN/PVS-5 and AN/PVS-5A, AN/PVS-5C, AN/PVS-5D; Aviation Use GM-6(V)1 Goggles, GM-6(V)2 Goggles.
- TM 11-5855-262-10-1, Operators Manual, Night Vision Goggles, AN/PVS-7A.
- TM 11-5855-262-10-2, Operators Manual, Night Vision Goggles, AN/PVS-7B and AN/PVS-7D.
- All HN or local directives and regulations.

#### 2-3. TRAINING FACILITIES.

- Classroom.
- Motor pool.
- Training area(s).
- Suitable road network for driver training (primary, secondary, and off road).

#### 2-4. TRAINING AIDS AND DEVICES.

- Overhead projector.
- Projection screen.
- Transparencies (paper copies included with the instructional material).
- VHS video projector.
- Night vision goggles.\*
- Wheeled vehicles.\*
- NVG batteries.\*\*
- Field tables.\*\*
- Tentage.\*\*

- Lightsticks.\*\*
- Engineer tape.\*\*
- Directional markers.\*\*
- Video tape: Preparation and Use of the AN/PVS-7B Night Vision Goggle, PIN: 708929DA.\*\*\*
- Video tape: Preparation and Use of the AN/PVS-5 series Night Vision Goggle, PIN: 708983DA.\*\*\*

\* Based on availability, a 1:2 ratio is preferable (one per two students)

\*\* As necessary.

\*\*\* Units may order the video programs through their supporting TASC.



**CHAPTER 3**  
**SAMPLE TRAINING SCHEDULE**

<b><u>WHEN</u></b>	<b><u>WHAT</u></b>	<b><u>WHERE</u></b>	<b><u>TASK NUMBER</u></b>
<b>DAY 1 NVG ACADEMICS</b>			
0730-0800	Student Inprocessing	Classroom	
0800-0815	Purpose of Course, Objective, and Admin (Local) Policies of the Course	Classroom	
0815-0835	Overview of the Course	Classroom	
0835-0850	Overview of Academics	Classroom	
0850-0950	Principles of Night Vision	Classroom	721-500-01.5
0950-1020	Quiz and Review (PE3)	Classroom	721-500-01.5
1020-1025	Student Assignment for Day 2 and Release to Unit	Classroom	
<hr/>			
<b>DAY 2 NVG ACADEMICS</b>			
0730-0800	NVG General Characteristics	Classroom	721-501-01.5
0800-0900	AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part I)	Classroom	721-502-01.5
0900-0930	Quiz and Review (PE3)	Classroom	721-502-01.5
0930-1200	AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part II)	Classroom	721-503-02.5
1200-1300	Lunch		
1300-1430	NVG Driving Techniques and Procedures	Classroom	721-504-02
1430-1500	Quiz and Review (PE3)	Classroom	721-504-02
1500-1600	Final Exam Review	Classroom	

**TC 21-305-2**

1600-1605

Student Assignment for Day 3

Classroom

<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
<b>DAY 3</b>			
<b>NVG ACADEMICS</b>			
1300-1400	Final Written Exam (PE3)	Classroom	
<b>NVG DRIVING</b>			
1500-1515	Overview of NVG Driving	Motor pool	
1515-1600	Driving With Night Vision Goggles, Phase I (PE1) Training Break - waiting for dark	Training area(s)	721-505-.45
1930-2100	Driving With Night Vision Goggles, Phase II (PE1)	Training area(s)	721-506-01.5
2100-2400	Driving With Night Vision Goggles, Phase III (PE1)	Training area(s)	721-507-06
<hr/>			
<b>DAY 4</b>			
<b>NVG DRIVING</b>			
1930-2230	Driving With Night Vision Goggles, Phase III, continued (PE1)	Training area(s)	721-507-06
2230-2330	Driver Performance Test (PE1)	Training area(s)	
2330-2400	After-Action Review (AAR)	Training area(s)	
<hr/>			

**NOTES:**

- (1) Total estimated times do not include time for meals, breaks, and other local administrative requirements.
- (2) Commanders may wish to administer the instruction in NVG Driving as part of a FTX shortly (no more than 2 weeks) after completion of the NVG Academics.
- (3) Legend:
  - PE1: Hands-on.
  - PE3: Quizzes/exam/performance test.

**CHAPTER 4**  
**INSTRUCTIONAL MATERIAL**

**LESSON TITLE: PRINCIPLES OF NIGHT VISION**

**TASK NUMBER: 721-500-01.5**

This section is provided for familiarization purposes only and is not included in the final written examination. However, a quiz is to be administered. Although not critical for accomplishing the objectives of the course, the student should have a working knowledge of the basics of vision/night vision before receiving and applying any instruction on night vision goggles. See Appendix A for paper copies of viewgraphs.

**A. TRAINING OBJECTIVE:**

<b>TASK:</b>	The student will demonstrate a basic understanding of the principles of night vision.
<b>CONDITION:</b>	Given this lesson and its viewgraphs, quiz, and class notes.
<b>STANDARD:</b>	To receive a GO on this lesson, the student must correctly answer no less than 10 out of 14 questions on the quiz within 15 minutes.

**B. INTERMEDIATE TRAINING.** None.

**C. ADMINISTRATIVE INSTRUCTIONS**

1. Training time: Recommended instructional time is 1.5 hours.
2. Training location: Scheduled classroom.
3. Training type:           1.0 hour conference.  
                                  0.5 hour PE3 (quiz and review).
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Viewgraphs 1 through 8, overhead projector and screen, quiz, and advance sheet (student handout).
7. References: FM 21-305.

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.
- b. **Tie-in.** Knowing the principles of night vision will permit your understanding of the use and functioning of night vision goggles.

c. **Lesson Objective.**

**TASK:** The student will demonstrate a basic understanding of the principles of night vision.

**CONDITION:** Given this lesson and its viewgraphs, quiz, and class notes.

**STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 10 out of 14 questions on the quiz within 15 minutes.

d. **Procedures.**

(1) *Explanation.*

(2) *Summary.*

2. **EXPLANATION.**

*Transparency 1*

- a. **Vision.** This is the most important sense you use while driving. It is the sense that makes you aware of the position of your vehicle in relation to the road. You need good depth perception for determining height and distance, good visual acuity for identifying terrain features and obstacles, and good night vision techniques for efficiency in night operations.

*Transparency 2*

b. **Anatomy of the eye.**

- (1) The cornea is the clear, protective part of the eye that covers the iris and pupil.
- (2) The iris is the colored portion of the eye.
- (3) The pupil is a hole in the center of the iris. The size of the pupil varies with the amount of light entering the eye. That is, it gets smaller with increased light and larger with less light.
- (4) The lens can change shape to focus on objects at different distances from the eye.
- (5) The retina is the lining at the back of the eye where the image is formed. The picture seen by the retina is sent to the brain along the optic nerve.

c. **How the eye works.** Light enters your eye through the pupil. The amount of light entering the eye is controlled by the iris. The light passes through the lens, which focuses it onto the retina at the back of the eye. The picture seen by the retina is upside down and the brain turns it right way up.

d. **Visual acuity.** This is how well you see. It is determined for each eye by reading a standard eye chart. A shorthand notation records acuity, with normal recorded as 20/20.

### *Transparency 3*

e. **Three types of vision.**

(1) Photopic vision is used during daylight hours or when a high level of artificial light exists.

(2) Mesopic vision is used at dawn, dusk, and during periods of mid-light levels. A reduction in color vision and visual acuity occurs as the light level decreases.

(3) Scotopic vision is used when low-level light conditions exist, such as at night. Visual acuity decreases to 20/200 or less and total loss of color vision occurs.

f. **Visual problems affecting night vision.**

(1) Presbyopia is common in individuals over 40 years of age. Light transmission from the lens to the retina decreases. Instruments, maps, and so forth, are more difficult to read, especially in red light. This can be corrected with certain types of bifocal lenses.

(2) Night myopia occurs in a person who is nearsighted (myopic). He will experience blurred vision at night. Special lenses can be prescribed to correct this.

(3) Astigmatism an out-of-focus condition in the eye. For example, if you focus on power poles, the wires will be out of focus in most cases. It can be corrected with prescription eyeglasses.

g. **Dark adaptation.** This is the process by which your eyes increase their sensitivity to low light levels. Maximum dark adaptation is reached in about 30 to 45 minutes. Exposure to a flare or lightning may require 5 to 45 minutes for night vision recovery.

h. **Night tactical operations precautions.**

(1) If a flash or high-intensity light is expected from a specific direction, turn your head away from the light source. If direction is not known, close one eye. Once the light source is no longer a factor, the eye that was closed will provide enough night vision to continue driving. The reason for this is because dark adaptation occurs independently in each eye.

(2) Select routes to avoid built-up areas where there is a heavy concentration of light.

- (3) Maneuver your vehicle away from the flare or high-intensity light source to the edge of the lighted area.
- (4) Use short bursts of fire when firing automatic weapons.

#### *Transparency 4*

i. **Self-imposed stresses.**

- (1) **Smoking.** The smoker effectively reduces his night vision ability by 20 percent.
- (2) **Alcohol.** This impairs both coordination and judgment.
- (3) **Fatigue.** When you are tired, you are not mentally alert; fatigue will slow down your response to night situations that require immediate reaction.
- (4) **Nutrition.** Hunger pains lead to distraction and a shortened attention span. Failure to eat foods that provide sufficient vitamin A (eggs, cheese, carrots) can reduce night vision.
- (5) **Physical conditioning.** You should exercise daily. Good physical conditioning will help you conduct night driving with less fatigue. However, too much exercise in a given day may leave you too tired.
- (6) **Sleep.** Night driving is more tiring and stressful than day driving. Therefore, it is important to get enough rest and deep before driving.

#### *Transparency 5*

- j. **Scanning techniques.** Night vision scanning techniques are important in object identification at night. Scan from right to left, or left to right, using a slow, regular scanning movement.
- k. **Identification by shape.** Because your visual acuity is greatly reduced at night, objects must be identified by their shape or outline. Being familiar with the architectural design of structures common to your area will help.

#### *Transparency 6*

- l. **Depth perception.** This is the quality of seeing objects as three-dimensional solids in space. Perhaps it gave our tree-dwelling forefathers an edge when they swung from branch to branch. They knew exactly where in space that next branch was located.

#### *Transparency 7*

- m. Clues used to aid in distance estimation and depth perception.

**Transparency 7 (Part A)**

(1) **Linear perspective.** Parallel lines, such as railroad tracks, tend to converge as distance increases from the observer.

**Transparency 7 (Part B)**

(2) **Apparent foreshortening.** The apparent shape of an object or terrain feature appears oval when viewed from a distance.

**Transparency 7 (Part C)**

(3) **Vertical position on the field.** Objects or terrain features at a distance from the observer appear higher on the horizon than objects or terrain features that are closer to the observer.

(4) **Motion parallax.** This clue to depth perception is often considered the most important. It refers to the apparent motion of still objects as seen by an observer moving across the landscape. For example, mountains in the distance appear to be moving with the vehicle.

(5) **Retinal image size.** The size of an image focused on the retina is perceived by the brain to be a certain size. The nearer a known object is to the observer, the larger is its retinal size. If the image decreases, the object is moving away. Comparison of an object such as a motor pool with an object of known size, such as a 5-ton truck, will help to determine the object's relative size and distance from the observer.

**n. Visual illusions.**

(1) **Autokinesis.** When a person stares at a still light in the dark, the light will appear to move in about 8 to 10 seconds.

(2) **Relative motion.** A person sitting in a car waiting for a train to pass often experiences the illusion of relative motion. Even though the car is not moving, the person has the sensation that it is moving.

(3) **Structural illusions.** These are caused by heat waves, rain, snow, or other factors that obscure vision. For example, a straight line may appear to be curved when seen through a desert heat wave.

**o. Nerve agents and night vision.** Night vision is adversely affected by exposure of the eyes to small amounts of nerve agents. Leaders should assume that there will be some loss of night vision among personnel otherwise fit for duty.

**Transparency 8****p. Sources of ambient light.**



(1) ***Moon.*** The moon provides the greatest source of ambient light at night. Light from the moon is brightest when the moon is at its highest point in the sky.

(2) ***Background lighting.*** Besides the moon, other natural light sources contribute to night brightness, such as the aurora (northern lights in the Northern Hemisphere) and starlight.

(3) ***Artificial lights.*** Lights from cities, cars, fires, and flares are sources of illumination.

(4) ***Solar light.*** This light is usable for certain periods following sunset and before sunrise.

(5) ***Lasers.*** Lasers can affect the performance of the naked eye or night vision devices.

q. **Weather considerations that reduce illumination.** The following conditions reduce illumination:

(1) Cloud coverage of the moon and stars.

(2) High moisture content (dew).

(3) Fog, dust, haze, and smoke.

**NOTE:** A lightning flash is one weather phenomenon that increases illumination, although, this may have a derogatory impact on your eyes or night vision devices.

### 3. SUMMARY.

a. **Recap Main Points.** Call on students to answer questions you present.

b. **Allow for Student Questions.**

c. **Clarify Questions.**

d. **Give Closing Statement.** Understanding the principles of night vision will make possible your effective use of night vision goggles for driving operations.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** None.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**LESSON TITLE: NVG GENERAL CHARACTERISTICS****TASK NUMBER: 721-501-01.5****A. TRAINING OBJECTIVE:**

- TASK:** The student will demonstrate a basic knowledge of the general characteristics and limitations of NVGs.
- CONDITION:** Given this lesson and its viewgraphs, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 10 out of 13 questions on the quiz within 15 minutes.

**B. INTERMEDIATE TRAINING. None.****C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: Recommended instructional time is 1.5 hours.
2. Training location: Scheduled classroom.
3. Training type: 1.0 hour conference.  
0.5 hour PE3 (quiz and review).
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Viewgraphs 9 through 14, overhead projector and screen, quiz, and advance sheet (student handout).
7. References: FM 21-305.

**D. SEQUENCE OF ACTIVITY.****1. INTRODUCTION.**

- a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.
- b. **Tie-in.** Night vision goggles overcome some of the limitations we learned in the principles of night vision.

**c. Lesson Objective.**

- TASK:** The student will demonstrate a basic knowledge of the general characteristics and limitations of NVGs.
- CONDITION:** Given this lesson and its viewgraphs, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 10 out of 13 questions on the quiz within 15 minutes.

d. **Procedures.**

(1) *Explanation.*

(2) *Summary.*

2. **EXPLANATION.**

*Transparency 9*

a. **Night vision goggles.** NVGs are devices that make an object more visible during periods of low light levels. Performance is directly related to the amount of available light, such as starlight and moonlight.

*Transparency 10*

b. **Advantages.** NVG use gives a better view of the surrounding area and object identification during low light levels. NVGs make it possible to read, patrol, provide medical aid, drive, walk, and observe the enemy at night without the help of lights.

*Transparency 11*

c. **Disadvantages.** NVG performance is reduced in rain, haze, fog, snow, or smoke. Also, NVGs do not magnify images viewed through the tubes. An object viewed through the goggles at night will be the same size as if it were seen during the day without the goggles. Objects that are difficult to see during the day with the naked eye are also hard to detect at night with NVGs.

d. **Visual acuity.** A driver with 20/20 vision using NVGs will have, at best--

- 20/40 vision with the PVS-7, and
- 20/50 vision with the PVS-5.

e. **Field of view.** The field of view with the NVGs is 40 degrees compared to 200 degrees unaided.

f. **Depth perception and distance estimation.**

(1) NVGs provide their best depth perception between 20 to 500 feet.

(2) NVGs decrease depth perception at distances less than 20 feet or greater than 500 feet.

(3) Depth perception capability for NVGs will be less than daytime unaided but better than nighttime unaided.

g. **User overconfidence.** This seems to be the main problem associated with NVG use. After wearing the device for a short period, the user begins to feel he has complete visual acuity and depth perception when in fact he does not.

h. **Focal range.** The NVG will focus from 10 inches to infinity.

### *Transparency 12*

i. **IR illuminator.** This feature allows viewing at close range, such as map reading. (Two major problems are created when the IR illuminator is used. First, it makes the NVG an active system that can be detected by the threat's night vision devices. Second, the battery power is consumed six times faster.)

j. **Nighttime use only.** Operate the goggle under nighttime conditions only. To prevent damage to the tubes, operate the NVG in high light conditions only if day vision filters or objective lens caps are attached.

### *Transparency 13*

k. **Single-color viewing.** All objects viewed through the NVGs will appear as a single color, green or yellow, depending upon the NVGs' construction. NVGs do not provide for color discrimination. As a result, it is difficult to distinguish between certain objects or features. Shadows, for example, are difficult to distinguish from puddles of water, walls, ditches, and vice versa when viewed through the goggles at night. **It is critical that drivers take the lack of color discrimination into account when using NVGs.**

l. **Monochromatic (one-color) adaptation.** Upon reentering a high ambient light environment after wearing the NVG for an extended time, you may experience a tint or discoloration of objects viewed with the unaided eye. This is a normal physical reaction that causes no discomfort and disappears after a short time.

m. **Dark adaptation.** Under ideal conditions (total dark adaptation before NVG use and removal of NVGs in a dark environment), you can expect to regain full dark adaptation in about 2 minutes.

n. **Spatial disorientation.** Dizziness and nausea may be caused by driving with one tube focused inside the vehicle and the other tube focused outside the vehicle.

o. **Second versus third generation tubes.** There are two distinct generations (models) of NVG tubes with militarily significant performance differences: second and third.

(1) All AN/PVS-5 NVG tubes are second generation. AN/PVS-7 tubes were produced in both second and third generation versions.

