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Research By-Product

CRITICAL COMBAT PERFORMANCES, KNOWLEDGES, AND SKILLS REQUIRED OF THE INFANTRY RIFLE SQUAD LEADER

Infrared Weaponsight and Image Intensification Devices

by
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10 March 1969

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HumRRO Division No. 4
(Infantry)

The George Washington University
HUMAN RESOURCES RESEARCH OFFICE
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FOREWORD

In response to a request from the United States Army Infantry School (USAIS), HumRRO Division No. 4 (Infantry) initiated a Technical Advisory Service research project to identify and record the critical combat performances, knowledges, and skills required of the Infantry Rifle Squad Leader (IRSL) and the Infantry Fire Team Leader (IFTL).

The requirements imposed upon the IRSL and IFTL are essentially the same, except that the former is responsible for the control of the men and fires of both fire teams in a rifle squad, rather than only one. The senior IFTL within each squad must be prepared to assume effective leadership of the squad immediately if the IRSL becomes a casualty, completes a prescribed combat tour, or is absent for any reason. Since it is common practice to provide the same training for candidates for both positions of leadership and to employ the outstanding candidates in the higher position, each paper in this series will set forth the critical requirements imposed upon the IRSL and, therein, those imposed upon the IFTL as well.

Under Work Unit LEAD, Work Sub-Unit I, the critical combat performances, knowledges, and skills of the Infantry Rifle Platoon Leader were published in a series of 41 papers covering a like number of subject areas. Each paper was published with prior review and concurrence by the USAIS Instructional Departments concerned. These papers are being used as the primary source of data in completing a parallel series of papers for the Infantry Rifle Squad Leader and the Infantry Fire Team Leader. This document details the requirements pertaining to the infrared weaponsight and image intensification devices.

This Technical Advisory Service research is being performed at HumRRO Division No. 4 (Infantry), Fort Benning, Georgia. The present Director of Research is Dr. T. O. Jacobs.

Military support for the study is being provided by the U.S. Army Infantry Human Research Unit, Fort Benning, Georgia. LTC Chester I. Christie, Jr. is the present Unit Chief.

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Meredith P. Crawford
Director
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INFRARED WEAPONSIGHT AND IMAGE INTENSIFICATION DEVICES

General Considerations

Introduction

The delivery of effective fire is vital to the accomplishment of the Infantry mission at small-unit level. The effectiveness of the fire delivered by the Infantry Rifle Squad Leader (IRSL) and his men is dependent to a large degree upon their ability to detect, locate, and identify targets. Thick vegetation, fog, rain, dust, smoke, and enemy use of camouflage, cover, and concealment hinder target acquisition even during daylight hours. Darkness vastly increases the difficulties of target acquisition and of controlling men and fires.

During operations against irregular forces or combinations of regular forces and guerrillas, the enemy often enjoys an intimate knowledge of the terrain. This enhances his ability to move and to deliver fire when visibility is severely limited by darkness. Further, the daylight effectiveness of saturation patrolling by small units, aerial surveillance, and the delivery of lethal fire by artillery, armed helicopters, and tactical aircraft tend to force an enemy who is denied air superiority to fight during darkness as a matter of necessity.

It must be anticipated that the enemy often will limit his daylight activities to observation, the collection of intelligence, and harassment by sniping and the use of mines and boobytraps. He often may deliberately seek to avoid major contact during unlimited visibility and largely confine his activities to carefully planned and rehearsed offensive operations during darkness. While there is no substitute for practical training and experience in night combat, the use of night-vision sights by small-unit members to aid surveillance, target acquisition, and the delivery of effective fire during darkness often may be vital to offset the enemy's intimate knowledge of the terrain. Therefore, the effective use of available night-vision sights by and in support of the Infantry rifle squad is essential to achieving maximum success against an enemy that routinely seeks contact primarily during darkness.

Either the M16A1 <u>or</u> the M14 and M14A1 rifles are organic to all rifle squads. The M72 antitank weapon is available as a standard item to all rifle squads. Both the M67, 90mm recoilless rifle and the M60 machinegun are organic to all rifle platoons and frequently will be attached to or placed in support of the IRSL's squad. The M60 machinegun is organic to the mechanized rifle squad, as is the caliber .50 machinegun which may be mounted on the armored personnel carrier or employed on the tripod in a ground role. Night-vision sights are available for all of these weapons. In addition to use for the delivery of <u>aimed</u> fire from the weapons upon which they are mounted, night-vision sights may be used to detect, locate, and identify targets for engagement with hand grenades, Claymores, M79 grenade launchers, supporting indirect fires, and armed

helicopter fires. The IRSL and his IFTL's must use and supervise the use, maintenance, and safeguarding of the night-vision sights organic to and placed in support of their squad. In addition, any tripod-mounted, night-vision sight placed in a forward area by a higher headquarters is likely to be located within the sector of responsibility of an IRSL. The IRSL must provide security and support for the crew and their equipment as directed by his platoon leader. He must integrate the observers into his squad to ensure security and take maximum advantage of information gained through the use of the night-vision sight, including effective delivery of fire on targets detected with the supporting night-vision sight.

Scope

This paper covers mounting, zeroing, operation, user maintenance, techniques of employment (including use to adjust indirect fires), and destruction to prevent capture of the infrared weaponsight and night-vision sights by the IRSL and his IFTL's and their supervision of the same performances by selected personnel within the rifle squad. The IRSL is cast in the role of operator, firer, and supervisor for the purpose of this paper. The requirements imposed upon the IFTL's are essentially the same as those of the IRSL. An assumption is made that if the IRSL and the IFTL's are thoroughly competent in the use and maintenance of night-vision sights they can instruct and supervise squad members and attached personnel and ensure adequate performance.

Directly related material is presented in the papers on Offensive Operations; Defensive Operations; Retrograde Operations; Airmobile Operations; Tactical Movement; Patrolling; Land Navigation; Visual, Sound, and Tactual Communications; Use of Indirect Supporting Fires; Observation, Combat Intelligence, and Reporting; Counterintelligence; Cover, Concealment, and Camouflage; Emplacements, Shelters, Obstacles, and Fields of Fire; and in all papers of the IRSL series that pertain to the specific weapons employed by members of the rifle squad.

Materiel

Infrared weaponsight.

Night-vision sight, individual-served weapon.

Night-vision sight, crew-served weapon.

Night-vision sight, tripod mounted.

Organic, attached, and supporting weapons and equipment.

Battlefield Cues

Orders and instructions from the platoon leader or higher authority which require the use of infrared weaponsights and/or night-vision sights, e.g., orders to prepare to lead a reinforced squad in the conduct of a night ambush or to establish a defensive position that must be maintained during darkness.

