



Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: G-OCC
Phone: (202) 267-0252
Fax: (202) 267-4380

COMDTINST 1543.3
19 MAY 2005

COMMANDANT INSTRUCTION 1543.3

Subj: PERSONNEL QUALIFICATION STANDARD (PQS) – AN\PVS 14 MONOCULAR NIGHT VISION DEVICE (MNVD)

1. PURPOSE. This Instruction provides guidance for establishment, implementation and administration of specific individual PQS for members performing varied tasks while wearing an AN\PVS 14 Monocular Night Vision Device (MNVD).
2. ACTION. Area and district commanders, commanders of maintenance and logistics commands, commanding officers of headquarters units, assistant commandants for directorates, chief counsel, and special staff offices at headquarters shall provide widest dissemination. Internet release authorized.
3. DIRECTIVES AFFECTED. None
4. BACKGROUND. PQS is a system for qualifying personnel to perform certain duties or tasks. It is a compilation of the minimum level of knowledge and skills a trainee is required to correctly demonstrate in order to qualify for a specific watchstation, maintain specific equipment or perform as a team member within your unit. The PQS is not designed as a training program, but provides many training objectives. This PQS was written as a cooperative effort of the Headquarters staff and representatives from both operational units and training centers with many years of experience.
5. DISCUSSION.
 - a. This Instruction does not establish policy for specific uses of the MNVD. The intent is to set qualification standards **if** the device is used. Units should consult their Program Manager via the chain of command when seeking specific guidance on when and where the use of MNVD is authorized.

DISTRIBUTION – SDL No.143

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
A	1	1	1	1	1	1	1		1	1		1	1	1	1	1		1		1						
B		1	1	1		1		1	1			1	1	1			1	1			1				1	
C	1	1		1	1			1	1		1	1	1		1					1	1	1	1			
D	1	1		1				1				1									1	1	1	1		
E	1	1													1			1	1							
F																			1							
G			2	2	1																					
H																										

NON-STANDARD DISTRIBUTION:

- b. This PQS is applicable for use of the AN\PVS 14 MNVD. MNVDs are being purchased and distributed by the USCG via NAVSEA Crane, Crane, IN. It is important to point out that many forms of night vision are available for sale but those commercially available to the public will not meet the required military specifications and so the use of those items shall be limited.
 - c. This Instruction serves as a minimum standard of training for personnel performing tasks where the MNVD use will enhance their capability and effectiveness.
 - d. PQS Qualifiers are designated in writing by the commanding officer/officer-in-charge to sign off individual PQS line items. Qualifiers will normally be E-4 or above and, as a minimum, must have completed the PQS they are authorized to sign off.
 - e. This PQS is divided into three sections, 100, 200, and 300. Section 100 (Fundamentals) contains the fundamental knowledge or “book learning” necessary for satisfactory understanding of the technology and its capability for use while performing other tasks. Section 200 (Systems) is designed to acquaint individuals with the AN\PVS 14 MNVD standard kit available to all Coast Guard Units. Section 300 (Watchstations) lists those performance tasks when use of the MNVD may apply.
 - f. This PQS does not replace but may enhance task specific training or PQS for watchstations referred to in this Instruction.
 - g. This PQS is considered complete at the Basic Level when all items in Sections 100 and 200 are completed. PQS for Watchstations are specifically addressed in Section 300. It should be completed in addition to the Basic Level before a member is considered qualified for use of this equipment while performing the tasks required of that watchstation.
6. CHANGES. Future changes to this Instruction will be coordinated by Commandant (G-OCS, G-OCU).
7. ENVIRONMENTAL ASPECTS AND IMPACT CONSIDERATIONS. Environmental considerations were examined in the development of this Instruction and have been determined to be not applicable.
8. FORMS/REPORTS. None.