(2) Third generation tubes have increased performance and longer tube life (about 7,500 hours). When they eventually fail, they tend to fail quickly.

(3) Second generation tubes have a tube life projected at about 2,500 hours. They tend to fail slowly, so it is important that maintenance personnel check the devices periodically.

(4) Resolution checks are required on all NVGs every 180 days.

p. **Battery.** Always remove the battery before storing the goggles. When installing or removing a battery, make sure the selector switch is in the OFF position. If the rotary switch is in the ON position when installing the batteries, it causes an electrical surge, which can damage the tubes.

**WARNING**

Batteries have safety vents to prevent explosion. When they are venting gas, you will smell it (very irritating) or hear the sound of gas escaping. Handle with care! Do not heat, puncture, disassemble, short circuit, recharge, or otherwise tamper with the batteries.

**Transparency 14**

q. **Tube defects.** Refer to the specific AN/PVS-5 or AN/PVS-7 NVG Operator's Manual for details on proper image intensifier operation. Inspect each tube for faults.

(1) The following unacceptable faults make NVG driving unsafe:

- Shading. Both tubes should show a perfect circle. If shading is present, you will not see a fully circular image.
- Edge glow. Edge glow is a bright area in the outer portion of the viewing area. To check for this defect, block out all light by cupping your hand over the lens. If the bright area is still visible, turn the NVG in to DS maintenance.
- Flashing, flickering, or intermittent operation. The NVG may appear to flicker on and off or the output may flash. This can occur in one or both tubes. If you see more than one flicker, consult the troubleshooting chart in the operator's manual.

(2) The following are acceptable faults for NVG driving:

- Bright spots/white dots. This condition is caused by a pinhole in the phosphorous screen. Spots may flicker or may appear constant. Check by cupping your hand over the lens to block out all light. If bright or white spots appear, then turn the NVG in to DS maintenance. Bright spots are acceptable if they do not interfere with the ability to view the outside scene and perform the mission.

- Dark spots/black dots. Black marks that may look like spots or streaks are acceptable as long as the marks do not interfere with the mission.
- Fixed pattern noise/honeycomb. A faint honeycomb pattern occurs most often at high light levels. This condition is acceptable as long as the pattern does not interfere with the mission.

r. Goggle operating temperature. The operating temperature for the AN/PVS-5 ranges from 125° to -65° F and for the AN/PVS-7 from 113° to -60° F.

### 3. SUMMARY.

- a. **Recap Main Points.** Call on students to answer questions you present.
- b. **Allow for Student Questions.**
- c. **Clarify Questions.**
- d. **Give Closing Statement.** Knowledge of the general characteristics and limitations of night vision goggles will enhance your use of NVGs for driving operations.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** None.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**LESSON TITLE: AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I)**

**TASK NUMBER: 721-502-01.5**

**A. TRAINING OBJECTIVE:**

- TASK:** The student will correctly identify and describe component nomenclatures, functions, and characteristics of NVGs.
- CONDITION:** Given this lesson, its viewgraphs, -10 operator manual, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than five out of six questions on the quiz within 10 minutes.

**B. INTERMEDIATE TRAINING.** None.

**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: Recommended instructional time is 1.5 hours.
2. Training location: Scheduled classroom.
3. Training type: 1.0 hour conference.  
0.5 hour PE3 (quiz and review).
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Viewgraph 15A/B/C, overhead projector and screen, night vision goggles, quiz, and advance sheet (student handout).
7. References: TM 11-5855-238-10 (AN/PVS-5), TM 11-5855-262-10-1 (AN/PVS-7A), and TM 11-5855-262-10-2 (AN/PVS-7B).

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.
- b. **Tie-in.** In order to understand the principles of night vision, and the general characteristics and limitations of NVGs, we will learn components, functions, and characteristics of NVGs.
- c. **Lesson Objective.**

- TASK:** The student will correctly identify and describe component nomenclatures, functions, and characteristics of NVGs.
- CONDITION:** Given this lesson, its viewgraphs, -10 operator manual, quiz, and class

**STANDARD:** notes.  
To receive a GO on this lesson, the student must correctly answer no less than five out of six questions on the quiz within 10 minutes.

d. **Procedures.**

(1) *Explanation.*

(2) *Summary.*

2. **EXPLANATION.**

*Transparency 15A/B/C (all items)*

a. **OFF-ON-PULL IR switch/rotary switch.** This switch controls goggles and IR illuminator power, ON or OFF.

b. **Image intensifier tubes.** These tubes amplify available light.

**WARNING**

NVG tubes contain toxic material. If they break, be extremely careful to avoid inhalation of the phosphor screen material. If the screen material comes in contact with the skin, wash as soon as possible with soap and water. If phosphor screen material is inhaled or swallowed, induce vomiting and see a doctor as soon as possible.

c. **Objective lens/lenses.** This lens focuses the light on the image intensifier.

d. **Objective lens cap/caps.** This protects the objective lens.

\* e. **Objective focus.** This is used to focus objective lens/lenses independently from 10 inches to infinity. Adjust for sharpest view. The majority of driving requires the optical infinity setting.

\* f. **Diopter adjustment rings.** These are used to focus your eyes (without eyeglasses) within the compensation range of 20/10 to 20/200. Focus one eye at a time. System must be ON before making the interpupillary distance and focus adjustments. This adjustment accommodates some of the problems, such as farsightedness experienced by persons who wear corrective lenses. However, it will not correct for astigmatism. It is recommended that corrective lenses (eyeglasses/contact lenses) be worn with the NVG.

\* The sharpest image will be observed only when the objective lens/lenses and both eyepieces are properly focused. These adjustments operate independently and must be made separately. Adjust distance, diopter, then distance and diopter until the best focus is achieved. When properly focused, the following lines on the eye chart (Appendix B) should be readable at these distances:

	<u>10 Feet</u>	<u>20 Feet</u>
AN/PVS-5 series	20/25	20/50



**NOTE:** Proper focusing procedures are in FM 21-305.

g. **Interpupillary (eye span) adjustment.** This adjusts the tubes for the desired IPD. Improper setting of the IPD will result in a distorted image and can contribute to eye fatigue. When properly set, the user should see a full circle. (The AN/PVS-5 video shows a good example of how an object is seen through the goggles after the proper eye span adjustments are made.)

h. **Clamp knobs (PVS-5 only).** These knobs adjust for eye tilt and eye relief.

i. **IR illuminator.** This provides light for viewing up to 3 meters in low ambient light conditions, such as for reading instruments and maps, and is invisible to the naked eye.

j. **Battery compartment.** This houses the various batteries. Do not use the goggles with more than one type of battery.

k. **Headstrap assembly and snaps.** This assembly secures the goggles to the operator's head. Ensure proper adjustment for stability and comfort. (All NVD driving operations will be conducted with the NVG secured in the head harness and worn on the driver's head).

l. **Eyepiece lens cap.** This protects the eyepiece lens and prevents light from leaking around the eyepiece.

m. **Demisting shields.** These are used to prevent the eyepiece lenses from becoming fogged.

n. **Sacrificial window (AN/PVS-7 only).** This is used during adverse operating conditions, such as in sandy or dusty environments, which could scratch or abrade the objective lens.

o. **Latch (AN/PVS-7 only).** This is used for separation of goggle assembly from headmount assembly. If ON, goggles will automatically shut off when separated from the headmount.

p. **High-light detector (AN/PVS-7 and AN/PVS-5C only).** This automatically shuts off the goggles after 30 to 60 seconds of operation in daylight or bright room light. Individual bright lights (headlights, flashlights, or other concentrated light sources) will not activate the high light shutoff unless focused directly on the detector.

### 3. SUMMARY.

a. **Recap Main Points.** Call on students to answer questions you present.

b. **Allow for Student Questions.**

c. **Clarify Questions.**

d. **Give Closing Statement.** Your knowledge of night vision goggle components, functions, and characteristics is necessary for driving operations.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** Night vision devices contain batteries. When a battery is out of service and is no longer needed, it is considered waste. At the time it becomes waste, a hazardous waste determination needs to be made (most lithium batteries are considered hazardous waste). All hazardous waste must be managed according to installation or host nation hazardous waste procedures. Some batteries such as alkaline batteries may be determined to be non-hazardous waste, but still must be disposed of properly. Contact the installation or host nation environmental office for the specific procedures for disposing of NVD batteries.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**LESSON TITLE: AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II)**

**TASK NUMBER: 721-503-02.5**

**A. TRAINING OBJECTIVE:**

- TASK:** The student will demonstrate a basic knowledge on operational procedures and maintenance of the NVG.
- CONDITION:** Given this lesson, a video, -10 operator manual, NVG, eye charts, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly perform NVG PMCS procedures, place the NVG into operation, and achieve the proper focus all within 5 minutes.

**B. INTERMEDIATE TRAINING.** None.

**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: Recommended instructional time is 2.5 hours.
2. Training location: Scheduled classroom.
3. Training type: 0.5 hour video.  
2.0 hours PE1.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students and 1 NVG AI per 6 students.
6. Training aids and equipment: VHS video player and monitor, AN/PVS-5 series or AN/PVS-7B video program (TVT 20-928 and TVT 20-929), eye chart, night vision goggles, NVG spare batteries, and advance sheet (student handout).
7. References: TM 11-5855-238-10 (AN/PVS-5), TM 11-5855-262-10-1 (AN/PVS-7A), and TM 11-5855-262-10-2 (AN/PVS-7B).

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.
- b. **Tie-in.** We understand the components, functions, and characteristics of NVGs. Now we will learn operational procedures and maintenance of the NVG.
- c. **Lesson Objective.**

- TASK:** The student will demonstrate a basic knowledge on operational procedures and maintenance of the NVG.
- CONDITION:** Given this lesson, a video, -10 operator manual, NVG, eye charts, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly perform NVG PMCS procedures, place the NVG into operation, and achieve the proper focus all within 5 minutes.

**d. Procedures.**

(1) *Explanation.*

(2) *Summary.*

**2. EXPLANATION.**

- a. Show the video of AN/PVS-5 and/or AN/PVS-7B.
- b. Follow the step-by-step procedures contained in applicable technical manual for the following activities:
- (1) The pre-operational and post-operational checks do not require the student to turn the goggles on. Therefore, the checks may be conducted in a lighted classroom or during daylight hours in a field/simulated field environment.
  - (2) Instruction on placing the goggles in operation will require low light level conditions. In a classroom, this may be done with all lights turned off except for a small light source, bright enough for the goggle to operate under, for example, a low-intensity lightstick or a 7 1/2 watt light bulb. In a field/simulated field environment, the instruction must be conducted at night. (The goggles can be used in cloudy starlight to bright moonlight.) This is the preferred method as it gives the student an appreciation for how objects are seen at night through the goggles. Make every effort to schedule this block of instruction when the moon provides not less than 25 percent illumination (quarter moon) and is positioned at least 30 degrees above the horizon.
- c. Focusing the goggles is best accomplished with the aid of an eye chart (Appendix B). Hang it on a tree (or wall if in a classroom) and slightly lower than eye height. The desired distance is 20 feet from the chart to the viewing line. If in a classroom, attach the light to the ceiling about 10 feet away from the eye chart and position the light so that it will not create a glare for the viewer.
- d. Once the students conduct their pre-operational checks and have the goggles properly focused, familiarize them with the terrain as seen through the goggles. Do this by having them walk a short route (15 to 20 minutes). Make sure the route is free of any vehicular traffic. Point out ditches, shadows, gullies, ravines, signs, and so forth. (This may be the same route the students will use during driving maneuvers.)
- e. The last activity requires the students to perform post-operational checks of the NVG.

**NOTE:** Explain to the students that they will be tested in this block of instruction during the driver performance test.

**3. SUMMARY.**

- a. **Recap Main Points.** Call on students to answer questions you present.
- b. **Allow for Student Questions.**
- c. **Clarify Questions.**
- d. **Give Closing Statement.** Knowing operational procedures and maintenance for night vision goggles makes possible your correct use of night vision goggles for driving operations.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** Night vision devices contain batteries. When a battery is out of service and is no longer needed, it is considered waste. At the time it becomes waste, a hazardous waste determination needs to be made (most lithium batteries are considered hazardous waste). All hazardous waste must be managed according to installation or host nation hazardous waste procedures. Some batteries such as alkaline batteries may be determined to be non-hazardous waste, but still must be disposed of properly. Contact the installation or host nation environmental office for the specific procedures for disposing of NVD batteries.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**LESSON TITLE: NVG DRIVING TECHNIQUES AND PROCEDURES****TASK NUMBER: 721-504-02****A. TRAINING OBJECTIVE:**

- TASK:** The student will demonstrate a basic knowledge of specific driving techniques, procedures, and precautions while wearing the NVG.
- CONDITION:** Given this lesson, its viewgraphs, range limitation and speed limitation graphs, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 11 out of 14 questions on the quiz within 15 minutes.

**B. INTERMEDIATE TRAINING. None.****C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: Recommended instructional time is 2.0 hours.
2. Training location: Scheduled classroom.
3. Training type: 1.5 hours conference.  
0.5 hour PE3 (quiz and review).
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Viewgraphs 16 through 19, overhead projector and screen, range limitation and speed limitation graphs, advance sheet (student handout), and quiz.
7. References: FM 21-305.

**D. SEQUENCE OF ACTIVITY.****1. INTRODUCTION.**

a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.

b. **Tie-in.** We understand the operational procedures and maintenance of the NVG. Now we will learn specific driving techniques, procedures, and precautions while wearing the NVG.

c. **Lesson Objective.**

- TASK:** The student will demonstrate a basic knowledge of specific driving techniques, procedures, and precautions while wearing the NVG.
- CONDITION:** Given this lesson, its viewgraphs, range limitation and speed limitation graphs, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 11 out of 14 questions on the quiz within 15 minutes.

d. **Procedures.**

- (1) *Explanation.*
- (2) *Summary.*

2. **EXPLANATION.**

**NOTE:** This is the last academic block of instruction before the final written examination. Students must pass the written examination with a score of 70 percent or more before receiving instruction in driving with NVGs.

*Transparency 16*

a. **Effects of light.**

- (1) NVG compatibility is best achieved by eliminating all interior and exterior vehicle lighting.

<p><b><i>CAUTION</i></b></p> <p>Vehicle drivers without NVGs may not see you.</p>
---

- (2) Instruments and gauges can be read with NVGs without the aid of instrument lighting.
- (3) No dark adaptation period is necessary for effective viewing through NVGs.
- (4) Lasers will be used on the battlefield. Most lasers will degrade the performance of NVGs, but will not cause permanent damage to NVGs.
- (5) Viewing an area lit by artificial lights, such as flares, will limit your ability to see objects outside the lighted area. Try to keep the light source outside the field of view of the goggles.
- (6) Using goggles will allow you to detect light sources at great distances that are not visible to the unaided eye; for example, flashlights, burning cigarettes, chemical lightsticks, and IR light source.
- (7) The capability of goggles to detect these light sources improves as the ambient light level decreases.

**b. Weather considerations when driving with NVGs.**

- (1) The effectiveness of NVGs is greatly reduced in rain, haze, fog, snow, and/or smoke. NVGs also have a limited ability to detect rain, haze, or fog before you enter the area of reduced visibility.
- (2) Visual clues to the presence of visibility restrictions include—
  - A halo around artificial lights as seen through the goggles.
  - An increase in "image noise" (similar in appearance to the "snow" seen on television with poor reception).

*Transparency 17*

**c. Ground speed limitations.**

- (1) The normal tendency of most drivers is to overdrive their capability to see! To avoid obstacles, you must understand the relationship between the NVG visual range capability and speed of your vehicle.
- (2) The range limitation graph (Appendix C) shows how to determine the maximum range at which an object can be identified. It addresses a hazard 3 meters long, and 15 centimeters in diameter (the size of a small pole or a bare tree).
- (3) To find the range at which an object can be detected in a given ambient light condition:
  - Enter the chart along the top at a point representing the ambient light conditions; for example, 25 percent illumination or quarter moon.
  - Move down until the range curve is intercepted. The range an object can be detected is read at the left, for example, 75 meters.
- (4) After computing the range at which an object can be detected, use the ground speed limitation graph (Appendix C) to determine a safe speed for driving with NVGs:
  - Enter the graph along the left side at the predetermined detection range (staying with the previous example, locate 75 meters).
  - Move right until the 10-second driver response line is intercepted. This line measures the time it takes for the operator to react to an object at a given distance and speed.
  - From the intersection, move down and read the safe speed for driving with goggles (in this example, about 15 MPH).



**NOTE:** These graphs are not exact; however, they give planners a good, rough estimate of the working range of the goggles for determining safe vehicle speed limits.

(5) Other factors that you must consider to drive at a safe speed when wearing NVGs are:

- Type of NVG being used for driving, and the generation of the image intensifier tube (second or third).
- Type of vehicle used for training.
- Weather conditions.
- Mode of driving, such as convoy and off-road.
- Terrain.
- Amount of light available (natural and artificial).

**d. Vehicle preparation.**

- (1) Keep windshields clean. Remove dirt, grease, and bugs.
- (2) Turn off all exterior and interior lights. Tape over those, which cannot be turned off.

**Transparency 18**

**e. Driver preparation.**

- (1) Keep physically fit.
- (2) Eat a well-balanced meal.
- (3) Get adequate rest.
- (4) Avoid self-medication.
- (5) Avoid the use of tobacco and alcohol.
- (6) As much as possible, avoid all bright lights (including sunlight during the day). Wear sunglasses when outside.
- (7) Participate in frequent night driving.