Any requirement for night combat where night-vision sights or infrared devices can be employed to aid target acquisition, surveillance, reconnaissance, navigation, and communication, e.g., patrolling, movement to contact, night attack, river crossing, or the establishment of an ambush, road block, LP/OP, or sniper positions.

Receipt of night-vision sights from any issuing agency, i.e., need to check the equipment for completeness and serviceability and to mount and zero the sights to specific weapons.

Tactical requirements for weapons equipped with night-vision sights that are available on request, but are not organic to the rifle squad, e.g., need for an M60 machinegun with mounted, zeroed night-vision sight to reinforce the rifle squad during a night ambush mission.

Light tables, weather forecasts, and direct observation of weather and light conditions pertinent to the employment of night-vision sights, including pertinency during planning of employment.

Freezing or colder weather requiring use of the low temperature adapter assembly with the night-vision sight.

Requirements to transport night-vision sights during dismounted or mounted tactical movement under all conditions of visibility, weather, and terrain commonly encountered in a specific area of operations.

Availability of multiple night-vision sights for use in a defensive position or ambush site, i.e., requirement to prepare a surveillance plan and, in defensive positions, to coordinate with adjacent squads and report the siting of night-vision sights as part of the fire plan for the squad for inclusion in the platoon fire plan.

Rough or overgrown terrain that interferes with line-of-sight vision in any defensive position, ambush site, LP/OP, etc., i.e., the need to select and designate the most useful sites and to clear fields of fire and observation for weapons mounting night-vision sights and for tripod-mounted, night-vision sights.

Enemy targets or the indications of existence of targets (e.g., noise) that can be located, identified, and engaged with aimed fire with weapons mounting night-vision sights.

Enemy targets located and identified during darkness at ranges other than those for which any specific weapon equipped with a night-vision sight is zeroed, i.e., necessity to use an adjusted aiming point (hold-off) to deliver effective fire.

Landmarks (reference points) located and identified during unlimited visibility that can be recognized during darkness with night-vision sights to aid range estimation and target designation, including the designation of specific targets upon which indirect fires have been planned for delivery on call, and to aid the adjustment of indirect fires.

Enemy targets detected, located, and identified during darkness that can be effectively engaged with Claymores, pull-wired hand grenades, thrown hand grenades, planned indirect fires or other sources of fire not likely to divulge the location of the observer, i.e., need to select a weapon appropriate to the target and the situation to gain surprise and obtain effective fire without pinpointing friendly ground positions for enemy firers.

Availability of powerful infrared searchlights which will extend range and permit cross-illumination of selected fields of observation and fire, i.e., need to request and coordinate the use of supporting infrared illumination devices such as tank-mounted, infrared searchlights during use of the infrared weaponsight and image intensification sights.

Availability of flares delivered by aircraft or indirect fire weapons or of searchlights to aid the use of night-vision sights, i.e., need to request and coordinate supporting illumination or to call for illumination planned and provided by higher echelons to aid use of image intensification devices.

Possibility of friendly use of flares, visible searchlights or other sources of visible light that will interfere with the use of infrared weaponsights, e.g., need to coordinate the control of visible light within and adjacent to an ambush site that is under observation with infrared weaponsights by the IRSL and his men.

Failure of any individual for whom the IRSL is responsible to follow standard procedures during the transport, use, maintenance, and safeguarding of night-vision sights.

Failure of any night-vision sight to function efficiently, i.e., need for systematic operator maintenance under any light or weather condition.

Failure of any night-vision sight to function efficiently after systematic application of the probable remedies for apparent causes of malfunction within the limits of operator maintenance, i.e., need for replacement and organizational maintenance of the equipment.

Repeated failure of any weapon to group shots effectively around the point of aim for which it was zeroed with a night-vision sight, i.e., need to zero the weapon-sight combination to ensure the delivery of effective, aimed fire.

Loss of any night-vision sight or the recovery of such equipment previously reported as lost.

Orders to prepare any night-vision sight for extended storage or for extended movement during which use is not planned or anticipated.

Imminent threat of capture of any infrared or night-vision sight, i.e., need for systematic destruction to prevent capture.

Capture of any enemy night-vision sight or device or indications of enemy use of such equipment.

Performances, Knowledges, and Skills

1. THE IRSL WILL USE AND SUPERVISE THE USE OF THE NIGHT-VISION SIGHTS (INFRARED WEAPONSIGHT; NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON; NIGHT-VISION SIGHT, CREW-SERVED WEAPON; AND NIGHT-VISION SIGHT, TRIPOD MOUNTED) ORGANIC OR ATTACHED TO HIS SQUAD.

He must : know that the use of night-vision sights often will be vital to overcome the enemy's knowledge of the terrain and ability to operate during darkness, i.e., to detect, locate, identify, and engage enemy targets effectively during darkness. 1

: know the practically applicable characteristics, capabilities, and limitations of the night-vision sights available for use by himself and his men; anticipate requirements for night-vision sights available within the larger tactical unit, but not organic to his squad; and make timely requests for specific support in accordance with the demands of assigned missions. 2

He will : employ night-vision sights for the effective delivery of aimed fire, and within their limitations, employ night-vision sights essentially as he employs binoculars at higher levels of illumination, i.e., for target detection, location, identification, and designation for engagement with organic and supporting weapons, for the surveillance of defensive sectors and approach routes, etc. 3

: anticipate an increased ability to detect, locate, identify, and engage targets during darkness through the combined use of night-vision sights and binoculars, as opposed to the use of either night-vision sights or binoculars alone. (The use and maintenance of binoculars is covered in the paper Use of Indirect Supporting Fires and is not repeated herein; however, it is pertinent to note that the probability of seeing a target with 6x30 binoculars at night is approximately 3.5 times as great as of seeing the same target with the naked eye.) 4

He must : know that clear, dark nights are required for the most effective operation of the infrared weaponsight. 5

: know that the most effective operation of night-vision sights (image intensification devices) can be expected under conditions of bright moonlight or starlight. 6

He will : know that heavy smoke, fog, rain, snow, thick vegetation, or other limitations to vision, except natural darkness, will reduce the effective range of night-vision sights. 7

: recognize the value of direct observation of weather and atmospheric conditions (smoke, fog, haze), use of weather reports and forecasts, and use of light tables (moon phase and times for sunset, moonrise, moonset, sunrise, etc.) as these factors apply to the use of night-vision sights; obtain a useful forecast of weather and light conditions from the platoon leader or supervising headquarters; and consider the effect of weather and light conditions upon the overall mission with emphasis upon the effect on night-vision sights available for use, e.g., when planning a semi-independent night ambush mission for a reinforced squad. 8