R.D. SIROIS/s/
Assistant Commandant for Operations

- Encl: (1) Personnel Qualification Standard (PQS) – AN\PVS 14 Monocular Night Vision Device (MNVD)
(2) AN\PVS 14 Monocular Night Vision Device (MNVD) Study Guide

PERSONNEL QUALIFICATION STANDARD (PQS)



AN/PVS 14 MONOCULAR NIGHT VISION DEVICE (MNVD)

TABLE OF CONTENTS

100	Fundamentals	1
101	Safety and Security	2
102	Terminology Fundamentals	2
103	Image Intensification (I ²) Night Vision	3
104	Basic Operating Procedures	4
105	Operational Limitations	5
106	Operational Use Assessment	5
200	System	6
201	System Components	7
202	3X Magnifier Lens Assembly	7
203	Care and Maintenance	7
300	Watchstation	8
301	Lookout and/or Crewman	9
302	Coxswain	9
303	Boarding/Security Team Member	10
304	EMSST Team Member	12

References:

- (a) TM6015-1, Monocular Night Vision Device Operators Manual
 - (b) AN\PVS 14 MNVD STUDY GUIDE (Enclosure 2)
-

100 FUNDAMENTALS

This PQS begins with the Fundamentals section covering the basic knowledge and principles needed to understand the equipment and technology. Completion of this section will give the user the basic knowledge of safety concerns while wearing the device. Additionally it will give the member an understanding of the terminology and technology used in reference to Image Intensification Night Vision Technology (I²).

Section 100 is required for all users.

101 Safety and Security Fundamentals

- 101.1. Discuss the following items as they pertain to safety:
- a. Performance of the device in very low or no light.
 - b. Obstructions such as clouds, trees, building shadows, etc.
 - c. Viewing into shadows and other darkened areas.
 - d. Viewing through rain, fog, sleet, snow or smoke.
 - e. Dense smoke.

(Signature and Date)

- .2. Discuss security issues related to MNVD.

(Signature and Date)

102 Terminology Fundamentals

- 102.1. Define the following:
- a. Fixation
 - b. Chicken wire effect
 - c. Dark Spot
 - d. Scanning
 - f. Infrared (IR)
 - g. Contrast Reversal
 - h. Scintillation
 - i. False Horizon
 - j. Halo
 - k. Field of View
 - l. Blooming
 - m. Supplemental Illumination
 - n. Peripheral Vision
 - o. Tunnel Vision

(Signature and Date)

103 Image Intensification (I²) Night Vision

103.1. Identify the technology that collects and intensifies available light in the visible and near infrared spectrum, producing a clear, distinguishable image under dark conditions.

(Signature and Date)

.2. Explain how I² technology is clearly different from infrared (thermal) imaging devices.

(Signature and Date)

.3. Discuss what can or should be done to compensate for the following occurrences:

- a. Black or dark specks in the image.
- b. Chicken wire effect
- c. Scintillation

(Signature and Date)

.4. Discuss contrast reversal and how it can adversely impact a mission.

(Signature and Date)

.5. Discuss the following advantages and disadvantages of using an IR light source:

- a. Visual acuity
- b. Distance
- c. Identification
- d. Overcoming complete darkness
- e. Reflection
- f. Impact on covert operations

(Signature and Date)

.6. State the procedure for overcoming the use of MNVDs by other than Coast Guard personnel.

(Signature and Date)

- .7. State the approximate times that it takes for the eyes to adjust to the night vision device and to return to normal vision.

(Signature and Date)

104 Basic Operating Procedures

- 104.1. State the purpose and location of the following indicators and features:

- a. Low battery Indicator
- b. LED On Indicator
- c. Automatic shut off device

(Signature and Date)

- .2. In a dark environment, properly donn the MNVD and perform the following:
 - a. Adjust head harness and harness mount or helmet ensuring proper eye and lens alignment.
 - b. Turn on the unit.
 - c. Adjust the diopter using the adjustment ring.
 - d. Adjust the objective focus.
 - e. Adjust the variable gain.
 - f. Remove device from head harness or helmet.
 - g. Change batteries.
 - h. Attach device to head harness or helmet.
 - i. Flip device up using pivoting device on the mount.

(Signature and Date)

- .3. State the average alkaline battery life under the following operating conditions:
 - a. 70 deg F, Negligible IR usage.
 - b. 70 deg F, IR usage 10% of the time.
 - c. -4 deg F, Negligible IR usage.
 - d. -4 deg F, IR usage 10% of the time.