**Transparency 19**

**f. Driving with goggles.**

- (1) The ability to drive with goggles is developed through continuous hands-on training. The key to that training lies in awareness and understanding of NVG capabilities and limitations.

**WARNING**

NVGs should never be used on public highways. The effect of oncoming headlights on the device may cause some very dangerous situations as the operator will not be able to see other objects in the field of view. If the light is sufficiently bright, the devices all have a bright source protection feature that shuts down the NVG to protect it. If the bright source protection is activated, the NVG will be off for at least 2 seconds. In addition, drivers without NVGs are unlikely to see your vehicle.

- (2) Although unlikely to occur, drivers with NVGs may face the above situation in an NVG-controlled training area. To minimize the effect on NVGs by the headlights from an oncoming vehicle while avoiding a potentially serious accident, do the following:

- slow down,
- look away so that the light source is just outside the goggles field of view, and
- pull off to the far right-hand side of the road (use caution when pulling to the side of the road to avoid an unintended departure from the roadway).

NVG training at this point is now compromised as other vehicles with headlights on may appear. Do not continue driving with NVGs unless authorized to do so by a responsible officer/individual, such as range control personnel.

- (3) In the event of a malfunction, follow these procedures:

- If your vehicle malfunctions or if the NVGs exhibit the faults discussed earlier in NVG general characteristics, such as shading, flashing, and flickering, slow down and pull off to the far right-hand side of the road (use caution when pulling to the side of the road to avoid an unintended departure from the roadway). Warn approaching NVG-equipped drivers with hand and arm signals and NVG-compatible light sources (IR lightstick). Do not turn on your four-way emergency flasher lights as this may blind approaching drivers equipped with NVGs.
- If your vehicle malfunctions on a road hidden from approaching drivers by a curve or hill, walk back along the shoulder of the road to a position where you can signal them to slow down in time. Do not attempt to make repairs on your vehicle while it is in an exposed position on the road.

- If you are in a vehicle and observe the scene described above, slow down and proceed with caution.
- If the NVGs low battery indicator turns on, replace the batteries. Do not wait until the goggles shut down while driving because of weak or dead batteries. Slow down and pull off to the far right-hand side of the road (use caution when pulling to the side of the road to avoid an unintended departure from the roadway). Make sure you (or the assistant operator) warn approaching traffic first before attempting to switch batteries from another NVG or replacing the batteries if spares are available. Do not switch goggles as you will have to refocus the device to suit your eyesight.

(4) Since the field of view is greatly reduced, you must use a slow, continual scanning pattern to compensate for this.

(5) Operating a vehicle with the goggles over the NBC mask will further reduce your field of vision to about 20 degrees. (This practice is not recommended.)

(6) Driving with one lens focused inside and one focused outside the vehicle can cause spatial disorientation, and is not recommended.

(7) When driving in convoy, the major concern is to keep a safe distance between vehicles and to maintain proper speed discipline. Speed limits should not exceed those established for blackout driving without NVGs. For safety reasons, permit convoy driving with NVGs only if every driver and assistant operator is NVG-equipped. If there are not enough NVGs for this, a mix of NVG and blackout drive may be used. The NVG-equipped vehicles should be grouped together in the rear of the convoy, rather than being dispersed and intermixed with other vehicles not equipped with NVGs. If grouped in this manner, make sure that the last non-NVG-equipped vehicle has its rear blackout drive lights off.

(8) All NVD driving operations will be conducted with the NVG secured in the head harness and worn on the driver's head.

(9) Assistant (shotgun) drivers with NVGs can assist primary drivers by compensating for lack of peripheral vision. They must keep the driver informed of any obstacles in or outside his field of view. Communication is a must! Drivers, on the other hand, must keep assistant drivers informed of any deterioration in vision caused by weather, eye fatigue, or goggle malfunction.

(10) Primary operators must focus their goggles for distance vision even though this will make instrument reading difficult. Assistant drivers can compensate for this by alternating between distance and close-up viewing and keeping the primary operator informed of any critical instrument lights that may turn on. Depending on vehicle configuration, the assistant driver may need to sit directly behind the driver to gain a better view of the instrument panel.

(11) Motorcycles and ATVs may be operated with NVGs. In general, the motorcycle or ATV should be operated with headlights off, or at most, with

blackout marker lights on. The additional weight that the goggles place on the operator's head and the position of this weight may require ATV and motorcycle operators to redevelop their sense of balance during training.

(12) The limited field of view of NVGs will have a greater impact on motorcycle and ATV operators than on other vehicles. Operators will have to practice and train to turn their heads from side to side to compensate for the loss of peripheral vision.

g. **Degraded NVG lighting countermeasures.** Refer students to FM 21-305 and talk them through each condition in the following table.

**NVG LIGHTING COUNTERMEASURES**

<b>SPECIFIC CONDITIONS</b>	<b>IMPACT ON NVGs</b>	<b>COUNTERMEASURES</b>
Driving with external & internal lights off. (Vehicles without NVGs may not see you.)	None	N/A
Blue-green instrument panel lights on. (Vulnerable to Threat detection with NVGs.)	Minimal on third generation tubes; will reduce performance of second generation tubes.	Turn to lowest light level or turn off. Tape over all non-critical lights. (May allow warning lights to go unnoticed.)
Instrument panel lights on. (Vulnerable to Threat detection with NVGs.)	Will cause all NVGs to have degraded performance.	Turn to lowest light level or turn off. Tape over all non-critical lights. (May allow warning lights to go unnoticed.)
Headlights on. (Vulnerable to Threat detection.)	Not recommended. Will shorten life of NVG and blind oncoming drivers with NVGs.	Use BO lights.
Chemlights on front of lead vehicle and rear of trail vehicle. (Vulnerable to Threat detection.)	Will degrade lead vehicle's distance vision to some degree under low light conditions.	Tape over part of chemlight. Use BO lights.

SPECIFIC CONDITIONS	IMPACT ON NVGs	COUNTERMEASURES
Blackout marker lights on. (Vulnerable to Threat detection with NVGs.)	Low light levels (heavy overhead canopy or starlight) will degrade performance.	Tape over all but one of four markers on rear of vehicle. Tape over brake marker.
Blackout markers with blackout drive. (Threat detection easy with NVGs.)	Will enhance near vision, but degrade distance vision. May blind oncoming drivers with NVGs.	Turn off BO drive or ensure BO hood is adjusted so light only shines down.
Normal parking/brake lights. (Vulnerable to Threat detection).	Will seriously degrade all NVG performance and may blind oncoming drivers with NVGs.	Use BO lights.

3. **SUMMARY.**

- a. **Recap Main Points.** Call on students to answer questions you present.
- b. **Allow for Student Questions.**
- c. **Clarify Questions.**
- d. **Give Closing Statement.** Knowing operational procedures and maintenance for night vision goggles makes possible your effective use of night vision goggles for driving operations.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** None.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**LESSON TITLE: DRIVING WITH NIGHT VISION GOGGLES, PHASE I (Transparency 20)****TASK NUMBER: 721-505-0.45**

The following tasks are mandatory. They must be administered in order and in accordance with AR 600-55. Units may wish to supplement the phases based on unique mission requirements.

**A. TRAINING OBJECTIVE:**

<b>TASK:</b>	The student will drive an assigned vehicle in daylight conditions without the NVG.
<b>CONDITION:</b>	Given a vehicle on which the student is licensed to drive.
<b>STANDARD:</b>	To receive a GO on this lesson, the student must correctly perform vehicle PMCS, obey the designated speed limit, and maintain control of the vehicle at all times over a designated route.

**B. INTERMEDIATE TRAINING.** None.**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: Recommended instructional time is 0.45 hours.
2. Training location: Scheduled classroom.
3. Training type: 0.45 hours PE1.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students and one assistant instructor per student.
6. Training aids and equipment: Selected wheeled vehicles, advance sheet (student handout).
7. References: Operator TM for assigned vehicle and FM 21-305.

**D. SEQUENCE OF ACTIVITY.****1. INTRODUCTION.**

a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.

b. **Tie-in.** We understand the operational procedures and maintenance of the NVG. Now we will learn specific driving techniques, procedures, and precautions while wearing the NVG.

c. **Lesson Objective.**



<b>TASK:</b>	The student will drive an assigned vehicle in daylight conditions without the NVG.
<b>CONDITION:</b>	Given a vehicle on which the student is licensed to drive.
<b>STANDARD:</b>	To receive a GO on this lesson, the student must correctly perform vehicle PMCS, obey the designated speed limit, and maintain control of the vehicle at all times over a designated route.

d. **Procedures.**

(1) *Explanation.*

(2) *Summary.*

2. **EXPLANATION.**

- a. The intent of this phase is to familiarize the students with the road and terrain during daylight hours. Make them aware that this will be the same route they will be evaluated on during the driver performance test.
- b. Explain the procedures for this practical exercise; for example, vehicle speed, ground guide, and length of route. Instructors/assistant instructors should point out to students any obstruction along the route, as well as signs, ditches, and other terrain features.
- c. Make sure that students perform PMCS on their vehicle as they will be required to do this at night while wearing goggles.

**NOTE:** Estimated instructional time includes before-, during-, and after-vehicle PMCS.

3. **SUMMARY.**

- a. **Recap Main Points.** Call on students to answer questions you present.
- b. **Allow for Student Questions.**
- c. **Clarify Questions.**
- d. **Give Closing Statement.** Knowing operational procedures and maintenance for night vision goggles makes possible your effective use of night vision goggles for driving operations.

**E. SAFETY RESTRICTIONS.**

1. Make sure vehicles are started and driven only on command of the instructor/AI.
2. Use ground guides when backing vehicles.
3. Make sure students comply with the designated speed limit at all times.
4. Make sure students maintain at least a 3-minute gap between vehicles.

5. Make sure students wear seat belts at all times when the vehicle is in operation.

**F. ENVIRONMENTAL CONSIDERATIONS.**

1. Ensure that all hazardous materials and hazardous wastes are stored and labeled properly.
2. Ensure that spill kits are within reach when changing or adding vehicle fluids or in the case of vehicle failures. Spill kits should enable the soldiers to contain a spill on land or in water.
3. Ensure that drip pans remain under parked vehicles.
4. Ensure that containers are the proper size and type for draining vehicle fluids.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**LESSON TITLE: DRIVING WITH NIGHT VISION GOGGLES, PHASE II (*Transparency 20*)**

**TASK NUMBER: 721-506-01.5**

**A. TRAINING OBJECTIVE:**

- TASK:** The student will drive an assigned vehicle at night with headlights on, and without NVG.
- CONDITION:** Given a vehicle on which the student is licensed to drive.
- STANDARD:** To receive a GO on this lesson the student must correctly perform vehicle PMCS, obey the designated speed limit, and maintain control of the vehicle at all times over a designated route.

**B. INTERMEDIATE TRAINING.** None.

**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: Recommended instructional time is 1.5 hours.
2. Training location: Scheduled classroom.
3. Training type: 1.5 hours PE1.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Assigned vehicles, advance sheet (student handout).
7. References: Operator TM for assigned vehicle and FM 21-305.

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.
- b. **Tie-in.** We understand the operational procedures and maintenance of the NVG. Now we will learn specific driving techniques, procedures, and precautions while wearing the NVG.

c. **Lesson Objective.**

<b>TASK:</b>	The student will drive an assigned vehicle at night with headlights on, and without NVG.
<b>CONDITION:</b>	Given a vehicle on which the student is licensed to drive.
<b>STANDARD:</b>	To receive a GO on this lesson the student must correctly perform vehicle PMCS, obey the designated speed limit, and maintain control of the vehicle at all times over a designated route.

d. **Procedures.**

(1) *Explanation.*

(2) *Summary.*

2. **EXPLANATION.**

a. In this phase, the student will drive over the route, previously driven in daylight, at night with vehicle headlights on. The purpose of this phase is to give the student an appreciation for how the route and objects along the route appear at night without the goggles.

b. Explain the procedures for this practical exercise, including vehicle PMCS, speed, ground guide, and length of route. Instructors/assistant instructors should point out to the students any obstructions along the route as well as signs, ditches, and other terrain features.

3. **SUMMARY.**

a. **Recap Main Points.** Call on students to answer questions you present.

b. **Allow for Student Questions.**

c. **Clarify Questions.**

d. **Give Closing Statement.** Knowing the operational procedures and maintenance for night vision goggles makes possible your effective use of night vision goggles for driving operations.

**E. SAFETY RESTRICTIONS.**

1. Make sure vehicles are started and driven only on command of the instructor/assistant instructor.

2. Use ground guides when backing vehicles.

3. Make sure students comply with the designated speed limit at all times.

4. Allow at least 30 minutes for dark adaptation before driving.

5. Make sure students maintain a 5- to 10-minute gap between vehicles.

**F. ENVIRONMENTAL CONSIDERATIONS.**

1. Ensure that all hazardous materials and hazardous wastes are stored and labeled properly.
2. Ensure that spill kits are within reach when changing or adding vehicle fluids or in the case of vehicle failures. Spill kits should enable the soldiers to contain a spill on land or in water.
3. Ensure that drip pans remain under parked vehicles.
4. Ensure that containers are the proper size and type for draining vehicle fluids.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**LESSON TITLE: DRIVING WITH NIGHT VISION GOGGLES, PHASE III (Transparency 20)****TASK NUMBER: 721-507-06****A. TRAINING OBJECTIVE:**

- TASK:** The student will drive an assigned vehicle at night while wearing NVGs.
- CONDITION:** Given a vehicle on which the student is licensed to drive, NVG, and an eye chart.
- STANDARD:** To receive a GO on this lesson, the student must—
- (1) Properly perform pre-operational NVG PMCS procedures, place the NVG into operation, and achieve the proper focus all within 5 minutes.
  - (2) Correctly perform vehicle PMCS (before operation) while wearing the NVG within 15 minutes.
  - (3) Maintain control of the vehicle at all times and obey the designated speed limit.
  - (4) Successfully negotiate and correctly identify selected terrain features, route markers, and/or signs along the route and distinguish shadows from other features such as water puddles, walls, and ditches as seen through the NVG.
  - (5) Correctly perform vehicle PMCS (after operation) while wearing the NVG within 15 minutes.
  - (6) Correctly perform post-operational NVG PMCS procedures within 5 minutes.

**B. INTERMEDIATE TRAINING.** None.**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: Recommended instructional time is 6.0 hours.
2. Training location: Scheduled classroom.
3. Training type: 6 hours (not more than 3 hours per night) PE1.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students and one assistant instructor per student.

6. Training aids and equipment: Assigned vehicles, advance sheet (student handout), night vision goggles, NVG spare batteries, eye chart, tentage and field tables (as necessary), lightsticks (for use around the TOC/staging area and along the route as necessary), directional markers, engineer tape, command and control vehicle with radio, hazard chart (as necessary).

7. References: Operator TMs for assigned vehicle and applicable NVG and AR 600-55.

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

a. **Interest Device.** Obtain the students' attention. State the purpose of the class and motivate the students to learn the objective.

b. **Tie-in.** We understand the operational procedures and maintenance of the NVG. Now we will learn specific driving techniques, procedures, and precautions while wearing the NVG.

c. **Lesson Objective.**

**TASK:** The student will drive an assigned vehicle at night while wearing NVGs.

**CONDITION:** Given a vehicle on which the student is licensed to drive, NVG, and an eye chart.

**STANDARD:** To receive a GO on this lesson, the student must—

(1) Properly perform pre-operational NVG PMCS procedures, place the NVG into operation, and achieve the proper focus all within 5 minutes.

(2) Correctly perform vehicle PMCS (before operation) while wearing the NVG within 15 minutes.

(3) Maintain control of the vehicle at all times and obey the designated speed limit.

(4) Successfully negotiate and correctly identify selected terrain features, route markers, and/or signs along the route and distinguish shadows from other features such as water puddles, walls, and ditches as seen through the NVG.

(5) Correctly perform vehicle PMCS (after operation) while wearing the NVG within 15 minutes.

(6) Correctly perform post-operational NVG PMCS procedures within 5 minutes.

d. **Procedures.**

(1) *Explanation.*

(2) *Summary.*

**2. EXPLANATION.**

- a. The success of this training phase depends largely on effective preplanning, briefings, and coordination of support requirements (refer to Appendixes D and E).
- b. Students will receive a safety briefing before the start of this phase (see Safety Restrictions below).
- c. Students will perform the following activities in sequence before driving with NVGs:
  - (1) Perform pre-operation NVG procedures.
  - (2) Check for proper wear and fitting.
  - (3) Focus the device properly for near viewing.
  - (4) Perform vehicle PMCS while wearing the NVG (includes reading the instrument panel and gauges with engine running).
  - (5) Refocus the NVG for distance viewing immediately before driving.
- d. With all external and internal lights off, the student will drive the vehicle over the same range while wearing the NVG and under the supervision of an NVG-equipped instructor or AI. (It may be necessary before driving to tape over certain exterior lights such as the brake lights.) All NVD driving operations will be conducted with the NVG secured in the head harness and worn on the driver's head.
- e. The student will:
  - (1) Keep the vehicle at a steady, constant speed.
  - (2) Identify and obey any traffic signs and detect markers.
  - (3) Identify and negotiate ditches or other rough road conditions along the route.
  - (4) Judge distances to road junctions or potholes.
  - (5) Be able to see the edge of the road.
  - (6) Distinguish shadows from objects, such as puddles of water.
  - (7) Use proper night vision scanning techniques.
- f. Upon return to the tactical site, the student will perform the following activities in sequence, while wearing the NVG:
  - (1) Park the vehicle.
  - (2) Perform post-operational vehicle PMCS.