: know that night-vision sights (image intensification devices) will detect infrared light sources and that infrared light sources may be used to illuminate targets or objectives for viewing with all night-vision sights; plan use of and employ available equipment accordingly. 9

He must : among the several night-vision sights commonly available for use by his squad members or by frequently attached personnel (e.g., machinegun crew), identify any device and its components by sight or touch (during darkness); check the device and its components for completeness and serviceability; replace unserviceable or missing components within authorized maintenance limitations; and obtain repair or replacement of parts by organizational maintenance as required to ensure effective operation. 10

: change batteries in darkness without artificial light when a drop in image strength indicates weak batteries. 11

: site the device and adjust the controls for maximum range and clarity of vision of specific fields of fire and observation. 12

: designate a specific squad member (or an attached individual, as applicable) to be responsible for the operation, maintenance, and physical security of each night-vision sight issued to his squad or to attached personnel. 13

: train all squad members to safeguard, operate, maintain, and destroy all night-vision sights issued to the squad or to frequently attached personnel (e.g., machinegun crew) to ensure continuous operation, immediate replacement of operators who become casualties, and destruction to prevent complete operating systems from being captured. 14

: check frequently to ensure effective employment, adequate and timely maintenance, and physical security of night-vision devices, e.g., ensure that each operator keeps the sight, components, and extra batteries in his personal possession at all times; and require similar supervision by his IFTL's. 15

: require constant attention to the adequate use of cover, concealment, and camouflage and correct operating techniques to protect operators and equipment from enemy observation and fire. 16

: anticipate that operator vigilance will drop rapidly after 20 to 30 minutes in the absence of contact or other stimulation, particularly when operators are fatigued, and provide for periodic relief by rested personnel. 17

He will : when any night-vision sight or component repeatedly fails to meet the requirements of field service, report the inadequacy in detail to his platoon leader and recommend needed changes in design or function to provide the basis for an unserviceable equipment report to be submitted at the discretion of the platoon leader. 18

He must : require an <u>immediate report</u> of the loss of any night-vision sight and promptly report the circumstances of the loss and the action being taken to recover the device and restore it to duty to his platoon leader; report subsequent recovery of the equipment in a like manner. 19

He will : anticipate possible enemy use of night-vision sights; forewarn his men accordingly; and promptly report any concrete evidence, including captured equipment, to his platoon leader. 20

2. THE IRSL WILL INSTRUCT HIS MEN IN STORAGE AND CARRYING TECHNIQUES AND ACTIVELY SUPERVISE THE TRANSPORT OF NIGHT-VISION SIGHTS TO PREVENT DAMAGE OR DESTRUCTION EN ROUTE.

He must : know that the infrared weaponsight and night-vision sights (image intensification devices) contain delicate electronic and optical components and must be handled with maximum care and protected from damage at all times. 21

He will : remove the 1.5-volt battery (BA-42) from the electronic telescope of the infrared weaponsight and the power supply battery (BA-1100U) from the night-vision sights during extended storage to avoid corrosion likely to result from battery breakdown. 22

: check the devices and components to ensure completeness and serviceability; ensure that all items, including the carrying cases, are clean and dry; and require each complete set of equipment to be securely stowed in its metal container during extended movement by vehicle, aircraft, or ship when immediate employment of the devices is not anticipated. 23

He must : protect and require night-vision sights to be protected with the issue carrying case and carrying strap during foot movements when the device is not mounted on the weapon, e.g., during daylight hours when no need for the night-vision sight exists. 24

: require individual weapons upon which night-vision sights are mounted to be securely hand-held during mounted movement (i.e., movement by truck, armored personnel carrier, tank, helicopter, etc.) to prevent loss of zero or damage to the device from vibration, droppage, or being stepped upon while lying on the floor, e.g., if the butt of a rifle equipped with a night-vision sight is rested on the floor of a combat vehicle during movement, vibration may be transmitted from the vehicle floor to the weapon to loosen mountings or internal parts. 25

: to prevent damage, remove the night-vision sight, individual-served weapon, from the weapon upon which it is mounted and place it in either the vinyl carrying case or the metal shipping container when the weapon is to be hand-carried or transported by vehicle for a considerable distance and the immediate use of the sight for the delivery of aimed fire is not anticipated. 26

: to prevent damage, remove both the night-vision sight, crew-served weapon, AN/TVS-2, and the weapon-adapter bracket from the caliber .50 machine-gun when the weapon must be hand-carried for a considerable distance and use of the sight is not anticipated en route. 27

: to prevent damage, remove only the night-vision sight, crew-served weapon, AN/TVS-2, from a vehicle-mounted caliber .50 machinegun when it becomes necessary to move the vehicle for a considerable distance and use of the device for the delivery of aimed fire during movement is not anticipated. (Sight should be placed in the metal shipping container during movement when use is not anticipated.) 28

: require his IFTL's to closely supervise the handling of night-vision sights by their fire team members during movement to avoid damage and to ensure that sights are mounted prior to need to deliver aimed fire during darkness. 29

3. THE IRSL WILL INSPECT THE INFRARED WEAPONSIGHT UPON RECEIPT AND BEFORE DEPARTURE FROM THE BASE AREA TO ENSURE COMPLETENESS AND SERVICEABILITY.

He must : recognize the major components of the infrared weaponsight, i.e., (1) M14 rifle receiver mount adapter; (2) infrared light source; (3) telescope with attached reticle projector, high-voltage power supply, lens cover (shield), and weapon-mounting bracket; (4) light source power-supply battery with carrying case; (5) connecting power cable; (6) battery, 1.5-volt, BA-42; and (7) tool bag with tools. 30

: inspect the weaponsight for loose or missing parts, dirty or cracked filter and lenses, and other damage; perform necessary operator maintenance; check operation; and check legibility of identification markings. 31

: inspect the push-pull switch and the rotary switch for secure mounting and ease of operation, and ensure that all lights work when the switches are operated. 32

: obtain replacements for all unserviceable or missing tools and equipment normally issued with the weaponsight. 33

He will : recognize the level of illumination within the telescope when a fully charged power supply is in use; test the high-voltage power supply by turning the rotary switch to position number four (power to telescope and reticle on high), looking through the telescope, and judging the level of illumination to determine when a fresh power supply must be installed. 34

: know that the telescope is powered by a 1.5-volt, BA-42 battery and a power slug located in the cylindrical tube on the lefthand side of the telescope. 35

: know that the average life expectancy of the power slug is approximately 500 hours, that it is discarded after use, and that it is replaced by the operator. 36