(Signature and Date)

105 Operational Limitations

- 105.1. Identify 4 phenomena that limit operational capability of night vision.
 - .2. Describe the effect of supplemental light when using the device in fog, sea spray and rain.
 - .3. Describe the effects on a person's depth perception while using MNVD.

(Signature and Date)

106 Operational Use Assessment:

- 106.1. Discuss the following:
 - .2. Situations where night vision use is advantageous.
 - .3. Situations where night vision use is not desirable.

(Signature and Date)

Enclosure (1) to COMDTINST 1543.3

References:

- (a) TM6015-1, Monocular Night Vision Device Operators Manual
 - (b) AN\PVS 14 MNVD STUDY GUIDE (Enclosure 2)
-

200 System

This PQS section reviews the AN\PVS 14 MNVD system functions. In order to get optimum use of the device for any task the user/wearer needs to become familiar with general system functions. Completing this section along with section 100 will give the member a Basic Level of qualification for general use and maintenance of the device.

Section 200 is required for all users.

201 System Components

201.1. Identify the following main components of the MNVD:

- a. LED On Switch Setting
- b. Variable Gain
- c. Objective Focus
- d. Diopter Adjustment Ring
- e. Battery Compartment
- f. Intensifier Tube
- g. Lens Cover
- h. On /Off Switch
- i. Rubberized Eyepiece
- j. Demist Shield

(Signature and Date)

.2. Identify the components of MNVD accessory kit:

- a. 3 X Magnifier Focus Ring Adapter
- b. Helmet Mount Assembly
- c. Tethering (Float w/Reflective IR tape and small ring)
- d. Sacrificial Lens
- e. Supplemental IR Illuminator Pen Light
- k. Camera Adapter Ring

(Signature and Date)

202 3X Magnifier Lens Assembly

202.1. Demonstrate, using the slip on method, attaching the lens assembly.

.2. Demonstrate, using the screw on method, attaching the lens assembly.

(Signature and Date)

203 Care and Maintenance:

203.1. State the cleaning methods of the MNVD.

.2. State the proper storing methods of the MNVD.

(Signature and Date)

Enclosure (1) to COMDTINST 1543.3

References:

- (a) TM6015-1, Monocular Night Vision Device Operators Manual
 - (b) AN\PVS 14 MNVD STUDY GUIDE (Enclosure 2)
 - (c) USCG Boat Operations and Training (BOAT) Manual, Volume II
COMDINST M16114.33
-

300 Watchstation

This PQS section addresses specific tasks that can be performed while using the MNVD. Specific policy for use of this device to perform tasks is designated by the appropriate Program Manager. Questions regarding tasks are to be directed via the chain of command to the appropriate Program Office. As with any tool the member should always error on the side of caution when deciding when and how to employ the tool. The following tasks are listed as they have inherent safety factors that need to be specifically considered.

301 Lookout and/or Crewman

301.1. Complete all tasks contained in 100 FUNDAMENTALS and 200 SYSTEM.

.2. Gain a minimum total of four hours wearing the device in a non-operational setting. Task can be performed on land or underway and may include time spent completing task 301.3.

(Signature and Date)

.3. Perform the following tasks from the Boat Manual (reference c.) while wearing night vision:

- a. TASK BCM-04-08-ANY, Stand a Lookout Watch
- b. TASK BCM-07-01-TYPE, Participate in a Man Overboard Evolution as a Pointer

(Signature and Date)

302 Helmsmen/Coxswain

CAUTION! : Depth perception is skewed and field of view is decreased when wearing night vision.

302.1. Complete all requirements in sections 100, 200 and 301 Lookout and/or Crewmen.

.2. Complete the following tasks from the BOAT Manual (reference c).