(3) Perform post-operational procedures.

g. Perform post-operational NVG PMCS.

h. At the conclusion of this phase, instructors and AIs should conduct an AAR with the students. The purpose of the AAR is to provide two-way feedback between instructor and student on positive and negative aspects encountered in this phase.

### 3. SUMMARY.

a. **Recap Main Points.** Call on students to answer questions you present.

b. **Allow for Student Questions.**

c. **Clarify Questions.**

d. **Give Closing Statement.** Knowing operational procedures and maintenance for night vision goggles makes possible your effective use of night vision goggles for driving operations.

### E. SAFETY RESTRICTIONS.

1. Make sure students do not exhibit any signs of fatigue before the start of this phase.

2. Make sure vehicles are started and driven only on instructions from the instructor/AI.

3. Use NVG-equipped ground guides when backing vehicles.

4. Make sure students comply with the speed limit at all times.

5. Make sure students maintain a 5 to 10-minute gap between vehicles.

6. Make sure an NVG-equipped instructor or AI is in the vehicle at all times.

7. Cease training if insufficient illumination exists or weather conditions deteriorate; for example, snow, rain, or fog. If these conditions occur while students are driving the route, and depending on the severity of the conditions encountered, the instructor or AI may authorize the following:

- Use blackout drive with the NVG, or
- Remove the goggles and use headlights to complete the route or a portion of the route.

**NOTE:** These actions must be simultaneously coordinated with all vehicles on the route.

8. Tell students to always keep the instructor or AI informed of any vision deterioration that may impede their ability to continue safe driving with the NVG. The students should also report any other problems, such as eyestrain, headaches, or nausea.

9. Make sure the route selected is in an area where other traffic is precluded. If the route does not preclude this, establish some form of traffic control.

10. Review with the students the emergency procedures learned previously with regards to goggle failure and vehicle breakdown.

11. Make sure students wear seat belts at all times when the vehicle is in operation.

***CAUTION***

Make every effort to schedule this phase on a night when the moon offers no less than 25 percent illumination (quarter moon) and is positioned at 30 degrees or more above the horizon.

**F. ENVIRONMENTAL CONSIDERATIONS.**

1. Ensure that all hazardous materials and hazardous wastes are stored and labeled properly.
2. Ensure that spill kits are within reach when changing or adding vehicle fluids or in the case of vehicle failures. Spill kits should enable the soldiers to contain a spill on land or in water.
3. Ensure that drip pans remain under parked vehicles.
4. Ensure that containers are the proper size and type for draining vehicle fluids.
5. Night vision devices contain batteries. When a battery is out of service and is no longer needed, it is considered waste. At the time it becomes waste, a hazardous waste determination needs to be made (most lithium batteries are considered hazardous waste). All hazardous waste must be managed according to installation or host nation hazardous waste procedures. Some batteries such as alkaline batteries may be determined to be non-hazardous waste, but still must be disposed of properly. Contact the installation or host nation environmental office for the specific procedures for disposing of NVD batteries.

**G. ADDITIONAL COMMENTS AND INFORMATION.** None.

**CHAPTER 5**

**TESTING MATERIALS**

**QUIZZES**

<b>QUIZ</b>	<b>TITLE</b>
721-500-01.5	PRINCIPLES OF NIGHT VISION
721-501-01.5	NVG GENERAL CHARACTERISTICS
721-502-01.5	AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I)
721-503-02.5	AN/PVS - AND AN/PVS-7 NIGHT VISION GOGGLE (PART II)
721-504-02	NVG DRIVING TECHNIQUES AND PROCEDURES

**EOCCT**

**INTERMEDIATE TRAINING OBJECTIVE 1**

<b>EOCCT</b>	<b>TITLE</b>
9H9-501-01	WRITTEN EXAMINATION (VERSION I)
9H9-502-01	WRITTEN EXAMINATION (VERSION II)

**INTERMEDIATE TRAINING OBJECTIVE 2**

DRIVER'S PERFORMANCE TEST (ROAD TEST)

**QUIZ 721-500-01.5**

**LESSON TITLE: PRINCIPLES OF NIGHT VISION**

**TASK NUMBER: 721-500-01.5**

**A. TRAINING OBJECTIVE:**

**TASK:** Pass the quiz.

**CONDITION** Given the quiz and pencil.

**STANDARD:** Answer correctly 10 out of 14 questions on the quiz within 15 minutes.

**B. INTERMEDIATE TRAINING.** None.

**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Performance evaluation.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Quiz and pencil.
7. References: FM 21-305.

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.**
- b. **Tie-in.**
- c. **Lesson Objective.** (paragraph A).
- d. **Procedures.**
  - (1) Performance testing.
  - (2) Evaluation.
  - (3) Summary.

2. **PERFORMANCE TESTING.**
  3. **EVALUATE.** Check written quiz results.
  4. **SUMMARY.**
    - a. Recap main points.
    - b. Allow for questions.
    - c. Clarify questions.
    - d. Give closing statement.
  5. **RETRAINING.** Retrain and retest NO-GOs.
- E. SAFETY RESTRICTIONS.** None.
- F. ENVIRONMENTAL CONSIDERATIONS.** None.
- G. ADDITIONAL COMMENTS AND INFORMATION.** Recommended testing time is 15 minutes.

**QUIZ 721-500-01.5**

**PRINCIPLES OF NIGHT VISION**

**INSTRUCTIONS:** This quiz will measure your knowledge of principles of night vision. Select the letter corresponding to the word or phrase that best complete the following statements.

1. Vision is the most important sense you use while driving. You need good \_\_\_\_ for determining height and distance, good \_\_\_\_ for efficiency in night operations, and good \_\_\_\_ for identifying terrain features and obstacles.

- a. Night vision techniques
- b. Visual acuity.
- c. Depth perception.
- d. Weather.

2. Identify the portions of the eye that correspond to the following descriptions:

- |   |                 |
|---|-----------------|
| ____ Clear, protective part of the eye.                           | a. Cornea.      |
| ____ The lining at the back of the eye where the image is formed. | b. Iris.        |
| ____ The colored portion of the eye.                              | c. Lens.        |
|   | d. Retina.      |
|   | e. Optic nerve. |

3. Light enters your eye through the \_\_\_\_\_. The amount of light entering the eye is controlled by the \_\_\_\_\_. The light passes through the \_\_\_\_\_ which focuses it on the \_\_\_\_\_ at the back of the eye. The picture seen is upside down, which the \_\_\_\_\_ turns right way up.

- a. Brain.
- b. Iris.
- c. Retina.
- d. Optic nerve.
- e. Pupil.
- f. Lens.

4. The accuracy of how well you see is known as \_\_\_\_\_. It is determined for each eye by reading a standard eye chart.

- a. Depth perception.
- b. Visual acuity.
- c. Dark adaptation.

5. What type of vision is used at dawn, at dusk, and during periods of mid-light levels?

- a. Mesopic.
- b. Photopic.
- c. Scotopic.

6. Night myopia is a visual problem that affects night vision. A person with this condition will experience blurred vision at night. Special lenses cannot be prescribed for this condition.
- True.
  - False.
7. Maximum dark adaptation is reached in about \_\_\_\_.
- 30 to 45 minutes.
  - 5 to 10 minutes.
  - 1 to 2 hours.
8. If a flash or high intensity light is expected from a specific direction, turn the vehicle away from the light source. If the direction is not known, close one eye. Once the light source is no longer a problem, the eye that was closed will provide enough night vision to continue driving.
- True.
  - False.
9. Night driving is more tiring and stressful than day driving.
- True.
  - False.
10. Of the following self-imposed stresses, \_\_\_\_ reduces 20 percent of a person's night vision.
- Alcohol.
  - Smoking.
  - Fatigue.
11. Night vision scanning techniques are important in object identification. Select the statement that best describes the proper scanning technique.
- Scan from right to left, or left to right, using a slow, regular movement.
  - Scan from up to down, or down to up, using a regular movement.
  - Rapidly scan the horizon from right to left or left to right.
12. \_\_\_\_ gave our tree-dwelling forefathers an edge when they swung from branch to branch. They knew exactly where in space that next branch was located.
- Depth perception.
  - Spatial disorientation.
  - Visual acuity.
13. The \_\_\_\_ provides the greatest source of ambient light at night.
- Stars.
  - Moon.
  - Lights from cities.

14. Cloud coverage of the moon and stars, \_\_\_\_\_ are examples of weather considerations that reduce illumination.

- a. Fog and lightning.
- b. Dew, smoke, and haze.
- c. Dust, smoke, haze, dew, and lightning.



**QUIZ ANSWER SHEET  
PRINCIPLES OF NIGHT VISION  
QUIZ 721-500-01.5**

1. c, a, b
2. a, d, b
3. e, b, f, c, a
4. b
5. a
6. b
7. a
8. a
9. a
10. b
11. a
12. a
13. b
14. b

**QUIZ 721-501-01.5**

**LESSON TITLE: NVG GENERAL CHARACTERISTICS**

**TASK NUMBER: 721-501-01.5**

**A. TRAINING OBJECTIVE:**

**TASK:** Pass the quiz.

**CONDITION:** Given the quiz and pencil.

**STANDARD:** Answer correctly 10 out of 13 questions on the quiz within 15 minutes.

**B. INTERMEDIATE TRAINING.** None.

**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Performance evaluation.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Quiz and pencil.
7. References: FM 21-305.

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.**
- b. **Tie-in.**
- c. **Lesson Objective.** (paragraph A).
- d. **Procedures.**
  - (1) Performance testing.
  - (2) Evaluation.

(3) Summary.

2. **PERFORMANCE TESTING.**

3. **EVALUATE.** Check written quiz results.

4. **SUMMARY.**

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

5. **RETRAINING.** Retrain and retest NO-GOs.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** None.

**G. ADDITIONAL COMMENTS AND INFORMATION.** Recommended testing time is 15 minutes.

**QUIZ 721-501-01.5**

**NVG GENERAL CHARACTERISTICS**

**INSTRUCTIONS:** This quiz will measure your knowledge of general characteristics of night vision goggles. Select the letter corresponding to the word or phrase that best completes the statement.

1. Night vision goggles make an object more visible at night by \_\_\_\_\_.
  - a. Magnifying objects.
  - b. Intensifying the amount of available ambient light.
  - c. Using the NVGs infrared light feature.
  
2. The performance of NVGs is directly related to the amount of available light, such as starlight and moonlight. However, it is not affected by rain, haze, fog, or snow.
  - a. True.
  - b. False.
  
3. The field of view as seen through the goggles is limited to \_\_\_\_\_.
  - a. 20 degrees.
  - b. 60 degrees.
  - c. 40 degrees.
  - d. Unrestricted.
  
4. The IR illuminator makes the NVG a/an \_\_\_\_\_ system capable of being detected by night vision devices used by the enemy.
  - a. Passive.
  - b. Active.
  - c. Unreliable.
  
5. Operating the goggles, while staring at a bright light source at night, will not cause any damage to the tubes.
  - a. True.
  - b. False.
  
6. The best range for depth perception and distance estimation when wearing goggles is \_\_\_\_\_.
  - a. Less than 20 feet or greater than 500 feet.
  - b. 20 to 500 feet.
  - c. Greater than 500 feet.

7. All objects viewed through the NVGs will appear \_\_\_\_.
- a. Blue.
  - b. Blue-green.
  - c. Green.
8. The condition caused by \_\_\_\_ is due to driving with one tube focused inside the vehicle and the other outside the vehicle.
- a. Dark adaptation.
  - b. Spatial disorientation.
  - c. Motion parallax.
9. There are two distinct models of NVG tubes. Third generation tubes have increased performance and a longer tube life than second generation tubes.
- a. True.
  - b. False.
10. When installing or removing the battery, always make sure the selector switch is in the \_\_\_\_ position.
- a. ON.
  - b. OFF.
  - c. IR off.
11. \_\_\_\_ is an unacceptable tube fault which makes NVG driving unsafe.
- a. Flashing, flickering.
  - b. Dark spots.
  - c. Fixed pattern.
12. \_\_\_\_ is an acceptable tube fault for NVG driving as long as it does not interfere with the mission.
- a. Dark spots.
  - b. Edge glow.
  - c. White dots.
13. NVGs can operate at temperatures below freezing.
- a. True.
  - b. False.

**QUIZ ANSWER SHEET**  
**NVG GENERAL CHARACTERISTICS**  
**QUIZ 721-501-01**

1. b
2. b
3. c
4. b
5. b
6. b
7. c
8. b
9. a
10. b
11. a
12. a
13. a

**QUIZ 721-502-01.5****LESSON TITLE: AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I)****TASK NUMBER: 721-502-01.5****A. TRAINING OBJECTIVE:****TASK:** Pass the quiz.**CONDITION:** Given the quiz and pencil.**STANDARD:** Answer correctly 5 out of 6 questions on the quiz within 15 minutes.**B. INTERMEDIATE TRAINING.** None.**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Performance evaluation.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Quiz and pencil.
7. References: TM 11-10 (AN/PVS-5), TM 11-1 (AN/PVS-7A), and TM 11-2 (AN/PVS-7B).

**D. SEQUENCE OF ACTIVITY.****1. INTRODUCTION.**

- a. **Interest Device.**
- b. **Tie-in.**
- c. **Lesson Objective.** (paragraph A).
- d. **Procedures.**
  - (1) Performance testing.
  - (2) Evaluation.

(3) Summary.

2. **PERFORMANCE TESTING.**

3. **EVALUATE.** Check written quiz results.

4. **SUMMARY.**

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

5. **RETRAINING.** Retrain and retest NO-GOs.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** None.

**G. ADDITIONAL COMMENTS AND INFORMATION.** Recommended testing time is 15 minutes.



## QUIZ 721-502-01.5

## AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I)

**INSTRUCTIONS:** This quiz will measure your knowledge of components common to both the AN/PVS-5 and AN/PVS-7 night vision goggles. Select the letter corresponding to the word or phrase which best completes the statement.

1. The monocular tubes on the AN/PVS-5 or the image intensifier tube on the AN/PVS-7 \_\_\_\_ available ambient light.
  - a. Amplifies.
  - b. Magnifies.
  - c. Reduces.
  
2. The objective focus is used to focus on objects from \_\_\_\_.
  - a. 1 foot to infinity.
  - b. 10 inches to infinity.
  - c. 20 to 500 feet.
  
3. It is not necessary to focus one eye at a time with the diopter adjustment rings.
  - a. True.
  - b. False.
  
4. Improper adjustment of the \_\_\_\_ will result in a distorted image and can result in eye fatigue.
  - a. Interpupillary (eye span) adjustment.
  - b. Clamp knobs.
  - c. Headstrap assembly.
  
5. The sharpest image will be observed only when the \_\_\_\_ are properly focused.
  - a. Objective lens/lenses.
  - b. Objective lens/lenses and both eyepieces.
  - c. Eyepieces.
  
6. The IR illuminator provides light for viewing up to 3 meters in \_\_\_\_ ambient light conditions and is \_\_\_\_ to the naked eye.
  - a. High.
  - b. Invisible.
  - c. Low.
  - d. Visible.

**QUIZ ANSWER SHEET**  
**AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I)**  
**QUIZ 721-502-01.5**

1. a
2. b
3. b
4. a
5. b
6. c, b

**QUIZ 721-503-02.5**

**LESSON TITLE: AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II)**

**TASK NUMBER: 721-503-02.5**

**A. TRAINING OBJECTIVE:**

<b>TASK:</b>	Pass the quiz.
<b>CONDITION:</b>	Given applicable TMs, NVG, and eye chart.
<b>STANDARD:</b>	Correctly perform NVG PMCS procedures, place the NVG into operation, and achieve the proper focus within 5 minutes.

**B. INTERMEDIATE TRAINING.** None.

**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Performance evaluation.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students and 1 NVG AI per 6 students.
6. Training aids and equipment: Eye chart, night vision goggles, and NVG spare batteries.
7. References: TM 11-10 (AN/PVS-5), TM 11-1 (AN/PVS-7A), and TM 11-2 (AN/PVS-7B).

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.**
- b. **Tie-in.**
- c. **Lesson Objective.** (paragraph A).
- d. **Procedures.**

- (1) Performance testing.

(2) Evaluation.

(3) Summary.

2. **PERFORMANCE TESTING.**

3. **EVALUATE.** Check quiz results.

4. **SUMMARY.**

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

5. **RETRAINING.** Retrain and retest NO-GOs.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** None.

**G. ADDITIONAL COMMENTS AND INFORMATION.** Recommended testing time is 5 minutes.

**QUIZ 721-503-02.5****AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II)**

**INSTRUCTIONS:** This quiz will measure your ability to correctly perform NVG PMCS procedures, place the NVG into operation, and achieve the proper focus. You will have five minutes to accomplish all steps.

1. Follow step-by-step procedures in the applicable technical manual for pre-operational checks on the NVG.
2. Follow step-by-step procedures in the applicable technical manual to place the NVG in operation.
3. Follow step-by-step procedures in the applicable technical manual to focus the NVG.
4. Follow step-by-step procedures in the applicable technical manual for post-operational checks on the NVG.

**QUIZ ANSWER SHEET**  
**AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II)**  
**QUIZ 721-503-02.5**

Student follows procedures in the applicable technical manual to correctly perform NVG PMCS procedures, place the NVG into operation, and achieve the proper focus within 5 minutes.

**QUIZ 721-504-02****LESSON TITLE: NVG DRIVING TECHNIQUES AND PROCEDURES****TASK NUMBER: 721-504-02****A. TRAINING OBJECTIVE:**

**TASK:** Pass the quiz.

**CONDITION:** Given the quiz and pencil.

**STANDARD:** Answer correctly 11 out of 14 questions on the quiz within 15 minutes.

**B. INTERMEDIATE TRAINING. None.****C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Performance evaluation.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students.
6. Training aids and equipment: Quiz and pencil.
7. References: FM 21-305.