: remove the high-voltage power supply (power slug) and replace with a fresh one, if required. 37

: know that the average life expectancy of the BA-42 battery is approximately four hours when the reticle is used on full power. 38

: install a fresh 1.5-volt, BA-42 battery in the high-voltage power supply tube for the telescope and reticle, if required. 39

: know that the 6-volt light source battery has a life expectancy of approximately five hours of continuous use, can be recharged approximately 1,000 times, and weighs six pounds. 40

: ensure that the electrolyte (liquid) level in the 6-volt light source battery is 1/4 inch above the top of the plates when the battery is fully charged. 41

: know that the electrolyte used in the 6-volt light source battery is extremely caustic and will cause severe burns if allowed to touch bare flesh; avoid spilling the liquid; and flush from skin with water and obtain first aid if accidental contact occurs. 42

: replace the 6-volt light source battery as required to obtain effective illumination from the infrared light source and turn in the discharged 6-volt battery to be recharged. 43

: obtain additional fresh batteries and a new power slug if constant or extended usage of the infrared weaponsight is anticipated, i.e., ensure the availability of sufficient fresh batteries to keep the weaponsight in operation as demanded by the duration of the mission. 44

He must : ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can inspect and service the infrared weaponsight in preparation for use prior to a mission. 45

4. THE IRSL WILL OPERATE THE INFRARED WEAPONSIGHT AND INSTRUCT AND SUPERVISE HIS SUBORDINATES TO ENSURE EFFECTIVE OPERATION.

He must : know that the infrared weaponsight is not a secure viewing device, i.e., the infrared light source can be detected by an enemy equipped with infrared viewing devices and by image intensification devices. 46

: when using the infrared weaponsight, assume that the enemy may have effective viewing devices; habitually look through the weaponsight to scan the area for enemy infrared devices prior to turning on the light source; and make maximum use of available cover and concealment within the limits imposed by the mission. 47

: know that the visual security distance for the infrared light source is approximately 20 meters, i.e., the infrared light source can be detected with the naked eye at approximately 20 meters, and plan use accordingly to maintain security from enemy detection. 48

He will : know that the infrared weaponsight is capable of normal operation at temperatures from -15° to $+115^{\circ}$ F., but anticipate that failure of the weaponsight to operate effectively in extreme cold (below freezing) may be due to the effect of cold on the BA-42 dry-cell battery; remove this battery occasionally and warm it with body heat by placing it within protective clothing against the body. (Alternate use of two BA-42 batteries will permit one battery to be warmed by body heat while the other is in use.) 49

He must : avoid and forewarn his men against pointing the infrared telescope at the sun or at any strong source of artificial light to prevent damage to the image converter tube and avoid pointing the telescope directly into an infrared source for prolonged periods of time for the same reason. 50

He will : anticipate a reduction in the clarity of the image when using the infrared weaponsight under conditions of daylight, dawn, twilight, bright starlight and moonlight, and under visible light produced by searchlights, illuminating flares, and artillery concentrations. 51

: coordinate the suppression and control of artificial lights within and adjacent to any area where he is responsible for the effective use of infrared weaponsights, e.g., in a night ambush position. 52

He must : locate the four-position telescope rotary switch on the lower, rear, righthand side of the telescope housing during darkness and operate this switch as demanded by the mission, i.e.: 53

(1) First position: current to telescope and reticle lamp off.

(2) Second position: telescope on, reticle lamp off when scanning to detect enemy use of infrared light sources.

(3) Third position: telescope on, reticle lamp on low for firing at targets against dark backgrounds.

(4) Fourth position: telescope on, reticle lamp on high for firing at targets against light backgrounds.

: know that the third and fourth positions will cause excessive drain on the power-supply battery and limit use to the demands of the mission. 54

: prevent emission of a visible glow from the telescope eyepiece and the illumination of the operator's face by placing the rubber eyeshield in contact with the face prior to turning on power, keeping the eyeshield in contact with the face while power is on, and allowing the residual glow of the image tube to fade before the eyeshield is removed from contact with the face after turning off power. 55

: habitually keep the telescope rotary switch in the first position (off) when the telescope is not in use to avoid useless drain on the battery and to maintain concealment, i.e., to prevent emission of a visible glow from the eyepiece. 56

He will : locate the three-position light source push-pull switch on the lower right of the light source base during darkness and operate this switch as demanded by the mission, i.e.: 57

(1) First position: switch in, current to light source off.

(2) Second position: switch pulled out, current to light source on.

(3) Third position: intermittent light obtained by placing switch in off position and depressing knob for signaling.

: habitually keep the light source push-pull switch in the first position (switch in, current to light source off) when the light source is not needed to avoid useless drain on the battery and to maintain maximum concealment against possible enemy observation. 58

He must : ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can effectively operate the infrared weaponsight. 59

5. THE IRSL WILL MOUNT THE INFRARED WEAPONSIGHT ON HIS INDIVIDUAL WEAPON AND SUPERVISE MOUNTING OF THE DEVICE BY HIS SUBORDINATES.

He must : know that the standard receiver-mount adapter bracket shipped with the infrared weaponsight is for use with the M14 rifle only. 60

: know that the supporting ordnance unit must perform the necessary modifications to attach the mounting bracket to other weapons (M14A1, M16A1); initiate requests for modifications verbally through his platoon leader on a timely basis. 61

He will : install the receiver-mount adapter bracket on the left side of the M14 receiver, i.e.: 62

(1) Position the receiver-mount adapter bracket on the receiver.

(2) Tighten the receiver-mount screw into the threaded hole.

: attach the telescope by engaging the slot in the telescope mount with the guide rail on the receiver-mount adapter bracket, slide the telescope forward until it stops, and tighten the locking clamps. 63

: mount the infrared light source on top of the telescope and secure it with the thumb screw located at the rear of the mount. 64

: connect the power cable to the receptacles on the battery and the light source. 65

: install the 6-volt light-source battery into the canvas case and clip to belt by means of the metal clips attached to the canvas case. 66

: check the entire mounting and ensure that it is correctly and firmly secured to the weapon. 67

: ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can mount the infrared weaponsight on their individual weapons in preparation for zeroing. 68

6. THE IRSL WILL ZERO THE INFRARED WEAPONSIGHT TO HIS INDIVIDUAL WEAPON AND SUPERVISE THE ZEROING BY HIS SUBORDINATES.

He must : know that the standard 250-meter battlesight setting may be used; study the terrain, vegetation, and tactical situation and confer with his platoon leader to determine if a shorter range should be used for zero; specify the zero desired; and supervise the zeroing of subordinates' weapons at the desired range. (Use of the standard 250-meter battlesight zero eliminates the need to zero with iron sights at a shorter range when mounting the infrared weaponsight and thus hastens zeroing. Further, it eliminates the need to change the weapon's iron sights from a shorter range back to the standard 250-meter battlesight zero at daylight when the infrared weaponsight is removed from the rifle.) 69