- a. TASK BCM-04-09-TYPE, Act as a helmsman and steer a compass course

(Signature and Date)

- b. TASK COX-03-12-TYPE, Get the boat away from a pier

(Signature and Date)

Enclosure (1) to COMDTINST 1543.3

- c. TASK COX-03-13-TYPE, Maneuver the boat in tight quarters

(Signature and Date)

- d. TASK COX-03-14-ANY, Come about in a narrow channel

(Signature and Date)

- e. TASK COX-03-20-TYPE, Moor the boat

(Signature and Date)

- f. TASK COX-07-02-TYPE, Recover a life-like dummy (Oscar) in 2-4 foot seas

(Signature and Date)

- g. TASK COX-07-03-TYPE, Maneuver the boat alongside another boat, with no way-on, and transfer personnel

(Signature and Date)

- h. TASK COX-07-04-TYPE, Maneuver the boat alongside another boat, with way-on, and transfer personnel

(Signature and Date)

- i. TASK COX-07-05-TYPE, Maneuver the boat alongside a ship and transfer personnel

(Signature and Date)

303 Port Security Unit Team Member

303.1. Complete section 301 Lookout and/or Crewmen.

.2. Complete Dry Fire exercises using the MNVD (helmet mounted) with the qualifying weapon in a range environment. This task should be performed for each specific firearm type in order to be considered qualified on that firearm. Perform this task while being supervised by the SAI and Senior Instructor.

(Signature and Date)

.3. Complete Live Fire exercises using the MNVD (helmet mounted) with the qualifying weapon in a range environment. This task should be performed for each specific firearm type in order to be considered qualified on that firearm. Perform this task while being supervised by the SAI and Senior Instructor.

(Signature and Date)

.4. Complete four boardings using the MNVD to check spaces. Perform this task while being supervised by a qualified boarding team member not using nightvision.

(Signature and Date)

.5. Complete four hours of perimeter security surveillance while wearing the MNVD. Perform this task while being supervised by a qualified security team member not wearing night vision.

(Signature and Date)

.6. State the drawbacks and vulnerabilities in connection with wearing nightvision during boarding situations.

(Signature and Date)

.7. State the benefits of using the MNVD as a handheld device while clearing spaces.

(Signature and Date)

.8. List the reasons you would not wear the MNVD while using a weapon or when in a situation that may require the use of the weapon.

(Signature and Date)

304 EMSST Team Member

304.1. Complete all requirements for section(s) 301 and 303

.2. Complete Dry Fire exercises using the MNVD (helmet mounted) with the qualifying weapon in a range environment. This task should be performed for each specific firearm type in order to be considered qualified on that firearm. Perform this task while being supervised by the SAI and Senior Instructor.

(Signature and Date)

.3. Complete Live Fire exercises using the MNVD (helmet mounted) with the qualifying weapon in a range environment. This task should be performed for each specific firearm type in order to be considered qualified on that firearm. Perform this task while being supervised by the SAI and Senior Instructor.

(Signature and Date)

.4. Complete four Close Quarter Battle (CQB) and Non-Compliant Ship Boarding training exercises using the MNVD (helmet mounted). This task should be performed for each specific firearm type in order to be considered qualified on that firearm. Perform this task while being supervised by the SAI and Senior Instructor.

(Signature and Date)

.5. State the drawbacks and vulnerabilities in connection with wearing MNVD during live fire exercises and tactical operations.

(Signature and Date)

.6. State the benefits in connection with wearing MNVD during live fire exercises and tactical operations.

(Signature and Date)

A Brief History

Throughout this guide, we will refer to “Image Intensification”, the theory which led to the eventual development of night vision systems. This theory was originally conceptualized by the Nazis during WWII. Fortunately, they were not able to build a working system. Since WWII, night vision technology has been classified into 4 “Generations” (0, 1, 2, & 3), each more technologically advanced than the next. Although you may see generation numbers all the way up to Generation 6 technology advertised to the general public, this is a marketing ploy. The military sets the requirements for what determines a generation. Throughout this guide, you will see reference to “Generation 3” or “Gen 3” technology, the most technologically advanced generation of night vision.

System Functions Overview

On-Off: The PVS-14 type MNVDs have a rotary On-Off switch. The switch is located on the back of the PVS-14. To turn these units on, turn the switch one click clockwise. To turn it off, turn the switch one click counter-clockwise.