**D. SEQUENCE OF ACTIVITY.****1. INTRODUCTION.**

- a. **Interest Device.**
- b. **Tie-in.**
- c. **Lesson Objective.** (paragraph A).
- d. **Procedures.**
  - (1) Performance testing.
  - (2) Evaluation.
  - (3) Summary.

**2. PERFORMANCE TESTING.**

3. **EVALUATE.** Check written quiz results.

**4. SUMMARY.**

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

5. **RETRAINING.** Retrain and retest NO-GOs.

**E. SAFETY RESTRICTIONS.** None.

**F. ENVIRONMENTAL CONSIDERATIONS.** None.

**G. ADDITIONAL COMMENTS AND INFORMATION.** Recommended testing time is 15 minutes.



## QUIZ 721-504-02

## NVG DRIVING TECHNIQUES AND PROCEDURES

**INSTRUCTIONS:** This quiz will measure your knowledge of NVG driving techniques and procedures. Select the letter corresponding to the word or phrase that best completes the statement.

1. NVG compatibility is best achieved by eliminating all interior and exterior vehicle lights.
    - a. True.
    - b. False.
  
  2. Driving in an area lit by artificial lights, such as flares, will limit your ability to see objects \_\_\_\_ the lighted area.
    - a. Inside.
    - b. Outside.
  
  3. A halo around artificial lights as seen through the goggles is an indication of \_\_\_\_.
    - a. Visibility restrictions.
    - b. Low battery power.
    - c. A visual illusion.
  
  4. To avoid obstacles while driving, you must understand the relationship between \_\_\_\_.
    - a. The speed of your vehicle and the NVG visual range capability.
    - b. Time and distance.
    - c. Speed of your vehicle and weather.
- NOTE:** Use the range limitation and ground speed limitation graphs to solve problems 5 and 6.
5. At what speed can you safely drive with NVGs if the sky is overcast and only 10 percent illumination is available?
    - a. Approximately 10 MPH.
    - b. Approximately 15 MPH.
    - c. Approximately 5 MPH.
  
  6. At what speed can you safely drive with NVGs if 75 percent (crescent moon) illumination is available?
    - a. Approximately 20 MPH.
    - b. Approximately 23 MPH.
    - c. Approximately 28 MPH.
  
  7. Operating a vehicle with the goggles worn over the NBC mask will not further reduce your field of vision.
    - a. True.
    - b. False.

8. Drivers can compensate for their reduced field of view by \_\_\_\_\_.
  - a. Understanding the principles of night vision.
  - b. Understanding the limitations and capabilities of the device.
  - c. Using a slow, continual scanning pattern.
  
9. If riding in a vehicle as an assistant (shotgun) operator, focus the NVG for \_\_\_\_\_.
  - a. Distance viewing.
  - b. Close-up viewing for reading instrument gauges.
  - c. Both distance and close-up viewing (alternating).
  
10. Driving with instrument panel lights on will not degrade NVG performance.
  - a. True.
  - b. False.
  
11. Driving with blackout drive lights will enhance near vision, but degrade distance vision, and may blind oncoming drivers wearing NVGs.
  - a. True.
  - b. False.
  
12. Driving with only the blackout marker lights on will degrade the performance of the NVG at low light levels; for example, cloudy starlight.
  - a. True.
  - b. False.
  
13. To minimize the impact of an oncoming vehicle's headlights on the NVG, the operator should \_\_\_\_\_.
  - a. Look away from the light source and continue to drive.
  - b. Slow down, look away from the light source, and pull off to the far-right hand side of the road.
  - c. Slow down and pull off to the far right-hand side of the road.
  
14. In the event the NVG tube or tubes begin to fail or your vehicle breaks down while driving in an NVG controlled training area, you should \_\_\_\_\_.
  - a. Slow down, pull off the road, stop the vehicle, and warn approaching traffic.
  - b. Slow down, pull off the road, stop the vehicle, and turn on your four-way emergency flashers.
  - c. Pull off the road, identify the problem, and warn oncoming traffic.

**QUIZ ANSWER SHEET**  
**NVG DRIVING TECHNIQUES AND PROCEDURES**  
**QUIZ 721-504-02**

1. a
2. b
3. a
4. a
5. a
6. b
7. b
8. c
9. c
10. b
11. a
12. a
13. b
14. a

**END OF COURSE COMPREHENSIVE TEST**

**LESSON TITLE: EOCCT**

**TASK NUMBER: All previously taught tasks.**

**A. TRAINING OBJECTIVE:**

- TASK:** Pass the EOCCT.
- CONDITION:** Given an examination booklet and pencil.
- STANDARD:** Pass all written and driving performance tests.

**B. INTERMEDIATE TRAINING.**

**Intermediate Training Objective 1**

- TASK:** Pass a written examination.
- CONDITION:** Given an examination booklet and pencil.
- STANDARD:** Answer correctly 70 percent of the questions on the exam within 1 hour.

**Intermediate Training Objective 2**

- TASK:** Pass the driver's road test.
- CONDITION:** Given a vehicle on which the student is licensed to drive, NVG, and an eye chart.
- STANDARD:** The student must:
- (1) Properly perform pre-operational NVG PMCS procedures, place the NVG into operation, and achieve the proper focus within 5 minutes.
  - (2) Correctly perform vehicle PMCS (before operation) while wearing the NVG within 15 minutes.
  - (3) Maintain control of the vehicle at all times and obey the designated speed limit.
  - (4) Successfully negotiate and correctly identify selected terrain features, route markers, and/or signs along the route and distinguish shadows from other features such as water puddles, walls, and ditches as seen through the NVG.
  - (5) Correctly perform vehicle PMCS (after operation) while wearing the NVG within 15 minutes.

(6) Correctly perform post-operational NVG PMCS procedures within 5 minutes.

**C. ADMINISTRATIVE INSTRUCTIONS.**

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Performance evaluation.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for each class of 20 students and one assistant instructor per student.
6. Training aids and equipment: Assigned vehicles, night vision goggles, NVG spare batteries, eye chart, tentage and field tables (as necessary), lightsticks (for use around the TOC/staging area and along the route as necessary), directional markers, engineer tape, command and control vehicle with radio, hazard chart (as necessary).
7. References: Operator TMs for assigned vehicle and applicable NVG and AR 600-55.

**D. SEQUENCE OF ACTIVITY.**

**1. INTRODUCTION.**

- a. **Interest Device.**
- b. **Tie-in.**
- c. **Lesson Objective.** (paragraph A).
- d. **Procedures.**
  - (1) Performance testing.
  - (2) Evaluation.
  - (3) Summary.

**2. PERFORMANCE TESTING.**

**NOTE:** The driver will test in the order listed below and will not perform the next test until successfully passing the previous test.

- a. Intermediate training objective 1 (written test).
- b. Intermediate training objective 2 (driving test).

3. **EVALUATE.** Check written test results, road test score sheets, and performance test checklists.

4. **SUMMARY.**

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

5. **RETRAINING.** Retrain and retest NO-GOs.

**E. SAFETY RESTRICTIONS.**

1. Start and drive vehicles only on the command of the instructor or AI.
2. Use ground guides when backing vehicles (use NVG-equipped ground guides during NVG operations).
3. Obey the designated speed limit at all times.
4. Maintain the designated interval of a 5- to 10-minute gap between vehicles.
5. Keep the instructor or AI informed of any vision deterioration which may impede your ability to continue safe driving with the NVG. Also, report any other problems, such as eyestrain, fatigue, headaches, or nausea.
6. Report any unsafe act to the instructor or AI immediately.
7. Review the emergency procedures with regards to goggle failure and vehicle breakdown while driving with NVGs.
8. Wear seat belts at all times when the vehicle is in operation.
9. Allow at least 30 minutes for dark adaptation before driving.

**F. ENVIRONMENTAL CONSIDERATIONS.**

1. Ensure that all hazardous materials and hazardous wastes are stored and labeled properly.
2. Ensure that spill kits are within reach when changing or adding vehicle fluids or in the case of vehicle failures. Spill kits should enable the soldiers to contain a spill on land or in water.
3. Ensure that drip pans remain under parked vehicles.
4. Ensure that containers are the proper size and type for draining vehicle fluids.

5. Night vision devices contain batteries. When a battery is out of service and is no longer needed, it is considered waste. At the time it becomes waste, a hazardous waste determination needs to be made (most lithium batteries are considered hazardous waste). All hazardous waste must be managed according to installation or host nation hazardous waste procedures. Some batteries such as alkaline batteries may be determined to be non-hazardous waste, but still must be disposed of properly. Contact the installation or host nation environmental office for the specific procedures for disposing of NVD batteries.

**G. ADDITIONAL COMMENTS AND INFORMATION.** Recommended testing time is 1.0 hour for the written test and 1 hour for the driving test.

## INTERMEDIATE TRAINING OBJECTIVE 1

### WRITTEN EXAM ADMINISTRATION

#### 1. GENERAL.

a. There are two versions of the final exam which the NVG instructor/examiner can choose to administer. Each version consists of 25 questions and has a control number at the top of the first page. Instructors may elect to administer a combination of both versions or one of the two to all students. The latter is simpler to manage in terms of grading, reviewing, and documenting exam grades. The other version may be administered for re-testing purposes if authorized by the unit commander.

b. Read the instructions in paragraph 3 below to the examinees. When giving instructions aloud, speak slowly and clearly, making sure the examinees understand. Administer the exam in a comfortable, well-lighted room, free of distractions, such as outside noise.

c. A separate answer sheet is not required for this exam. Students may mark the answers on the exam by filling in the blanks. After all the exams are turned in, the examiner should review all the questions with the students and provide the correct answers. This may be done either before or after the exams are graded. In no case should the students be allowed to keep the exam once it is graded. NVG instructors will destroy the completed exams after transferring the scores onto the individual's NVG Test History Form (Appendix F). This optional form can then be filed per AR 25-400-2.

d. Explain to students the requirement to pass this exam with a score of 70 percent or higher before receiving instruction in Driving with Night Vision Goggles. To achieve that standard, they must correctly answer 18 questions or more. There is no limit to how many times a student may take the exam. Local unit policy, however, may set a limit, as necessary.

e. Students have 1 hour in which to take the exam. The unit commander, however, may elect not to place a time limit.

2. **PREPARING FOR ADMINISTRATION.** Before the session, ensure you have enough copies of all needed test material. This is a closed book exam. Other than the exam itself, the only other material needed are the range limitation and ground speed limitation graphs. You should also have an ample supply of rulers and sharpened pencils with erasers. (All examinees should use a pencil to take the exam.) Finally, you should read over the test instructions and familiarize yourself with the exam and answer sheets. Be prepared to answer questions that examinees may have. Practice reading the instructions aloud in a manner that is slow and clear.

#### 3. CONDUCTING THE EXAM.

a. When you have passed out the exam sheets, read this script:

LOOK AT THE TOP OF THE EXAM SHEET. THERE ARE SPACES FOR YOUR NAME, RANK, MOS, AND TODAY'S DATE. AT THIS TIME, PRINT YOUR FULL NAME, RANK, MOS, AND TODAY'S DATE IN THOSE BLANKS. TODAY'S DATE IS \_\_\_\_\_. PRINT YOUR FULL NAME ONLY AT THE TOP RIGHT HAND CORNER ON ALL OTHER PAGES.



- b. Pause to give examinees time to do this. Then say—

I AM NOW GOING TO READ THE TEST INSTRUCTIONS. PLEASE READ THEM QUIETLY ALONG WITH ME. THERE ARE A TOTAL OF 25 QUESTIONS ON THIS EXAM. SECTION I CONTAINS TRUE/ FALSE QUESTIONS. READ EACH QUESTION CAREFULLY. PLACE A "T" FOR TRUE OR AN "F" FOR FALSE IN THE BLANK SPACE PROVIDED. SECTION II CONSISTS OF MULTIPLE CHOICE QUESTIONS. THERE IS ONLY ONE BEST ANSWER FOR EACH QUESTION. YOU MAY CHANGE AN ANSWER IF YOU WISH, BUT BE SURE THAT YOU COMPLETELY ERASE IT. ANSWER ALL QUESTIONS ON THE EXAM. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, CHOOSE THE BEST POSSIBLE ANSWER. ARE THERE ANY QUESTIONS?

- c. Pause for a few seconds and then say (choose either script)

Script A:

THIS TEST IS NOT TIMED. YOU WILL HAVE AS LONG TO WORK ON IT AS YOU WISH. IF YOU HAVE ANY QUESTIONS EITHER NOW OR AS YOU WORK THROUGH THE EXAM, RAISE YOUR HAND. WHEN YOU FINISH, BRING ALL TEST MATERIAL TO ME, INCLUDING YOUR PENCIL AND RULER. YOU MAY BEGIN.

Script B:

YOU HAVE 1 HOUR IN WHICH TO FINISH THIS EXAM. IF YOU HAVE ANY QUESTIONS EITHER NOW OR AS YOU WORK THROUGH THE EXAM, RAISE YOUR HAND. WHEN YOU FINISH, BRING ALL TEST MATERIAL TO ME, INCLUDING YOUR PENCIL AND RULER. THE TIME IS NOW \_\_\_\_\_. YOU HAVE UNTIL \_\_\_\_\_ TO FINISH THE EXAM. YOU MAY BEGIN.

- d. When examinees are taking the exam, keep an eye on the room to see that no one is cheating, disrupting the session, or distracting others. Also, make sure that no one is having difficulty understanding the instructions. As the examinees finish, they should bring their exams (and graphs) to you. Check to make sure that all the information at the top of the first page is complete and that their full name is at the top right hand corner of other pages.

#### 4. SCORING THE EXAM.

- a. Circle the item number having the wrong answer.
- b. Count the number of items circled.
- c. Subtract the number of circled items from the total number of items on the exam (25). This is the amount of questions answered correctly. Divide that number by 25, and then multiply that amount by 100 to get a percentage score. For example:

- (1) Number of items circled (incorrect answers): 5.
- (2) Raw score:  $25 - 5 = 20$ .
- (3) Percentage score:  $20 \div 25 = 0.80 \times 100 = 80\%$ .

**INTERMEDIATE TRAINING OBJECTIVE 1  
WRITTEN EXAMINATION**

**NAME:** \_\_\_\_\_

**RANK:** \_\_\_\_\_ **MOS:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

-----  
INSTRUCTIONS: THERE ARE A TOTAL OF 25 QUESTIONS ON THIS EXAM. SECTION I CONTAINS TRUE/FALSE QUESTIONS. READ EACH QUESTION CAREFULLY. PLACE A "T" FOR TRUE OR AN "F" FOR FALSE IN THE BLANK SPACE PROVIDED. SECTION II CONSISTS OF MULTIPLE CHOICE QUESTIONS. THERE IS ONLY ONE BEST ANSWER FOR EACH QUESTION. YOU MAY CHANGE AN ANSWER IF YOU WISH, BUT BE SURE THAT YOU COMPLETELY ERASE IT. ANSWER ALL QUESTIONS ON THE EXAM. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, CHOOSE THE BEST POSSIBLE ANSWER.  
-----

**SECTION I. TRUE/FALSE**

1. \_\_\_\_ Operating the goggles while staring at a bright light source at night will cause damage to the tubes.
2. \_\_\_\_ NVGs can operate at temperatures below freezing.
3. \_\_\_\_ The performance of NVGs is directly related to the amount of available light, such as starlight and moonlight. However, NVGs are not affected by rain, haze, fog, or snow.
4. \_\_\_\_ There are two distinct models of NVG tubes. Third generation tubes have increased performance and a longer tube life than second generation tubes.
5. \_\_\_\_ NVG compatibility is best achieved by eliminating all interior and exterior vehicle lights.
6. \_\_\_\_ Operating a vehicle with the goggles worn over the NBC mask will not reduce your field of vision.
7. \_\_\_\_ It is not necessary to focus one eye at a time with the diopter adjustment rings.
8. \_\_\_\_ Driving with instrument panel lights on will not degrade NVG performance.
9. \_\_\_\_ Driving with blackout drive lights will increase distance vision, but decrease near vision, and may blind oncoming drivers wearing NVGs.
10. \_\_\_\_ The best range for depth perception and distance estimation when wearing goggles is less than 20 feet or greater than 500 feet.

**SECTION II. MULTIPLE CHOICE**

11. \_\_\_ Night vision goggles make an object more visible at night by
- Magnifying objects.
  - Intensifying the amount of available moonlight/starlight.
  - Using the NVGs infrared light feature.

**NOTE:** Use the range limitation and ground speed limitation graphs to solve problem 12.

12. \_\_\_ At what speed can you safely drive with NVGs if the sky is overcast and only 5 percent illumination is available?
- Approximately 8 MPH.
  - Approximately 3 MPH.
  - Approximately 10 MPH.
13. \_\_\_ To minimize the impact of an oncoming vehicle's headlights on the NVG, the operator should—
- Look away from the light source and continue to drive.
  - Slow down, look away from the light source, and if possible, pull off to the far right-hand side of the road.
  - Slow down and pull off to the far right-hand side of the road.
14. \_\_\_ Driving with one tube focused inside the vehicle and the other outside the vehicle is a condition that causes \_\_\_\_.
- Dark adaptation.
  - Spatial disorientation.
  - Motion parallax
15. \_\_\_ What position must the selector switch be in when installing or removing the battery?
- ON position.
  - OFF position.
  - IR off.
16. \_\_\_ The objective focus is used to focus on objects from—
- 1 foot to infinity.
  - 10 inches to infinity.
  - 20 to 500 feet.
17. \_\_\_ The monocular tubes on the AN/PVS-5 and the image intensifier tube on the AN/PVS-7 \_\_\_\_ available ambient light.
- Amplify.
  - Magnify.
  - Reduce.