: zero during daylight hours for convenience and to obtain a more effective zero with greater security than if zeroing were attempted during darkness. (Confirming shot groups may be fired during darkness if the tactical situation permits.) 70

: know that the sight reticle, as seen through the telescope, is a vertical bar of light used in the same manner as the front sight blade of a rifle, thus allowing the operator to use the standard military sight picture when aiming at a target. 71

He will : conduct zeroing from a prone position and support the weapon with sandbags, stakes, etc., to achieve maximum stability. 72

: adjust the open sights of the weapon (not the telescope) for the range and fire sufficient rounds at a clearly distinctive aiming point to obtain a good shot group, i.e., zero the weapon for the desired range by adjusting the weapon's iron sights. 73

: if the objective lens of the telescope (front of telescope) is out of focus (as indicated by blurred images at the desired range despite clean lens and a clearly perceived reticle), request adjustment by organizational maintenance, i.e., the armorer will place the spanner wrench on the objective lens and rotate the lens until the target being viewed is in sharp focus. 74

: with the open sights of the weapon laid on the center of the shot group and without disturbing the lay of the weapon, transfer his eye to the telescope and manipulate the elevation-adjustment knob at the bottom front of the telescope and the azimuth-adjustment knob at the left front of the telescope until the sight reticle is aligned with the center of the shot group. 75

: during adjustment of the telescope to zero, use the elevation-adjustment knob and the azimuth-adjustment knob to move the strike of the bullet approximately two inches for each 100 yards of range for each click of either elevation or azimuth. 76

: fire confirming rounds and adjust the elevation and azimuth knobs as necessary until shots called as hits fall within the shot group achieved with the open sights; then fire a confirming shot group at the same range at a clearly distinctive aiming point on a clean target by aiming with sight reticle of the telescope only to ensure that an acceptable shot group can be obtained, i.e., to ensure that the weapon is zeroed to hit the point of aim at the desired range when the telescope is used for aiming. 77

: compensate for his sight setting when firing at targets located at ranges other than his zero by using an adjusted aiming point and aiming above or below the desired point of impact as demanded by the known trajectory of the weapon. 78

He must : focus the infrared light source, i.e.: 79

(1) Place the spanner wrench on the lock-nut, located at the rear of the light source, and turn clockwise to loosen.

(2) Rotate the focus ring, located at the rear of the light source, until desired focus is obtained.

(3) Place the spanner wrench on the lock-nut and turn counterclockwise to tighten.

: adjust the light source elevation by rotating the adjustment knob, located on the right side of the light source mount, until the light beam center coincides with the center line of the telescope's visible range. 80

: adjust the horizontal alignment of the light source by loosening the set screws in the light source base and sliding the light source back and forth until the light beam falls in line with the center line of the telescope's visible range and then tightening the set screws. 81

He will : recognize that the weight of the infrared weaponsight (approximately 11 pounds) will hinder the rapid delivery of effective fire during daylight when the sight is not required to see and engage targets; require careful dismounting and safeguarding of the weaponsight when it is not required for use on a weapon during daylight hours. 82

: particularly in defensive positions, anticipate the necessity to dismount the infrared weaponsight to facilitate daylight employment of the weapon with a later requirement to mount the weaponsight on the same weapon again as darkness approaches, e.g., when manning security positions on the perimeter of a base area. 83

: when an infrared weaponsight is dismounted temporarily to facilitate the daylight delivery of effective fire, record the serial number of the weaponsight and the serial number of the weapon so the same weapon and weaponsight combination may again be employed for use during darkness; ensure that the azimuth- and elevation-adjustment knobs on the telescope are not moved from the desired zero; and double-check the recorded serial numbers to ensure retention of the desired zero of the matched weapon and weaponsight combination. 84

: require each rifleman to know the standard 250-meter battlesight setting for his (the rifleman's) individually assigned weapon and, after zeroing his rifle at a different range (e.g., 150 meters) for use with the infrared weaponsight, to place his individual 250-meter battlesight zero on his rifle at once to facilitate accurate delivery of fire at all effective ranges with open sights during daylight hours, i.e., the infrared weaponsight will be zeroed to hit the point of aim at 150 meters during darkness and the iron sights will be zeroed to hit the point of aim at 250 meters during daylight hours. 85

: recognize the probable existence of a felt need by the individual rifleman to confirm the zero of his weapon by firing it after changing open sight settings and after remounting any optical sight, despite the use of recorded sight settings based upon earlier firing with the same weapon and sight combination; coordinate and supervise firing to confirm the desired zero of a weapon after sight changes when the tactical situation will permit. 86

He must : ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can zero their weapons with the infrared weaponsight mounted and follow standard procedures to maintain the desired zero during periodic use of a given weapon-weaponsight combination during all levels of visibility. 87

7. THE IRSL WILL PLAN, COORDINATE, USE, AND SUPERVISE THE USE OF CROSS ILLUMINATION TO AID SURVEILLANCE AND TARGET ACQUISITION WHEN EMPLOYING MULTIPLE INFRARED WEAPONSIGHTS OR WHEN EMPLOYING THE INFRARED WEAPONSIGHT WITH OTHER INFRARED LIGHT SOURCES.

He must : know that cross illumination is obtained when two or more infrared light sources, located at different points, are directed to converge upon the same objective to achieve front and side lighting simultaneously; and that the best results are obtained from light sources converging at right angles or as nearly so as possible. 88

: know that the reflected glare of infrared rays from leaves and other vegetation can be reduced by employing cross illumination; that, when infrared light is projected at right angles to the line of sight of the viewing device, objects or persons partially hidden in vegetation appear as brighter objects against a darker background. 89

He will : demonstrate the use and effect of cross illumination to his IFTL's, squad members, and to frequently attached personnel to aid them to learn to employ the technique and provide practice in target detection, location, identification, and engagement when using multiple sources of infrared light. 90

He must : plan, coordinate, and use infrared cross illumination when the mission, terrain, situation, and availability of equipment permit, e.g., during the establishment of an L-shaped ambush site when leading a reinforced squad on a night ambush mission or during the coordinated use of one infrared weaponsight on the FEBA in his squad's defensive sector with a second infrared weaponsight located at an LP/OP forward of the FEBA in defensive operations. 91