Tuning the System to Your Eye: In order to get a clear image using night vision, the MNVD must be properly ‘tuned’, or adjusted, to fit your eyesight prior to use. To tune the MNVD, turn the system on and observe an object 8 to 10 feet away through the MNVD. Adjust the objective lens (on the front of the MNVD) until the image is as crisp and clear as possible. Next, adjust the diopter, or eyepiece lens, on the back of the MNVD, again until the image is as crisp and clear as possible. Finally, adjust the objective lens again. You should see as clearly through the MNVD as you would see during the day with unaided vision. If this is not the case, repeat the process. Once this has been done, you should only have to adjust the objective lens to focus for distance.

Focusing for Distance: Adjust the objective lens to focus for distance.

Variable Gain: The PVS-14 is equipped with variable gain, which is controlled by the knob on the front of the MNVD. The variable gain adjustment allows the user to manually adjust for varying light conditions. These systems have a built in light adjustment that does a good job of adjusting if you leave this knob set approximately in the mid range. The manual function is used primarily when there are extreme conditions.

Low Battery Indicator: The MNVDs also have a low battery indicator light. When the batteries are low, a flashing red light will be visible in the viewing area of the MNVD.

Battery Installation and Replacement: The PVS-14 systems commonly used by the Coast Guard use two standard AA batteries. Battery life is typically about 70 hours. This varies depending on ambient temperature during use and storage.

To install or replace batteries:

The PVS-14 has a battery compartment located on the bottom of the unit, with a cartridge that snaps into the compartment. The cartridge is accessed at the front of the unit, below the objective lens. To remove the cartridge, press the two détentes located on each side of the

Enclosure (2) to COMDTINST 1543.3

cartridge cover and pull. The cartridge is marked with positive and negative signs to assist with battery orientation. To replace the cartridge, line the cartridge up and slide it back into the compartment, *ensuring that you hear two audible clicks*. This indicates that the cartridge is properly seated, which helps prevent breakage if the unit is dropped.

Built-In IR Illuminator: All ITT night vision systems have a built-in infra-red (IR) illuminator that is designed to provide supplemental light when there is not enough ambient light for proper function. To turn on the IR illuminator on the PVS-14, pull the power switch away from the unit (it's spring-loaded) and turn the switch an additional click clockwise. To turn it off, turn the switch back one click counter-clockwise.

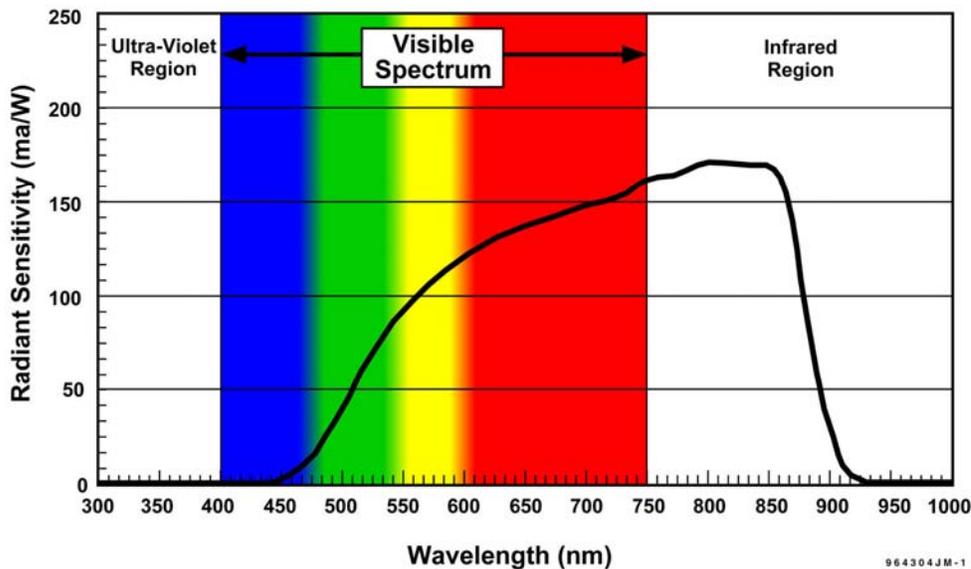
LED On Indicator: The MNVDs have an IR-On indicator light. When the IR illuminator is on, a steady red light will be visible in the viewing area of the MNVD.