18. \_\_\_ Improper adjustment of the \_\_\_ will result in a distorted image and can result in eye fatigue.
- Interpupillary (eye span) adjustment.
  - Clamp knobs.
  - Headstrap assembly.
19. \_\_\_ How can drivers compensate for their reduced field of view?
- By understanding the principles of night vision.
  - By understanding the limitations and capabilities of the device.
  - By using a slow, continual scanning pattern.
20. \_\_\_ Driving in an area lit by artificial lights, such as flares, will limit your ability to see objects—
- Inside the lighted area.
  - Outside the lighted area.
21. \_\_\_ The field of view as seen through the goggles is limited to—
- 30 degrees.
  - 40 degrees.
  - 45 degrees.
  - 50 degrees.
22. \_\_\_ A halo around artificial lights as seen through the goggles is an indication of—
- Visibility restrictions.
  - Low battery power.
  - A visual illusion.
23. \_\_\_ The IR illuminator provides light, invisible to the naked eye, for viewing up to 3 meters in \_\_\_ ambient light conditions.
- High.
  - Low.
  - Medium.
24. \_\_\_ If riding in a vehicle as an assistant (shotgun) operator, focus the NVG for—
- Distance viewing.
  - Close-up viewing for reading instrument gauges.
  - Both distance and close-up viewing (alternating).
25. \_\_\_ The sharpest image will be observed only when the—
- Objective lens/lenses are focused.
  - Objective lens/lenses and both eyepieces are properly focused.
  - Eyepieces are properly focused.

**INTERMEDIATE TRAINING OBJECTIVE 1**

**WRITTEN TEST ANSWER SHEET  
FINAL EXAM (VERSION I)  
9H9-501-01**

- |       |       |
|-------|-------|
| 1. T  | 14. b |
| 2. T  | 15. b |
| 3. F  | 16. b |
| 4. T  | 17. a |
| 5. T  | 18. a |
| 6. F  | 19. c |
| 7. F  | 20. b |
| 8. F  | 21. b |
| 9. F  | 22. a |
| 10. F | 23. b |
| 11. b | 24. c |
| 12. a | 25. b |
| 13. b |       |

**INTERMEDIATE TRAINING OBJECTIVE 1  
WRITTEN EXAMINATION**

**NAME:** \_\_\_\_\_

**RANK:** \_\_\_\_\_ **MOS:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

-----  
 INSTRUCTIONS: THERE ARE A TOTAL OF 25 QUESTIONS ON THIS EXAM. SECTION I CONTAINS TRUE/FALSE QUESTIONS. READ EACH QUESTION CAREFULLY. PLACE A "T" FOR TRUE OR AN "F" FOR FALSE IN THE BLANK SPACE PROVIDED. SECTION II CONSISTS OF MULTIPLE CHOICE QUESTIONS. THERE IS ONLY ONE BEST ANSWER FOR EACH QUESTION. YOU MAY CHANGE AN ANSWER IF YOU WISH, BUT BE SURE THAT YOU COMPLETELY ERASE IT. ANSWER ALL QUESTIONS ON THE EXAM. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, CHOOSE THE BEST POSSIBLE ANSWER.  
 -----

**SECTION I. TRUE/FALSE**

1. \_\_\_\_ Driving with only the blackout marker lights on will degrade the performance of the NVG at low light levels for example, cloudy starlight.
2. \_\_\_\_ Operating a vehicle with the goggles worn over the NBC mask will not reduce your field of vision.
3. \_\_\_\_ Objects that are difficult to see during the day are not difficult to detect with night vision goggles at night.
4. \_\_\_\_ It is not necessary to focus one eye at a time with the diopter adjustment rings.
5. \_\_\_\_ Driving with instrument panel lights on will not degrade NVG performance.
6. \_\_\_\_ Driving with blackout drive lights will increase distance vision, but decrease near vision, and may blind oncoming drivers wearing NVGs.
7. \_\_\_\_ NVGs can operate at temperatures below freezing.
8. \_\_\_\_ NVG compatibility is best achieved by eliminating all interior and exterior vehicle lights.
9. \_\_\_\_ There are two distinct models of NVG tubes. Third generation tubes have increased performance and a longer tube life than second generation tubes.
10. \_\_\_\_ Lasers will be used on the battlefield. Most will not cause permanent damage to NVGs. You may be able to continue to use the goggles with a bright or dark spot at the point where the tube was damaged.

**SECTION II. MULTIPLE CHOICE**

11. \_\_\_ The field of view as seen through the goggles is limited to—
- 25 degrees.
  - 40 degrees.
  - 50 degrees.
  - 55 degrees.
12. \_\_\_ A halo around artificial lights as seen through the goggles is an indication of—
- Visibility restrictions.
  - Low battery power.
  - A visual illusion.
- NOTE:** Use the range limitation and ground speed limitation graphs to solve problem 13.
13. \_\_\_ At what speed can you safely drive with NVGs if 50 percent illumination is available?
- Approximately 10 MPH.
  - Approximately 15 MPH.
  - Approximately 5 MPH.
14. \_\_\_ Which of the following is considered an acceptable fault for NVG driving as long as it does not interfere with the mission?
- Honeycomb pattern.
  - Edge glow.
  - White dots.
15. \_\_\_ The sharpest image will be observed only when the—
- Objective lens/lenses are focused.
  - Objective lens/lenses and both eyepieces are focused.
  - Eyepieces are properly focused.
16. \_\_\_ Which condition is caused by driving with one tube focused outside the vehicle and the other inside the vehicle?
- Dark adaptation.
  - Spatial disorientation.
  - Motion parallax.
17. \_\_\_ Which of the following is an unacceptable fault which makes NVG driving unsafe?
- Edge glow.
  - Dark spots.
  - Fixed pattern.

18. \_\_\_\_ The monocular tubes on the AN/PVS-5 or the image intensifier tube on the AN/PVS-7 \_\_\_\_ available ambient light.
- Amplifies.
  - Magnifies.
  - Reduces.
19. \_\_\_\_ Improper adjustment of the \_\_\_\_ will result in a distorted image and can result in eye fatigue.
- Interpupillary (eye span) adjustment.
  - Diopter clamp.
  - Headstrap assembly.
20. \_\_\_\_ The IR illuminator makes the NVG a/an \_\_\_\_ system capable of being detected by night vision devices used by the enemy.
- Passive.
  - Active.
  - Unreliable.
21. \_\_\_\_ Drivers can compensate for their reduced field of view by \_\_\_\_.
- Understanding the principles of night vision.
  - Understanding the limitations and capabilities of the device.
  - Using a slow, continual scanning pattern.
22. \_\_\_\_ To avoid obstacles while driving, you must understand the relationship between \_\_\_\_.
- Speed of your vehicle and NVG visual range capability.
  - Time and distance.
  - Speed of your vehicle and weather.
23. \_\_\_\_ Driving in an area lit by artificial lights, such as flares, will limit your ability to see objects \_\_\_\_ the lighted area.
- Inside.
  - Outside.
24. \_\_\_\_ In the event the NVG tube or tubes begin to fail or your vehicle breaks down while driving in an NVG-controlled training area, you should \_\_\_\_.
- Slow down, pull off the road, and warn approaching traffic.
  - Slow down, pull off the road, and turn on your four-way emergency flashers.
  - Pull off the road, identify the problem, and warn oncoming traffic.



25. \_\_\_\_ What is the best range for depth perception and distance estimation when wearing night vision goggles?
- a. Less than 20 feet or greater than 500 feet.
  - b. 20 to 500 feet.
  - c. Greater than 500 feet.
  - d. 30 to 500 feet.

**INTERMEDIATE TRAINING OBJECTIVE 1**

**WRITTEN TEST ANSWER SHEET  
FINAL EXAM (VERSION II)  
9H9-502-01**

- |       |       |
|-------|-------|
| 1. T  | 14. a |
| 2. F  | 15. b |
| 3. F  | 16. b |
| 4. F  | 17. a |
| 5. F  | 18. a |
| 6. F  | 19. a |
| 7. F  | 20. b |
| 8. T  | 21. c |
| 9. T  | 22. a |
| 10. T | 23. b |
| 11. b | 24. a |
| 12. a | 25. b |

13. b	
-------	--

**INTERMEDIATE TRAINING OBJECTIVE 2  
DRIVER'S PERFORMANCE TEST (ROAD TEST) INSTRUCTIONS**

**1. GENERAL.**

a. The unit commander has the flexibility of conducting the driver performance test over the same route used in Phases I through III or over an unknown route. Although the latter represents a real-world challenge, we recommend using the same route for the initial qualification training purposes as well as for safety considerations.

b. Make every effort to schedule the performance test on a night when the moon offers **no less than 25 percent illumination** (quarter moon) and is positioned at least 30 degrees above the horizon.

c. Retesting may be authorized by the unit commander. Document the test results on the NVG Road Test Score Sheet, if used (Appendix G).

2. **PURPOSE.** The driver performance test measures the student's ability to safely drive a vehicle with the aid of night vision goggles. Given a passing score on the written examination, successful performance on this test satisfies qualification training requirements stated in AR 600-55. In addition to driving ability, the test measures the examinee's ability to perform vehicle PMCS while wearing the NVG, to properly place the NVG into operation, and to read signs and identify terrain features or obstacles along the route.

**3. PERFORMANCE TEST CHECKLIST.**

a. The NVG driver performance test checklist is provided as a guide. Units may want to modify this checklist based on unique training requirements and geographical/topographical considerations.

b. Each time the examinee makes an **error** place a tally mark in the space provided next to that operation. Some NVGs may not apply to all operations listed on the checklist. Score only those that apply. In some cases, more than one tally mark may be required for each operation. For example, under Item 3 of Part II, the examinee failed to check the oil level before and after operating the vehicle. Under Item 4 of Part III, the examinee failed to read two out of the four road signs on the route. In both examples, the examiner would place two tally marks in the space provided for each item.

c. At the completion of the test, count the number of tally marks (errors). Subtract this number from 50 and multiply by 2 to obtain a percentage score. Record the score in the space provided on the checklist; for example:

(1) Percentage of tally marks: 5.

(2)  $50 - 5 = 45 \times 2 = 90\%$ .

d. The lowest passing score is 70 percent. If the examinee does not achieve 70 percent or above, indicate the reason for failure in the space provided under REASON FOR FAILURE. Examples are "examinee did not obtain minimum passing score" and "examinee continuously committed unsafe acts."

e. Failure of the visual performance test is determined when the following lines on the eye chart (see Appendix B) are not readable at the following distances:

	<u>10 Feet</u>	<u>20 Feet</u>
AN/PVS-5 series	20/30	20/70
AN/PVS-7 series	20/25	20/50

f. Automatic failures include—

- (1) Failure to pass the visual; performance test.
- (2) Failure to properly place the NVG into operation.
- (3) Any unsafe driving act.
- (4) Failure to achieve minimum passing score.

**NOTE:** Although an examinee may score 70 percent or higher, if, in the opinion or judgment of the test examiner, the examinee needs additional training, the examiner has the option not to certify the examinee as NVG-qualified.

#### 4. SAFETY RESTRICTIONS.

- a. Make sure the students are well rested and do not exhibit any signs of fatigue before the start of the performance test.
- b. Make sure the vehicles are started and driven only on the instructions from the examiner.
- c. Use NVG-equipped ground guides when backing vehicles.
- d. Make sure the examinees comply with the designated speed limit at all times.
- e. Make sure the students maintain a 5- to 10-minute gap between vehicles.
- f. Make sure an examiner is in the cab of the vehicle at all times.
- g. Cease testing if insufficient illumination exists or weather conditions deteriorate; for example, snow, rain, or fog. Examinees should remove their goggles and use headlights to return to the start point.
- h. Tell the examinees to always keep the examiner informed of any vision deterioration that may impede their ability to continue safe driving with the NVG. Examinees should also report any other problems, such as eyestrain, headaches, or nausea.
- i. Make sure the test route selected is in an area where other traffic is precluded. If the route does not preclude this, establish some form of traffic control (see Appendix E).
- j. Always watch for obstructions, be mindful of any deteriorating changes in the weather, and warn the examinee of dangers that you think he does not see. If the examinee becomes involved in a dangerous or unlawful traffic incident or an accident, the test is to be terminated immediately. After all responsibilities at the scene of the accident are fulfilled, the examiner will drive the vehicle back to the start point.

- k. Make sure all occupants wear seat belts while the vehicle is in operation.

**5. ROAD TEST ADMINISTRATION.**

- a. Enter the date in the space provided on the checklist, then say to the examinee:

**WHAT IS YOUR NAME, LAST NAME FIRST? SPELL IT.**

- b. Fill in the examinee's name after the word NAME, then say:

**WHAT IS YOUR RANK?**

- c. Enter the individual's rank after the word RANK, then say:

**WHAT IS YOUR ORGANIZATION?**

- d. Enter the name of the organization after the word ORGANIZATION. Enter the full nomenclature of the goggle (for example, AN/PVS-5/7B), the type vehicle the examinee will use, and the result of the visual performance test in the space provided. Then say to the examinee:

**THERE WILL BE NO "TRICK" ORDERS.**

**YOU WILL NOT BE ASKED TO DO ANYTHING IN VIOLATION OF THE LAW OR GOOD DRIVING PRACTICES.**

**YOUR SCORED TEST BEGINS WITH BEFORE-OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES WHICH YOU WILL PERFORM ON THE GOGGLES, FOLLOWED BY BEFORE-OPERATOR PMCS ON THE VEHICLE WHILE WEARING THE GOGGLES. (The examiner may stop the PMCS process when he is satisfied with the examinee's performance.) ONCE YOU COMPLETE YOUR PMCS, YOU WILL BE TESTED ON DRIVING WITH NVGs. AFTER DRIVING THE ROUTE, YOU WILL BE TESTED ON POSTOPERATIONAL PMCS PROCEDURES ON THE VEHICLE AND THEN ON THE GOGGLES. THIS WILL CONCLUDE THE PERFORMANCE TEST.**

**FOLLOW MY INSTRUCTIONS. IF I DIRECT YOU TO STOP THE VEHICLE FOR WHATEVER REASON, DO SO IMMEDIATELY.**

**ARE THERE ANY QUESTIONS?**

- e. Answer all questions, except those about scoring procedures; then say:

**DURING THE TEST, I WILL MAKE SOME OBSERVATIONS AND KEEP NOTES. DO NOT BE CONCERNED. YOUR SCORED PERFORMANCE TEST STARTS NOW.**

- 6. AFTER-ACTION REVIEW.** At the conclusion of the test, bring weaknesses to the attention of the examinee and advise him in what areas further practice or training is required. Conduct the AAR whether the examinee passes or fails the road test.

**CHAPTER 6****STUDENT ADVANCE SHEETS/HANDOUTS**

<b>ADVANCE SHEET</b>	<b>TITLE</b>
721-500-01.5	PRINCIPLES OF NIGHT VISION
721-501-01.5	NVG GENERAL CHARACTERISTICS
721-502-01.5	AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I)
721-503-02.5	AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II)
721-504-02	NVG DRIVING TECHNIQUES AND PROCEDURES
721-505-0.45	DRIVING WITH NIGHT VISION GOGGLES, PHASE I
721-506-01.5	DRIVING WITH NIGHT VISION GOGGLES, PHASE II
721-507-06	DRIVING WITH NIGHT VISION GOGGLES, PHASE III

**ADVANCE SHEET 721-500-01.5**

**PRINCIPLES OF NIGHT VISION**

**TRAINING OBJECTIVE**

- TASK:** The student will demonstrate a basic understanding of the principles of night vision.
- CONDITION:** Given this lesson and its viewgraphs, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 10 out of 14 questions on the quiz within 15 minutes.
- REFERENCE:** FM 21-305.
- SAFETY RESTRICTIONS:** None.

**ADVANCE SHEET 721-501-01.5**

**NVG GENERAL CHARACTERISTICS**

**TRAINING OBJECTIVE**

- TASK:** The student will demonstrate a basic knowledge of the general characteristics and limitations of NVGs.
- CONDITION:** Given this lesson and its viewgraphs, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 10 out of 13 questions on the quiz within 15 minutes.
- REFERENCE:** FM 21-305.
- SAFETY RESTRICTIONS:** None.



**ADVANCE SHEET 721-502-01.5**

**AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART I)**

**TRAINING OBJECTIVE**

- TASK:** The student will correctly identify and describe component nomenclatures, functions, and characteristics of NVGs.
- CONDITION:** Given this lesson, its viewgraphs, -10 operator manual, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than five out of six questions on the quiz within 10 minutes.
- REFERENCE:** Applicable -10 operator manual.
- SAFETY RESTRICTIONS:** None.

**ADVANCE SHEET 721-503-02.5**

**AN/PVS-5 AND AN/PVS-7 NIGHT VISION GOGGLE (PART II)**

**TRAINING OBJECTIVE**

- TASK:** The student will demonstrate a basic knowledge on operational procedures and maintenance of the NVG.
- CONDITION:** Given this lesson, a video, -10 operator manual, NVG, eye charts, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly perform NVG PMCS procedures, place the NVG into operation, and achieve the proper focus all within 5 minutes.
- REFERENCE:** Applicable -10 operator manual.
- SAFETY RESTRICTIONS:** None.