: use supporting sources of infrared light (e.g., searchlight, infrared, Xenon, 30") as directed by his platoon leader when operating as a part of his parent platoon or as coordinated with the supporting unit during semi-independent, squad-strength operations. 92

: establish and use electronic communication (radio, sound-power telephone) or visual (infrared) signals to control and coordinate separated sources of infrared illumination to achieve coverage of a specific area (e.g., killing ground in a night ambush site) and to obtain cross illumination of critical points within his area of responsibility. 93

: know that supporting infrared searchlights usually are tank-mounted or must be moved by a motor vehicle and are usually powered by gasoline-driven generators; recognize that the visual security distance of vehicle-mounted infrared searchlights may exceed 500 meters; and consider the effect of noise and light generated by such equipment prior to requesting its support for any operation demanding the use of stealth. 94

He will : coordinate the suppression of visible light, such as flares and searchlights, within and adjacent to any area for which he is responsible for the use of infrared light in the execution of an assigned mission, e.g., establishment of a night ambush position during semi-independent operations by his squad. 95

8. THE IRSL WILL PERFORM AND SUPERVISE THE OPERATOR MAINTENANCE OF THE INFRARED WEAPONSIGHT TO ENSURE TROUBLE-FREE OPERATION AND MAXIMUM OPERATING RANGE AT ALL TIMES.

He must : perform or require performance of and supervise all required services--before, during, and after operation and after any exposure likely to cause damage or to result in a need for maintenance or to require confirmation of zero and test firing. 96

: inspect the telescope for cleanliness, secure mounting, cracked or dirty lenses, damaged parts, and weak or no light. 97

: clean exposed lenses using a lens brush and lens tissue, a soft rag, or toilet tissue only. 98

: prevent dust and moisture from entering the weaponsight and the high-voltage power supply in dusty or damp atmosphere to prevent failure of the device, and promptly remove dirt and moisture from the weaponsight as required by exposure within the limits imposed by the mission. 99

: inspect the push-pull switch and the rotary switch for secure mounting and ensure that all lights work effectively when switches are operated. 100

: inspect the light source assembly for cleanliness, secure mounting, proper alignment, and dirty or cracked filter; adjust mounting and alignment as necessary; and clean or replace filter as required. 101

: inspect the 6-volt, light source battery for cracked cells, proper electrolyte level, and for loose, corroded, or damaged terminals, connectors, and leads; perform required maintenance; and exchange for fully charged battery as required. 102

: inspect the battery box and power cable for damage and replace damaged parts. 103

: ensure that all tools and equipment assigned to the weaponsight are present and in a clean, serviceable condition. 104

He will : ensure that quarterly preventive maintenance and organizational repair are performed. 105

: keep the weaponsight in its carrying case to ensure protection against the elements, tampering, and damage when not mounted on the weapon. 106

: promptly report the need for batteries, lens paper, replacement filters, or complete assemblies and turn in damaged assemblies for repair or replacement to ensure the availability of infrared weaponsights for use as demanded by the mission. 107

He must : ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can maintain the weaponsight, recognize any failure of the weaponsight to function effectively, apply probable remedies to restore the equipment to service within the limitations of operator maintenance, and request organizational maintenance or the replacement of the device as required. 108

9. THE IRPL WILL INSPECT AND ENSURE THAT EACH NIGHT-VISION SIGHT AND ITS COMPONENTS ARE PRESENT IN SERVICEABLE CONDITION UPON ISSUE AND PRIOR TO DEPARTURE UPON A MISSION.

He must : release internal pressure in the shipping container by turning the core of the relief valve located on the side of the shipping container before releasing the latches to open the container, and then open the container on a firm, flat surface. 109

: recognize the major components of the night-vision sight, individual-served weapon, AN/PVS-2, i.e.: 110

(1) Metal shipping container with foam-rubber liners.

(2) Night-vision sight, individual-served weapon, AN/PVS-2, with attached mount assembly.

(3) Vinyl carrying case and strap.

(4) Weapon-adapter brackets for the M14 and M16A1 rifles.

(5) Extra batteries, BA-1100U.

(6) Lens brush, lens tissue, Allen wrench for maintenance, and technical manual.

: recognize the major components of the night-vision sight, crew-served weapon, AN/TVS-2, i.e.: 111

(1) Metal shipping container with foam-rubber liners.

(2) Night-vision sight, crew-served weapon, AN/TVS-2 with attached boresight assembly.

(3) Weapon-adapter brackets for the caliber .50 machinegun and the 106mm recoilless rifle.

(4) Right-angle eyepiece.

(5) Extra batteries (BA-1100U), reticle lamps, and 106mm recoilless rifle sight reticle.

(6) Lens brush, lens tissue, maintenance wrenches, and technical manual.

: know that the pertinent technical manual, maintenance forms, and lens tissues are packed between the foam-rubber liners and the top of the metal shipping container; secure, safeguard, and use these items as required. 112

He will : systematically perform the required daily preventive maintenance services on each device to detect and correct deficiencies prior to departure from the issue point. 113

He must : obtain the required weapon-adapter brackets when the night-vision sights, individual-served weapon, AN/PVS-2, are to be mounted on weapons other than the M14 and the M16A1 rifles. 114

He will : when night-vision sights are to be employed on individual weapons during dismounted tactical movement (e.g., patrolling), arrange for the storage and safeguarding of the metal shipping containers, extra weapon-adapter brackets, technical manuals, etc., and use the vinyl carrying case to protect the night-vision sights when they are not mounted on weapons during the operation. 115

He must : ensure that spare batteries (BA-1100U) are in the shipping container or carried by each operator, as necessary, when extended use of night-vision sights is demanded by the mission; request the issue of additional batteries as required during prolonged periods of combat. 116

10. THE IRSL WILL OPERATE AND SUPERVISE THE OPERATION OF THE NIGHT-VISION SIGHTS MADE AVAILABLE TO HIS SQUAD MEMBERS AND TO ATTACHED PERSONNEL DURING DARKNESS AND UNDER WIDELY VARYING CONDITIONS OF WEATHER, TERRAIN, AND ENEMY PROXIMITY AND ACTIVITY.