Night vision MNVDs are ruggedized and as a result, are very durable. With proper care and maintenance, they should last for many years. Use fresh water, **NO** chemicals to rinse away dirt and debris after use. Dry with a soft, lint-free cloth. Clean with a lens pen or lens paper. Store in a dry place.

Characteristics and Limitations to the PVS-14 MNVD

The PVS-14 uses “**Image Intensification**” technology. This technology collects and intensifies available light in the visible and near infrared (IR) spectrum to produce a clear, distinguishable image under dark conditions. **Infrared** is an area outside of the visible spectrum that cannot be seen by the human eye. Image Intensification technology should not be confused with thermal imaging devices, which utilize the wavelengths of a different part of the electromagnetic spectrum.



Nightvision devices provide a 40-degree **field of view**, which is substantially less than the normal peripheral vision of 190 degrees. This means that when you’re wearing MNVDs, you’re unable to see things very far to the left or right, or above or below, the direction you’re looking. Use of monocular devices rather than bi-ocular or binocular systems help, since vision in one eye is less affected and you do not lose your peripheral vision on the side of the unaided eye. Regardless, though, of the system you’re using, it is *critical* that you constantly scan when you’re using night vision for anything other than static surveillance in order to maintain awareness of your surroundings. “**Tunnel vision**”, which is the tendency to fixate on an object and ignore things that would normally be in your peripheral vision is more prevalent when using night vision. As a user you must be on guard against this tendency.

Night vision devices cannot see the colors you normally see. If you need to see colors at night you should use a monocular device, such as the PVS-14, which will allow your unaided eye to see color.

Because night vision devices are more sensitive to red and white lights than they are to blue and green lights, the red and white ones will appear brighter and, therefore, sometimes closer.

For this reason, the apparent brightness of a light should not be used as an estimate for distance to that light.

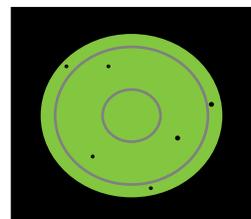
Older generations of night vision were plagued with what was known as “**blooming**” problems. This “blooming” was the actual whiting out of the night vision image caused by a bright light source in the field of view. With modern Generation 3 night vision devices, this blooming has been almost entirely eliminated. What you will now see around a bright light source is a **halo**, which may obscure the area around the light source. Reducing brightness on variable gain equipped units may reduce the halo.

Image intensification night vision will not work in the **total** absence of light, at the bottom of a cave, for instance. As we now know, this light does not have to be light in the visible wavelength, but there must be some source of light or photons for the night vision to function correctly. Remember that night light is reduced by passing **cloud cover** and while operating under **trees** or in building **shadows** and the equipment is less effective when viewing into shadows and other darkened areas. **Scintillation** is a faint, random, sparkling effect throughout the image area. Scintillation is more pronounced under low-light conditions. Seeing it is an indicator that you need to consider using supplemental illumination.

Contrast reversal is a characteristic of night vision that must be considered from a tactical standpoint. Night vision devices are very sensitive to reflected IR light. Objects that reflect IR light will appear light, while objects that absorb IR light will appear in dark - regardless of what color they actually are. A shiny, black automobile that’s just been waxed, for example, might look light-colored through a night vision device because it is actively reflecting IR light from the night sky.

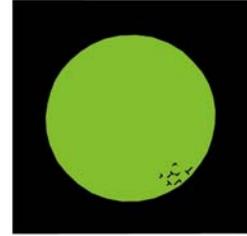
Clothing may also appear different through night vision than it does during the day, again based on whether it reflects or absorbs light. If you’re not careful, this could cause you to provide an inaccurate description of a suspect. Or, imagine being in an operational environment where the bad guys have night vision equipment. You are trying to take advantage of the darkness, shadows, or perhaps even a tree line or other dark hide. If your uniform and tactical equipment were to reflect near-infrared light, you could end up giving yourself away by not blending into your background. In most cases, the BDU-type uniforms designed for the military and police are specifically made to absorb light and stay dark under night vision conditions. However, this may not be true with all the accessories and tactical equipment worn with and over the BDUs. Conversely, there may be some conditions where you want your uniform and equipment to actually reflect near-infrared light so as to better blend in to this environment. Examples include snow and desert conditions. The only way to ensure that your uniform and equipment won’t give you away under night vision conditions is to go out at night and look at them with night vision equipment.