**ADVANCE SHEET 721-504-02**

**NVG DRIVING TECHNIQUES AND PROCEDURES**

**TRAINING OBJECTIVE**

- TASK:** The student will demonstrate a basic knowledge of specific driving techniques, procedures, and precautions while wearing the NVG.
- CONDITION:** Given this lesson, its viewgraphs, range limitation and speed limitation graphs, quiz, and class notes.
- STANDARD:** To receive a GO on this lesson, the student must correctly answer no less than 11 out of 14 questions on the quiz within 15 minutes.
- REFERENCE:** FM 21-305.
- SAFETY RESTRICTIONS:** None.

**ADVANCE SHEET 721-505-0.45**

**DRIVING WITH NIGHT VISION GOGGLES, PHASE I**

**TRAINING OBJECTIVE**

- TASK:** The student will drive an assigned vehicle in daylight conditions without the NVG.
- CONDITION:** Given a vehicle on which the student is licensed to drive.
- STANDARD:** To receive a GO on this lesson, the student must correctly perform vehicle PMCS, obey the designated speed limit, and maintain control of the vehicle at all times over a designated route.
- REFERENCE:** Operator TM for assigned vehicle and FM 21-305.

**SAFETY RESTRICTIONS:**

1. Start and drive vehicles only on the command of the instructor or AI.
2. Use ground guides when backing vehicles.
3. Obey the designated speed limit at all times.
4. Maintain at least a 3-minute gap between vehicles.
5. Report any unsafe act to the instructor or AI immediately.
6. Wear seat belts at all times when the vehicle is in operation.

**ADVANCE SHEET 721-506-01.5**

**DRIVING WITH NIGHT VISION GOGGLES, PHASE II**

**TRAINING OBJECTIVE**

**TASK:** The student will drive an assigned vehicle at night, with headlights on, and without NVG.

**CONDITION:** Given a vehicle on which the student is licensed to drive.

**STANDARD:** To receive a GO on this lesson, the student must correctly perform vehicle PMCS, obey the designated speed limit, and maintain control of the vehicle at all times over a designated route.

**REFERENCE:** Operator TM for assigned vehicle and FM 21-305.

**SAFETY RESTRICTIONS:**

1. Start and drive vehicles only on the command of the instructor or AI.
2. Use ground guides when backing vehicles.
3. Obey the designated speed limit at all times.
4. Maintain the designated interval between vehicles.
5. Report any unsafe act to the instructor or AI immediately.
6. Allow at least 30 minutes for dark adaptation before driving.
7. Wear seat belts at all times when the vehicle is in operation.

## ADVANCE SHEET 721-507-06

## DRIVING WITH NIGHT VISION GOGGLES, PHASE III

## TRAINING OBJECTIVE

- TASK:** The student will drive an assigned vehicle at night while wearing NVGs.
- CONDITION:** Given a vehicle on which the student is licensed to drive, NVG, and an eye chart.
- STANDARD:** To receive a GO on this lesson, the student must—
- (1) Properly perform pre-operational NVG PMCS procedures, place the NVG into operation, and achieve the proper focus, within 5 minutes.
  - (2) Correctly perform vehicle PMCS (before operation) while wearing the NVG, within 15 minutes.
  - (3) Maintain control of the vehicle at all times and obey the designated speed limit.
  - (4) Successfully negotiate and correctly identify selected terrain features, route markers, and/or signs along the route, and distinguish shadows from water puddles, walls, or ditches as seen through the NVG.
  - (5) Correctly perform vehicle PMCS (after operation) while wearing the NVG, within 15 minutes.
  - (6) Correctly perform post-operational NVG PMCS procedures, within 5 minutes.
- REFERENCE:** Operator TMs for assigned vehicle and applicable NVG and AR 600-55.

**SAFETY RESTRICTIONS:**

1. Start and drive vehicles only on the command of the instructor or AI.
2. Use NVG-equipped ground guides when backing vehicles.
3. Obey the designated speed limit at all times.
4. Maintain at least a 5- to 10-minute gap between vehicles.
5. Keep the instructor or AI informed of any vision deterioration, which may impede your ability to continue safe driving with the NVG. Also, report any other problems, such as eyestrain, fatigue, headaches, or nausea.
6. Report any unsafe act to the instructor or AI immediately.
7. Review the emergency procedures with regards to goggle failure and vehicle breakdown while driving with NVGs.
8. Wear seat belts at all times when the vehicle is in operation.

## APPENDIX A

### PAPER COPIES OF VIEWGRAPH CHARTS

This appendix contains hard copies of viewgraphs 1 through 20 as referenced in Chapter 4.

Editor's NOTE: Required viewgraphs are available in the Microsoft Power Pont source file *Nvgshw.ppt*.



## APPENDIX B

### EYE CHARTS

**B-1. Distance Vision.** The sharpest image will be observed only when the objective lens/lenses and both eyepieces are properly focused. These adjustments operate independently and must be made separately. Adjust distance, diopter, then distance and diopter until the best focus is achieved. When properly focused, the following lines on the eye chart (Figure B-1) should be readable at these distances:

	<u>10 Feet</u>	<u>20 Feet</u>
AN/PVS-5 series	20/25	20/50
AN/PVS-7 series	20/20	20/40

**B-2. Near Vision.** Focusing the goggles is best accomplished with the aid of an eye chart (Figure B-2). Hang it on a tree (or wall if in a classroom) and slightly lower than eye height. The desired distance is 20 feet from the chart to the viewing line. If in a classroom, attach the light to the ceiling about 10 feet away from the eye chart and position the light so that it will not create a glare for the viewer.

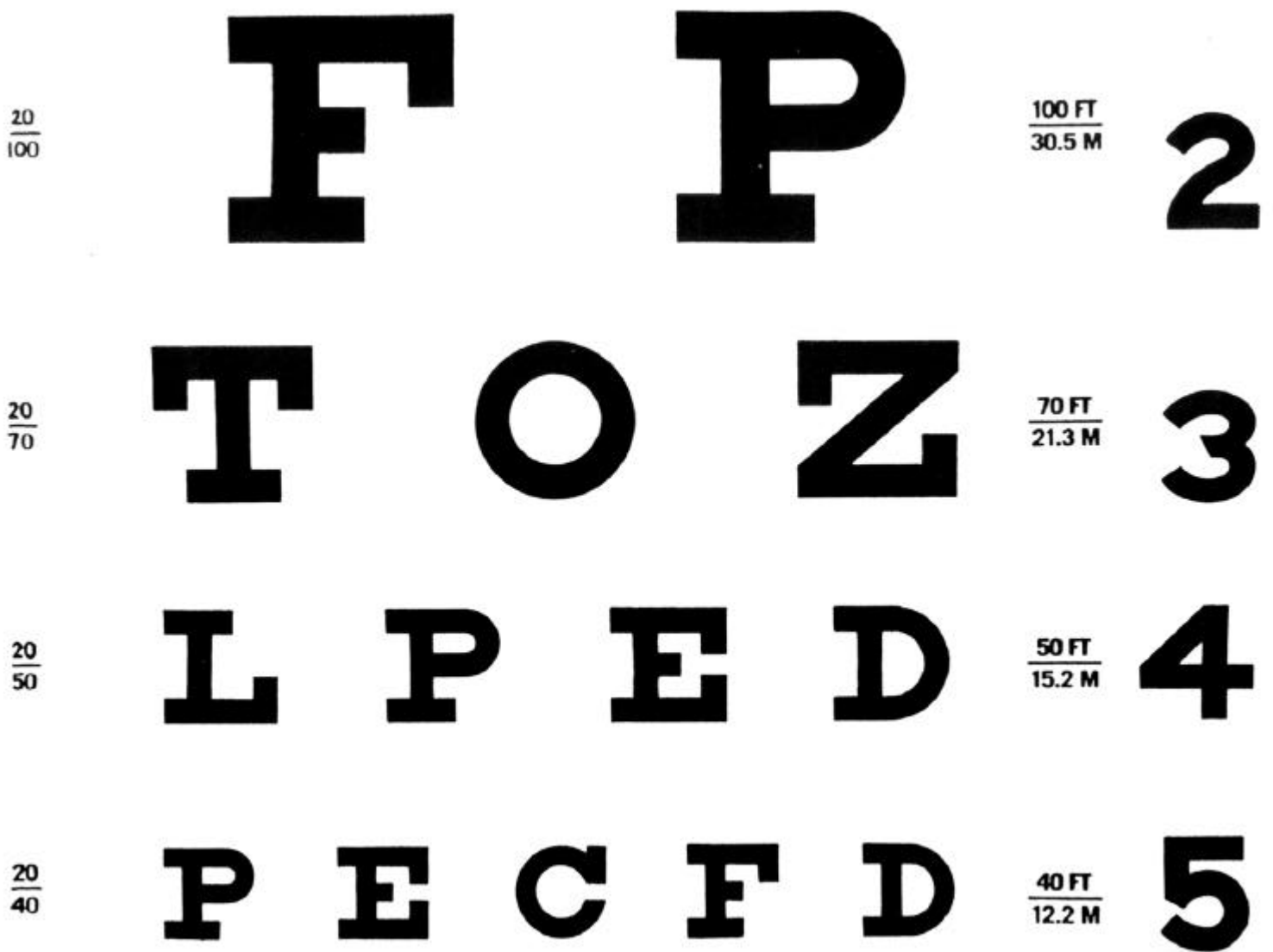


Figure B-1. Distance vision

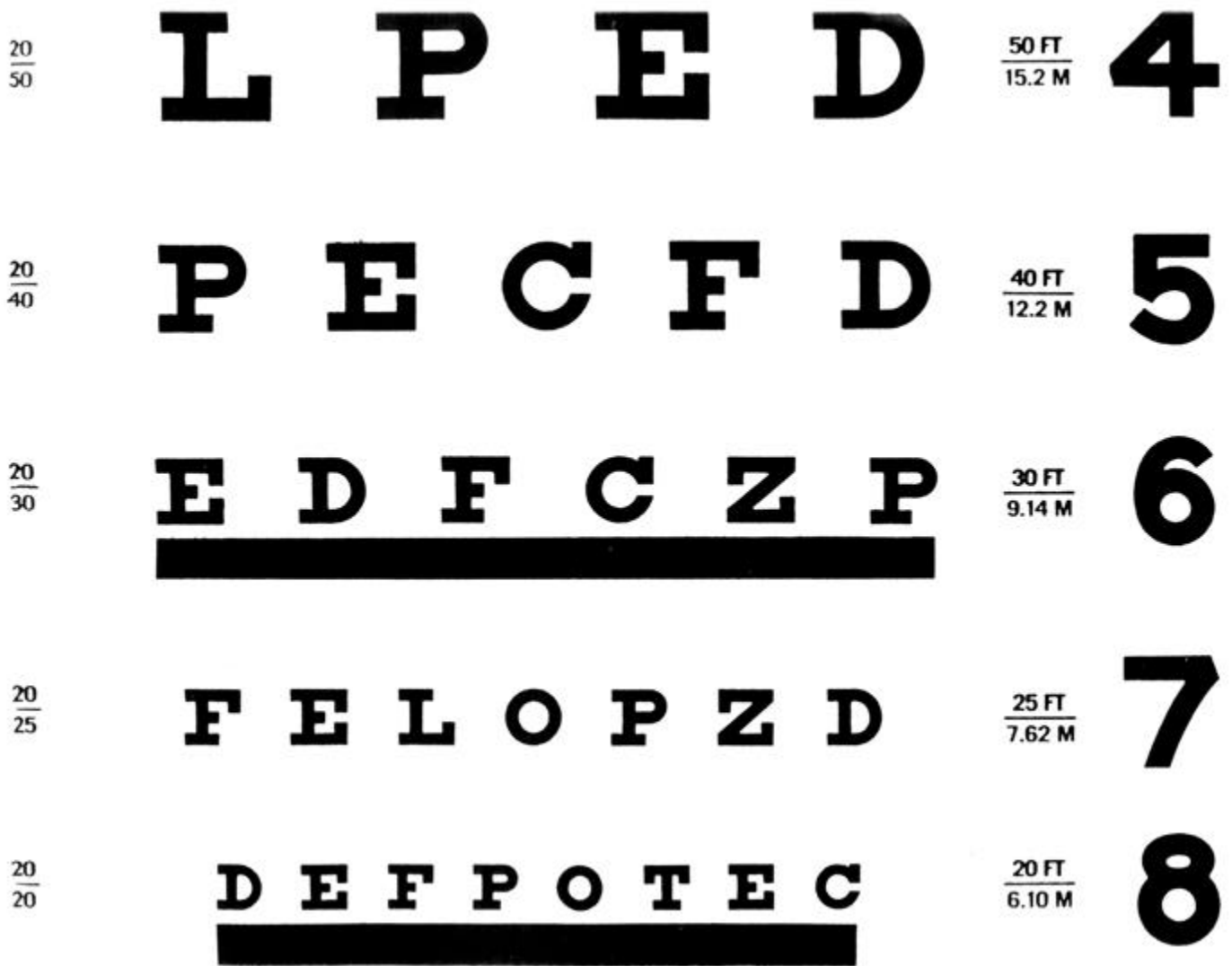


Figure B-2. Near vision

APPENDIX C

RANGE AND SPEED LIMITATION GRAPHS

**C-1. HAZARD RANGE LIMITATION GRAPH.** Figure C-1 shows how to determine the maximum range at which an object can be identified. It addresses a hazard 3 meters long, and 15 centimeters in diameter (the size of a small pole or a bare tree).

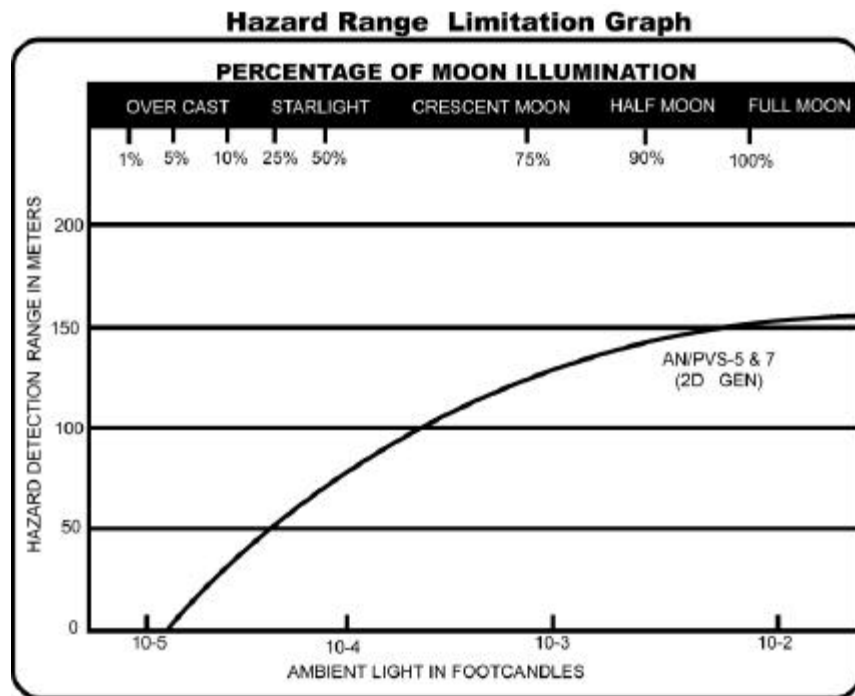


Figure C-1. Hazard range limitation graph

**C-2. GROUND SPEED LIMITATIONS.** After computing the range at which an object can be detected, use the ground speed limitations (Figure C-2) to determine a safe speed for driving with NVGs.

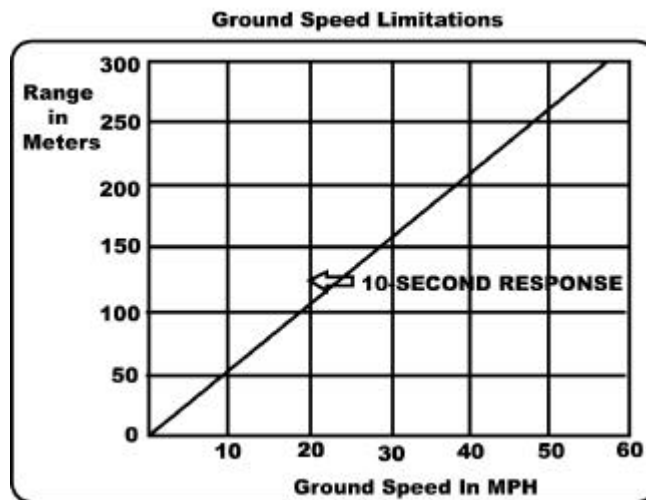


Figure C-2. Ground speed limitations

## APPENDIX D

### TRAINING MISSION PLANNING AND BRIEFINGS

1. Night driving operations are more easily conducted when ambient light sources provide the greatest amount of natural illumination. Make every effort to schedule Phase III of this module and the performance test on a night when the moon offers no less than 25 percent illumination (quarter moon) and is positioned at 30 degrees or more above the horizon.
2. Consider all possible situations when planning NVG training missions, such as deteriorating weather, disorientation, loss of depth perception, and equipment failure. All drivers/students must know their responsibilities under each situation. Communication between student and instructor/evaluator is critical. The student must constantly advise the instructor/evaluator of any reduction in vision.
3. Discuss the following subjects during a night vision goggle briefing, as a minimum—
  - a. Weather, including sunset, moonrise, moonset, percent moon available, ambient light level, and effect of cloud coverage on ambient light levels. Weather forecasts should cover from one hour before training begins through one hour after training ends. If actual weather conditions deteriorate, modify night training as necessary.
  - b. Visibility restrictions, such as smoke, haze, or fog.
  - c. Light-level planning calendar. The instructor, with the help of supporting weather personnel, can develop a light-level calendar to predict when optimum levels of ambient light will exist. Further, a computer program named NIGHTVIS provides accurate forecasts of favorable/unfavorable times of NVG use. This user-friendly software program can be obtained by writing to Commander, US Army Atmospheric Sciences Laboratory, ATTN: SLCAS-AE-A, White Sands Missile Range, NM 88002-5501.
  - d. Hazard map review for obstructions located in the training area and/or along the training route.
  - e. Mission to be performed.
  - f. Vehicle and site preparation.
  - g. Communication duties and responsibilities (student/instructor).
  - h. Parking and recovery plans.
  - i. Emergency procedures, such as goggle failure and vehicle breakdowns.
  - j. Medical evacuation/fire support.
  - k. Personal equipment.
    1. Safety.

m. Speed limitations. AR 600-55 sets the requirement for commanders to set speed limitations for all modes of driving while wearing the NVG. In deciding what those limitations are, they must consider the following factors:

- (1) Type of NVG being used for driving, and the generation of the image intensifier tube. (The range limitation and ground speed limitation graphs enclosed in this training circular may be used for this purpose.)
- (2) The type of vehicle used for training.
- (3) Weather conditions.
- (4) Mode of driving, such as convoy and off-road.
- (5) Terrain.
- (6) Amount of light available (natural and artificial).