He will : recognize the need for night-vision sight operators to locate and adjust the controls of the sights, change batteries, and perform essential operator maintenance under heavy combat stress, during darkness, without the aid of external artificial illumination such as flashlights, etc.; through instruction, demonstration, and supervised practice, ensure that his IFTL's and selected squad members can thus effectively operate and maintain available night-vision sights; and require his men to adhere to the demands of light discipline. 117

He must : know that night-vision sights (image intensification devices) are secure in that they project no light which can be detected by infrared scanners, as does the infrared weaponsight light source; but emphasize to his men the need to avoid illuminating the face with the backglow from the image tube when operating the device without a secure eyeshield attached to the eyepiece, i.e., the backglow will, if not masked, illuminate the face and make it visible to the naked eye of any close-in enemy observer. 118

He will : know that the night-vision sights may be operated in temperatures from -65° to $+125^{\circ}$ F., and, when weather is freezing or colder, install the low temperature adapter (provided for use only in cold climates) to maintain the battery at an effective operating temperature. 119

He must : forewarn his men to avoid aiming night-vision sights directly at the sun or any extremely bright light in either the on or off position to prevent failure or damage to the unit; require them to use flash suppressors on weapons to avoid momentary cut-off caused by muzzle flash; and instruct them to avoid pointing the objective lens into the wind to prevent dust and sand from scratching and pitting the lens' surfaces. 120

: with the power switch in the off position, install the BA-1100U battery in the power-supply housing during darkness (without the aid of artificial illumination) by removing the battery cap, inserting the battery positive end (raised center cap) first, and replacing the battery cap. 121

: ensure that each operator knows that the BA-1100U battery will provide approximately 100 hours of continuous use; require an extra battery to be carried by each operator as a matter of SOP; regularly determine the need for and request resupply of batteries during continuing operations. 122

: dispose of used batteries by chopping with the edge of the entrenching tool before burying and camouflaging or dumping in deep water, but never by burning as this will cause them to explode, and specifically prohibit careless discard of batteries that will permit salvage by enemy guerrillas for the electrical detonation of mines and boobytraps. 123

: know that the contents of the BA-1100U battery are highly caustic and harmful to exposed skin and to the eyes; avoid contact or inhalation of fumes from a crushed battery; and flush the skin surface with water and obtain first aid if accidental contact occurs. 124

He will : to adjust the eyepiece of the night-vision sight for individual use, rotate the eyepiece focus ring until the reticle pattern is sharp and clear. 125

: know that the diopter scale on the eyepiece focus adjustment is adjustable from +4 to -4. 126

: reduce eyestrain and resultant headaches by focusing the eyepiece from full plus (+) toward minus (-) beyond the point where the reticle is clearest, then back up to the point of sharpest clarity. 127

: know that daylight settings are not adequate at night; that 1 to 1-1/2 diopters of additional minus (-) are required when the eye is dark-adapted; and make adjustments accordingly to obtain maximum clarity of images during darkness. 128

: know that once the eyepiece focus is properly adjusted, further adjustment is not necessary as long as the same individual continues to use the device under essentially the same levels of illumination. 129

He must : repeatedly caution his men against illuminating the face with the backglow from the image tube when operating without a secure eyeshield attached to the eyepiece so that precautions against facial illumination become habitual. 130

He will : during darkness and without artificial illumination external to the sight, operate the night-vision sight, individual-served weapon, AN/PVS-2, as follows: 131

(1) Remove the lens cap from the objective lens only in darkness or under subdued light to protect the image intensifier assembly from excess light.

(2) Locate and operate the two-position power-supply toggle switch, i.e.:

(a) Down position: off.

(b) Up position: on.

(3) With the power-supply toggle switch up (on), look through the eyepiece and adjust the eyepiece focus ring for his individual eye requirement until the reticle comes into sharp view.

(4) Locate and rotate the objective lens focus ring (front of telescope) until the image being viewed is sharp and clear. (Avoid smudging the objective lens during adjustment.)

(5) Return the power-supply toggle switch to the down (off) position promptly after operation to conserve battery power and replace the lens cap to protect the image intensifier assembly from excess light.

He must : know that the night-vision sight, crew-served weapon, AN/TVS-2, is manufactured in three models, i.e., Model 9927, Model 9927A, and Model 9927B; that the procedures for adjusting the controls vary among the three different models; recognize the specific model(s) issued to his men; and ensure that the correct procedure is followed for each model being operated. 132

He will : during darkness and without artificial light external to the sight, operate the night-vision sight, crew-served weapon, AN/TVS-2, Model 9927, as follows: 133

(1) Locate and operate the four-position rotary control switch as required during adjustment and use, i.e.:

(a) Position one: off.

(b) Position two: cant level illumination on.

(c) Position three: tube on for viewing.

(d) Position four: tube on and reticle on for viewing targets and delivering aimed fire.

(2) Remove the boresight cover only in darkness or under subdued light to avoid damage to the image intensifier assembly from excess light.

(3) Turn the four-position rotary control switch from position one (off) to position two (cant level illumination on) and open the cant level view port.

(4) Adjust the cant level adjustment knob until the cant level vial bubble is centered to ensure that the reticle is horizontal, then close the cant level view port.

(5) Turn the four-position rotary control switch to position four (tube on, reticle on).

(6) Look through the eyeshield and adjust the reticle intensity knob until the reticle pattern is clearly visible.

(7) Adjust the eyepiece focus ring so that the reticle lines appear sharp and clear.

(8) Release the objective lens lock knob by turning it counterclockwise.

(9) Focus the objective lens on the desired target by adjusting the objective lens focus lever until the image being viewed is sharp and clear.

(10) Lock the objective lens lock knob by turning it clockwise with care to avoid disturbing the objective lens focus lever.

(11) To visually search an assigned sector of fire for targets, turn the four-position rotary control switch to position three (tube on).

(12) To engage an identified enemy target with aimed fire, turn the four-position rotary control switch to position four (tube on, reticle on) and use the reticle for aiming.

(13) Recognize that maintaining the four-position rotary control switch in position four (tube on, reticle on) increases the drain on the battery and use this position only during initial adjustment and when the reticle is required for aiming.

(14) Anticipate that enemy targets at ranges other than the one for which the objective lens is focused will appear to be unclear, i.e., will not be in sharp focus; adjust the focus of the objective lens to increase the clarity of images for motionless targets and to examine suspected positions at various ranges when time, enemy activity, and enemy proximity permit; but recognize that enemy targets will be glimpsed momentarily at various ranges during movement and then must be engaged quickly and effectively despite lack of complete clarity of the image.

(15) Return the four-position rotary control switch to position one (off) after operation and replace the boresight cover to protect the image intensifier assembly from excess light.

He must : during darkness and without artificial light external to the sight, operate the night-vision sight, crew-served weapon, AN/TVS-2, Model 9927A, as follows: 134

(1) Locate and operate the three-position rotary control switch as required during adjustment and use, i.e.:

(a) Position one: off.

(b) Position two: tube on for viewing.

(c) Position three: tube on and reticle on for viewing targets and delivering aimed fire.

(2) Remove the boresight cover only in darkness or under subdued light to avoid damage to the image intensifier assembly from excess light.