Two other phenomena exist with night vision with which the user should be aware; black spots and chicken wire. **Black spots** are cosmetic blemishes in the image intensifier or can be dirt or debris between the lenses. Black spots that are in the image intensifier do not affect the performance or reliability of a night vision device



and some number of varying sizes are inherent in the manufacturing processes. Spots due to dirt or debris between lenses should be removed by careful cleaning if the system is designed to open for interchanging optics.

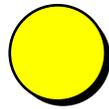
Chicken wire is an irregular pattern of very thin, dark lines in the field of view, either throughout the image area or in parts of the image area. These lines are caused by fibers that do not transmit light at the boundaries of fiber bundles in the optic of the image intensifier. A minimal amount may sometimes be found in some image intensifiers. It does not indicate a problem in the device.



When you use night vision, your eye adjusts to the light output of the eyepiece. This means that, when you remove the system, your aided eye, will not be adapted to darkness and so your vision will be limited in the eye that was night vision-aided. It will normally take at least two minutes to regain total unaided, dark-adapted vision.

Detection Distance

Relative Detection of a 6' Man



Full Moon
890 yards
250 yards



Quarter Moon
850 yards
50 yards



Starlight
601 yards
< 50 yards

PVS-14
Unaided Eye

You do not have the **depth perception** through a night vision device that you are used to with your normal eyesight. The primary reason for this is the fact that you are actually looking at a flat (two dimensional) picture tube called a phosphor screen. You can easily see this by focusing your night vision device on a close-in object. Try reaching out to touch the object and you will experience the depth perception difficulty. Fortunately, with time-spent training using night vision equipment, your brain will help you compensate for this lack of depth perception. This limitation may not completely go away, but with training, it will become less of an issue. Also, using monocular systems can improve depth perception over binocular devices, since the unaided eye can provide additional visual cues.

Image intensification night vision equipment is not designed to see through **fog** and **smoke** or **heavy rain** or **snowfall**, which reflect ambient light. As a general rule, you can see through rain, snow, fog, or dense smoke at night with your night vision just about as well as you can see through the same fog and smoke during daylight with your normal eyesight. Using supplemental IR illumination will not help- in fact, it will make it harder to see, just like using your high-beams would when driving in foggy or smoky conditions.

With PVS-14 MNVD, visual acuity is typically not an issue; it provides 20/20 visual acuity under most conditions. With older technology, however, it is an important consideration.

Earlier NVG systems provide 20/60 - 20/25 acuity under optimal conditions, but typically degrade considerably as conditions worsen.

Operational Considerations

When you must operate in extremely dark conditions, a **supplemental light** source may be required. Under most conditions, a near IR light source is preferable to a visible light source since visible light could give away the MNVD wearer's location and provide light for the target. There are many supplemental IR light sources available to the law enforcement user. The most common is a simple flashlight with an IR filter. Other supplemental IR light sources include handheld IR illuminators and spotlights, IR chemlights of assorted sizes, IR illumination ammunition, etc. Additionally, the PVS-14 is equipped with built-in IR illuminators for close range requirements. Finally, there is a variety of IR beacons and signaling devices that can be quite useful in a variety of tactical situations. However, it is important to keep in mind that night vision devices are widely available to the general public as well. We'll discuss this next.

In general, **visual acuity** when using supplemental IR illumination will be as good as or better than without supplemental illumination, depending on the environmental conditions. The **distance** one is able to see and identify a target can be increased substantially over the use of visible light alone, but phenomena such as rain, fog, snowfall, smoke and the **reflectivity** of the target will all play a role. For this reason, considering other operational aspects of the mission at hand, SAR crews should employ supplemental IR illumination to the maximum extent possible, especially if they suspect that the search targets may be wearing highly reflective material, such as the reflective tape of a PFD.