NOTE: As a general rule, driving with NVGs should never exceed 25 MPH under any circumstance! Speed under convoy conditions should not exceed the limitations set for normal convoy movement without NVGs.

4. Draw all charts, drawings, and diagrams to scale as accurately as possible.
5. Conduct a reconnaissance of the selected route during the day and night. The area should have a variety of road and open terrain conditions available (heavy/little overhead canopy, improved dirt roads, unimproved trails, cross-country terrain, good/poor contrast). Length of the route should be about 10 kilometers. Place directional markers along the route at night. This may be done in a variety of ways. One option is to use a coffee can with a cutaway design of an arrow about 3 inches long. Place an IR or visible chemlight inside and cover the top of the can. Nail these cans to trees along intersections, turns, and so forth.
6. Conduct the formal briefing far enough in advance of the scheduled departure to allow time to resolve any problems raised during the briefing. Schedule a final briefing just before departure time to:
  - a. Update weather conditions.
  - b. Confirm time schedule.
  - c. Discuss any mission changes.
  - d. Ensure the goggles are working properly.
  - e. Ensure spare batteries are available.
  - f. Review safety precautions and emergency procedures.
  - g. Allow the instructor time to reemphasize important aspects of the mission.

7. Safety restrictions are included in each phase of instruction. Brief the safety restrictions to the students before the start of each lesson. Pay particular attention to the safety restrictions in Phase II.
8. Assistant instructors should hold individual briefings after the formal briefing. Each driver should be required to discuss the entire mission.

**APPENDIX E****SUPPORT REQUIREMENTS**

Support requirements for conducting safe NVG driver training include the following:

- a. Before driving a route at night, check the route during the day for obstructions. Post a hazard chart in the classroom and update it when a new obstruction is detected.
- b. Set up the tactical site/staging area lighting system for night training. Use tactical lights for both aided and unaided vision when operating at a tactical site.
- c. A command and control vehicle, equipped with NVGs, must be on the route at all times during qualification and refresher training. Establish communication between the command and control vehicle and the TOC before beginning any driver training with NVGs.
- d. Military police support may be necessary if the route selected is in an area where other traffic is not precluded.
- e. MEDEVAC and fire support personnel must be on site or on standby.

**WARNING**

All support personnel not involved with NVG training should receive a briefing before training begins as to what will be going on and what they should and should not do; for example, random use of flashlights or other lights, walking around and between vehicles, and so forth.



**APPENDIX F**

**NVG TEST HISTORY FORM**

1. Use of this form is not mandatory. It is mainly intended as a management tool for documenting multiple exam/performance results when the unit commander has authorized retesting of the exam and road test.
2. Four lines are available for documenting testing and re-testing results for both written and performance tests. A space is also provided to record which version of the written exam was administered (9H9-501-01 or 9H9-502-01).
3. Use or nonuse of this form still requires the commander to annotate the training on the student's DA Form 348 and on the OF 346 or ULLS equivalent per AR 600-55.
4. If the course is conducted at a centralized location, forward this form to the soldier's unit commander along with DA Form 348 or ULLS equivalent.





**APPENDIX G**

**NVG ROAD TEST SCORE SHEET**

1. Use of this form is not mandatory. It is intended as a management tool for documenting driver's performance (road test) results for intermediate training objective two of the end of course comprehensive test of the Training Program for Night Vision Goggle Driving Operations.
2. The form facilitates documenting testing with GO/NO-GO entries and entering evaluator comments for each step evaluated.
3. Regardless of the form used, the commander must still annotate the training on the student's DA Form 348 and on the OF 346 or ULLS equivalent per AR 600-55.
4. If the course is conducted at a centralized location, the instructor should forward this form to the soldier's unit commander along with DA Form 348 or ULLS equivalent and the NVG Test History Form.

**NIGHT VISION GOGGLE DRIVER PERFORMANCE TEST  
(CHECKLIST)**

**DATE:** \_\_\_\_\_

**NAME:** \_\_\_\_\_ **RANK** \_\_\_\_\_

**ORGANIZATION:** \_\_\_\_\_

**TYPE GOGGLE USED:** \_\_\_\_\_ **TYPE VEHICLE USED:** \_\_\_\_\_

**VISUAL PERFORMANCE TEST: PASS** \_\_\_\_\_ **FAIL** \_\_\_\_\_

**PART I. PREOPERATIONAL NVG PROCEDURES** (Unless otherwise specified, items apply to both AN/PVS-5 and AN/PVS-7 series goggles.)

1. \_\_\_\_\_ Inspects all lenses for dirt, dust, chips, or cracks.
2. \_\_\_\_\_ Inspects face mask cushion (PVS-5) and housing (AN/PVS-5 and-7) for scratches, dents, or other damage.
3. \_\_\_\_\_ Inspects straps for holes, rips, defective fasteners, or other damage.
4. \_\_\_\_\_ Checks to see that the binocular assembly moves freely. (AN/PVS-5)
5. \_\_\_\_\_ Checks to see that the monocular can be moved apart or closer together freely. (AN/PVS-5)
6. \_\_\_\_\_ Checks to see that each eyepiece can be moved closer together freely. (AN/PVS-7)
7. \_\_\_\_\_ Checks diopter adjustment rings to see that they move freely.
8. \_\_\_\_\_ Checks objective lens focus knobs to see that they move freely. (AN/PVS-7)
9. \_\_\_\_\_ Checks mechanical action of the ON/OFF switch for looseness.
10. \_\_\_\_\_ Checks battery compartment for corrosion or damage to contacts.
11. \_\_\_\_\_ Properly inserts battery in the device.
12. \_\_\_\_\_ Installs battery with rotary switch in OFF position.
13. \_\_\_\_\_ Replaces battery cap and tightens firmly to ensure a watertight seal.

**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PART II. SELECTED BEFORE- AND AFTER-VEHICLE PMCS TASKS**

(Examinee performs these tasks while wearing the NVG.)

1. \_\_\_\_ Ensures blackout marker and drive lights function properly.
2. \_\_\_\_ Inspects for leaks.
3. \_\_\_\_ Checks oil level.
4. \_\_\_\_ Ensures all instrument panel gauges function properly.
5. \_\_\_\_ Inspects fan/radiator.
6. \_\_\_\_ Inspects for damage to body.
7. \_\_\_\_ Inspects tires for under/overinflation.
8. \_\_\_\_ Inspects mirrors.

**REMARKS:**

---

---

---

**PART III. DRIVING**

1. \_\_\_\_ Prepares vehicle lighting for NVG compatibility; for example, eliminates all interior and exterior vehicle lights.
2. \_\_\_\_ Refocuses the NVG for distance vision before driving.
3. \_\_\_\_ Fastens seat belt.
4. \_\_\_\_ Uses a ground guide when backing vehicle.
5. \_\_\_\_ Reads signs.
6. \_\_\_\_ Identifies route markers.
7. \_\_\_\_ Identifies and avoids obstructions on the route (holes, ditches, trees, and so forth).
8. \_\_\_\_ Uses proper night vision scanning techniques.
9. \_\_\_\_ Maintains a steady speed without exceeding the designated speed limit.
10. \_\_\_\_ Maintains distance between vehicles.
11. \_\_\_\_ Keeps the examiner informed on status of vision; for example, good, clear, or deteriorating.

12. \_\_\_ Stays on the road when executing turns or on curves.

13. \_\_\_ Does not show excessive nervousness.

14. \_\_\_ Is able to identify the edge of the road.

15. \_\_\_ Is able to properly judge distances to road junctions.

16. \_\_\_ Is able to distinguish shadows from other terrain features, such as puddles of water.

**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**SCORE:** \_\_\_\_\_%      **COMPUTATION:**      a. # of tally marks: \_\_\_\_\_  
b.  $50 - \# \text{ of tally marks} = \text{_____} \times 2 = \text{_____}\%$

**REASON FOR FAILURE:** \_\_\_\_\_  
\_\_\_\_\_

**EXAMINER:** \_\_\_\_\_  
(PRINTED NAME AND SIGNATURE)

## GLOSSARY

AAR	after-action review
AI	assistant instructor
AR	Army regulation
ARTEP	Army training and evaluation program
ATV	All-terrain vehicle
BO	blackout
CECOM	Army Communications-Electronics Command
chem	chemical
chemlight	chemical light
DA	Department of the Army
DS	direct support
est	estimated
F	Fahrenheit
FM	field manual
FMTV	family of medium tactical vehicles
ft	foot
FTX	field training exercise
gen	generation
hr	hour
IPD	interpupillary distance
IR	infrared
MEDEVAC	medical evacuation
METT-T	mission, enemy, terrain, troops and time
M.I.	middle initial
MOS	military occupational specialty
MPH	miles per hour
m	meter
min	minute
NBC	nuclear, biological, and chemical
NVD	night vision devices
NVG	night vision goggle
OF	optional form
op	operation
PE	practical exercise
PIN	production identification number
PMCS	preventive maintenance checks and services
sec	section
SOPs	standing operating procedures
TASC	Training and Audiovisual Support Center
TBP	to be published
TC	Training circular
TM	technical manual
TOC	tactical operations center
ULLS	unit level logistics system



## REFERENCES

### SOURCES USED

- AR 600-55                    *The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing)*, 31 December 1993
- FM 21-305                    *Manual for the Wheeled Vehicle Driver*, 27 August 1993
- FM 101-5                    *Staff Organization and Operations*, 31 May 1997
- TC 21-305                    *Training Program for Wheeled Vehicle Accident Avoidance*, 19 August 1996
- TM 11-5855-238-10        *Operators Manual, Night Vision Goggles, GROUND USE AN/PVS-5 AND AN/PVS-5A (NSN 5855-00-150-1820)(EIC: IPD), AN/PVS-5B (NSN 5855-01-228-0938)(EIC: IPV), AN/PVS-5C (NSN 5855-01-228-0936)(EIC: IPU); AVIATION USE GM-6(V)1 GOGGLES, GM-6(V)2 GOGGLES*, 15 May 1993
- TM 11-5855-262-10-1     *Operators Manual, Night Vision Goggles, AN/PVS-7A*
- TM 11-5855-262-10-2     *Operators Manual, Night Vision Goggles, AN/PVS-7B, (NSN 588-01-228-0937)(EIC: IPS)*, 1 July 1994
- TVT 20-928                    *Preparation and Use of the AN/PVS-5 Series Night Vision Goggle (PIN: 708983DA)*
- TVT 20-929                    *Preparation and Use of the AN/PVS-7B Night Vision Goggle (PIN: 708929DA)*

## INDEX

Ambient Light Sources, 4-6  
 Batteries, 4-10  
 Characteristics, NVG, 4-13 through 4-15  
 Components, NVG, 4-13 through 4-15  
 Dark Adaptation, 4-9  
 Demisting shields, 4-14  
 Diopter Adjustment Rings, 4-13  
 Driver Preparation, 4-22  
 Driving with Goggles, 4-23 through 4-25; and 4-35 through 4-39 (Phase III)  
 Driving under Daylight Conditions, 4-29 through 4-31 (Phase I)  
 Driving under Night Conditions without NVG, 4-32 through 4-34 (Phase II)  
 Effects of Light on NVG Driving, 4-20 through 4-21  
 Eye Charts, B-2 through B-3  
 Field of view, NVG, 4-8  
 Focusing the Goggle, 4-17  
 Graphs C-2  
     Hazard Range Limitation Graph, C-1  
     Ground Speed Limitations, C-1  
 Ground Speed Limitations, 4-21 through 4-22  
 High-light Detector, 4-14  
 Image Intensifier Tubes, 4-13  
 Infrared Illuminator, 4-9  
 Interpupillary Adjustment, 4-14  
 Instructional Aids, 2-1  
     Instructor Requirements, 2-1  
     Student Requirements 2-1  
     Training Facilities, 2-1  
     Training Aids and Devices 2-1 through 2-2  
 Instructional Material (LESSONS), 4-1  
     Principles of Night Vision, 4-1 through 4-6  
     NVG General Characteristics, 4-7 through 4-11  
     AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part I) 4-12 through 4-15  
     AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part II) 4-16 through 4-18  
     NVG Driving Techniques and Procedures, 4-19 through 4-28  
     NVG Lighting Countermeasures, 4-26 through 4-27  
     Driving with Night Vision Goggles, Phase I, 4-29 through 4-31  
     Driving with Night Vision Goggles, Phase II, 4-32 through 4-34  
     Driving with Night Vision Goggles, Phase III, 4-35 through 4-39  
 NVG Lighting Countermeasures, 4-26 through 4-27  
 NVG Use, Advantages, 4-8  
 NVG Use, Disadvantages, 4-8  
 Objective Focus, 4-13  
 Objective Lens, 4-13  
 Objective Lens Caps, 4-13  
 Risk Management, Definitions, 1-1  
 Risk Management Process, 1-2  
 Risk Management Elements, 1-3 through 1-6  
 Risk Management Decision Aid, 1-7

- Risk Control Alternatives, 1-7
- Sacrificial Window, 4-14
- Safety Restrictions, 5-42
- Sample Training Schedule, 3-1 through 3-2
- Self-imposed Stresses, 4-4
- Spatial Disorientation, 4-9
- Student Advance Sheets, 6-1 through 6-10
  - Advance Sheet, Principles of Night Vision, 6-2
  - Advance Sheet, NVG General Characteristics, 6-3
  - Advance Sheet, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part I), 6-4
  - Advance Sheet, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part II), 6-5
  - Advance Sheet, NVG Driving Techniques and Procedures, 6-6
  - Advance Sheet, Driving with Night Vision Goggles, Phase I, 6-7
  - Advance Sheet, Driving with Night Vision Goggles, Phase II, 6-8
  - Advance Sheet, Driving with Night Vision Goggles, Phase III, 6-9 through 6-10
- Testing Materials, 5-1 through 5-43
  - End Of Course Comprehensive Test Administration, 5-26 through 5-29
    - Intermediate Training Objective 1, Written Exam Administration, 5-30 through 5-31
    - Intermediate Training Objective 1, Written Exam (Version I), 5-32 through 5-34
    - Intermediate Training Objective 1, Written Exam (Version I), Answer Sheet, 5-35
    - Intermediate Training Objective 1, Written Exam (Version II), 5-36 through 5-39
    - Intermediate Training Objective 1, Written Exam (Version II), Answer Sheet, 5-40
    - Intermediate Training Objective 2, Driver's Performance Test Instructions, 5-41 through 5-43
  - Quizzes, 5-4 through 5-25
    - Quiz, Principles of Night Vision, Administration, 5-2 through 5-3
    - Quiz, Principles of Night Vision, 5-4 through 5-6
    - Quiz, Principles of Night Vision, Answer Sheet, 5-7
    - Quiz, NVG General Characteristics, Administration, 5-8 through 5-9
    - Quiz, NVG General Characteristics, 5-10 through 5-11
    - Quiz, NVG General Characteristics, Answer Sheet, 5-12
    - Quiz, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part I), Administration, 5-13 through 5-14
    - Quiz, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part I), 5-15
    - Quiz, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part I) Answer Sheet, 5-16
    - Quiz, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part II), Administration, 5-17 through 5-18
    - Quiz, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part II), 5-19
    - Quiz, AN/PVS-5 and AN/PVS-7 Night Vision Goggle (Part II) Answer Sheet, 5-20
    - Quiz, NVG Driving Techniques and Procedures, Administration, 5-21 through 5-22
    - Quiz, NVG Driving Techniques and Procedures, 5-23 through 5-24
    - Quiz, NVG Driving Techniques and Procedures, Answer Sheet, 5-25
- Viewgraphs, A-1; VGT-01 through VGT-20
- Visual Acuity, 4-8
- Visual Illusions, 4-5
- Visual Problems, 4-3
- Vision, Types, 4-3
- Weather Considerations, 4-21

**TC 21-305-2**  
**4 SEPTEMBER 1998**

By Order of the Secretary of the Army:

Official:

**DENNIS J. REIMER**  
*General, United States Army*  
*Chief of Staff*

  
**JOEL B. HUDSON**

*Administrative Assistant to the*  
*Secretary of the Army*

**DISTRIBUTION:**

Active Army, Army National Guard, and U.S. Army Reserve: To be distributed in accordance with the initial distribution number 114932, requirements for TC 21-305-2.