Night vision technology has been classified into 4 "Generations" (0, 1, 2, & 3), each generation contains various levels, only when there is significant engineering change to the technology is there a new generation declared. **This means that there are significant capability differences within a generation.** The systems that were the first introduced in Generation 3 show a great deal more blooming and have less visual acuity than the latest Generation 3 systems that have better acuity and a much better light handling capability. What is currently available to the general public is the older Generation 0,1, 2 and early 3 technology. Due to their old design they are subject to many limitations that do not hamper the most current Generation 3 technology. The most current technology is limited for sale to government agencies within the U.S. For this reason if the night vision is missing or lost it must be reported immediately. You will not find the latest technology available for sale from normal retail outlets. The Generations 3 technology they are selling is early Generation 3 and so in many cases does not meet the current required specifications for many Coast Guard uses.

In general, visual acuity when using supplemental IR illumination will be as good as or better than without supplemental illumination, depending on the environmental conditions. The distance one is able to see and identify a target can be increased substantially over the use of visible light alone, but phenomena such as rain, fog, snowfall, smoke and the reflectivity of the target will all play a role. For this reason, considering other operational aspects of the mission at hand, SAR crews should employ supplemental IR illumination to the maximum extent

possible, especially if they suspect that the search targets may be wearing highly reflective material, such as the reflective tape of a PFD.

Criminals are using night vision more and more frequently in the commission of their crimes. If you don't understand and plan for this fact, it can make tactical situations more difficult and more dangerous. They typically have the older technology, with proper planning and the right tools, their night vision can be used against them.

The first step in defeating night vision is to know that it is, or might be, in use. One of the best indicators is the presence of an IR light source, since Russian- or older- technology often requires it to operate. Another is simply the type of suspect that you're addressing. Drug smugglers, for instance, might be more likely than others to have high-tech equipment, including night vision.

One way to defeat night vision is to use a light source to blind the user by causing blooming in his/ her system. This can be done with just a flashlight or with a high-intensity light source (i.e. a Maxi-Beam light), using either white or IR light. Police grade flashlights (one hundred lumens of light or more), shined in the eyes of an individual using night vision, will generally shut their unit down or, at least (because of the intensification process), force the individual to look away and cause a momentary blinding effect. This is particularly true for users of Russian devices. High-intensity light sources (in the range of one million candlepower) will shut down most night vision devices, including some Gen 3 systems, if they are looking directly into the light source. With a flashlight or high-intensity light source, either white or IR light will cause the desired blooming effect. Be careful however, if you use white light; if you think an individual is using night vision when they're not, you may needlessly give your position away. IR light, on the other hand, will not give your position away to those not using night vision. IR filters are available for just about any police grade flashlight on the market today; if your agency uses night vision devices, you should have an IR filter for the flashlight you use.

Use Caution When Using Your IR: Remember to use extreme caution when considering using any one of your IR light sources. It will definitely give your position away to anyone else using night vision devices.

In close quarters confrontations- such as making arrests- having MNVDs on your face presents criminals with a great target. It takes only 13 lbs. of pressure to fracture the orbital socket. To keep from having your MNVDs jammed backward into your eyes, you need to get them off and away from your face before getting within reach of a suspect. Taking the MNVDs off, , can create another problem. Remember that looking into MNVDs means one eye is not completely dark-adapted. With a monocular system, one eye will be dark-adapted and the user will notice that it takes a few minutes for the aided eye to adapt.

Currently NVD devices, both monocular and binocular types made to be mounted on the users' head, are **not suitable to be worn while firing a weapon** without specialized training. There are significant problems found in firing accuracy. Additionally, the eye adjustment from light to dark may limit the user from timely response and so at this time it is not recommended that

MNVD be worn during times when there is a potential for using fire arms unless the member has qualified to use the firearm on a range. Instead, the user should consider using the MNVD as a handheld device secured to the user's belt so the MNVD can be easily used or not as the situation warrants.

Conclusion

Because of previous experiences with less advanced technology, there is some hesitation in the field concerning use of night vision devices. We hope you will realize the significant improvements in the Generation 3 technology of the PVS-14 MNVDs and employ them to the greatest extent safely possible in your operations.