(3) Turn the three-position rotary control switch to position three: tube on, reticle on.

(4) Look through the eyeshield and adjust the reticle intensity knob until the reticle pattern is clearly visible.

(5) Adjust the eyepiece focus ring so that the reticle lines appear sharp and clear.

(6) Check the vertical alignment of the reticle pattern. If reticle pattern is not vertical, loosen the reticle cell retaining nut and rotate the cell until the pattern is vertical, then tighten the retaining nut.

(7) Release the objective lens lock knob by turning it counterclockwise.

(8) Focus the objective lens on the desired target by adjusting the objective lens focus lever until the image being viewed is sharp and clear.

(9) Lock the objective lens lock knob by turning it clockwise with care to avoid disturbing the objective lens focus lever.

(10) To visually search an assigned sector of fire for targets, turn the three-position rotary control switch to position two (tube on).

(11) To engage an identified enemy target with aimed fire, turn the three-position rotary control switch to position three (tube on, reticle on) and use the reticle for aiming.

(12) Recognize that maintaining the three-position rotary control switch in position three (tube on, reticle on) increases the drain on the battery and use this position only during initial adjustment and when the reticle is required for aiming.

(13) Anticipate that enemy targets at ranges other than the one for which the objective lens is focused will appear to be unclear, i.e., will not be in sharp focus; adjust the focus of the objective lens to increase the clarity of images for motionless targets and to examine suspected positions at various ranges when time, enemy activity, and enemy proximity permit; but recognize that enemy targets will be glimpsed momentarily at various ranges during movement and then must be engaged quickly and effectively despite lack of complete clarity of the image.

(14) Return the three-position rotary control switch to position one (off) after operation and replace the boresight cover to protect the image intensifier assembly from excess light.

He will : during darkness and without artificial light external to the sight, operate the night-vision sight, crew-served weapon, AN/TVS-2, Model 9927B, as follows: 135

(1) Locate and operate the three-position rotary control switch as required during adjustment and use, i.e.:

(a) Position one: off.

(b) Position two: tube on for viewing.

(c) Position three: tube on and reticle on for viewing targets and delivering aimed fire.

(2) During daylight hours, ensure that the aperture selector on the boresight cover is turned to the darkest aperture position; open the aperture only in darkness or under subdued light to avoid damage to the image intensifier assembly from excess light; and adjust the aperture selector during operation to a less dark aperture until the image being viewed is clearly visible.

(3) Turn the three-position rotary control switch to position three: tube on, reticle on.

(4) Look through the eyeshield and adjust the reticle intensity knob until the reticle pattern is clearly visible.

(5) Adjust the eyepiece focus ring so that the reticle lines appear sharp and clear.

(6) Check the vertical alignment of the reticle pattern. If reticle pattern is not vertical, loosen the reticle cell retaining nut and rotate the cell until the pattern is vertical, then tighten the retaining nut.

(7) Focus the objective lens on the desired target by adjusting the objective lens focus knob until the image being viewed is sharp and clear.

(8) To visually search an assigned sector of fire for targets, turn the three-position rotary control switch to position two (tube on).

(9) To engage an identified enemy target with aimed fire, turn the three-position rotary control switch to position three (tube on, reticle on) and use the reticle for aiming.

(10) Recognize that maintaining the three-position rotary-control switch in position three (tube on, reticle on) increases the drain on the battery and use this position only during initial adjustment and when the reticle is required for aiming.

(11) Anticipate that enemy targets at ranges other than the one for which the objective lens is focused will appear to be unclear, i.e., will not be in sharp focus; adjust the focus of the objective lens to increase the clarity of images for motionless targets and to examine suspected positions at various ranges when time, enemy activity, and enemy proximity permit; but recognize that enemy targets will be glimpsed momentarily at various ranges during movement and then must be engaged quickly and effectively despite lack of complete clarity of the image.

(12) Return the three-position rotary control switch to position one (off) after operation and turn the aperture selector on the boresight cover to the darkest aperture position to protect the image intensifier assembly from excess light.

11. THE IRSL WILL MOUNT THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2, ON HIS INDIVIDUAL WEAPON AND INSTRUCT AND SUPERVISE HIS SUBORDINATES AND ATTACHED PERSONNEL IN MOUNTING THE NIGHT-VISION SIGHT ON THEIR INDIVIDUAL WEAPONS AND ON APPROPRIATE ORGANIC OR ATTACHED CREW-SERVED WEAPONS AS REQUIRED BY ASSIGNED MISSIONS.

He must : know that the night-vision sight, individual-served weapon, AN/PVS-2, can be employed with the M14, M14A1, and M16A1 rifles; M60 machine-gun; M67, 90mm recoilless rifle; and M72, 66mm high-explosive antitank rocket after installation of the proper weapon-adapter bracket on each weapon. 136

: anticipate that both the M60 machinegun and the M67, 90mm recoilless rifle frequently will be attached to his rifle squad from the rifle platoon's weapons squad, particularly during semi-independent squad missions such as night ambushes, and know that the M60 machinegun will be organic to his squad in a mechanized unit. 137

: ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can mount the night-vision sight, individual-served weapon, AN/PVS-2, on appropriate individual and organic or frequently attached crew-served weapons. 138

He will : install the weapon-adapter bracket on the left side of the M14 or M14A1 receiver, i.e.: 139

(1) Position the weapon-adapter bracket on left side of receiver.

(2) Tighten receiver-mount screw into threaded hole.

He must : install the weapon-adapter bracket on the M16A1 rifle, i.e.: 140

(1) Unthread wing nut on bracket to the thread-stop.

(2) Separate the tab and the mounting ear, then slide mounting ear under carrying handle of rifle.

(3) Position slotted groove in base of bracket over the top of receiver group.

(4) Tighten wing nut until bracket is secure.

He will : install the weapon-adapter bracket on the M72 (LAW), i.e.: 141

(1) Position the weapon-adapter bracket on the tube of the weapon so that the bracket notch and location stops engage the front of the firing mechanism.

(2) Swing the hinged lower clamp around the bottom of the tube and engage and secure the dial lock latch.

He must : install the weapon-adapter bracket on the M67, 90mm recoilless rifle, i.e.: 142

(1) Position the back-up plate of the weapon-adapter bracket against the inside of the M103 sight-mounting bracket.

(2) Place the mounting pad of the bracket against the left side of the M103 sight-mounting bracket so that the screw holes in the mounting pad mate with the screw holes in the back-up plate.

(3) Install and tighten the three socket-head screws with the Allen wrench provided in the night-vision sight components.

He will : know that the weapon-adapter bracket for the M60 machinegun consists of a saddle block and a sight-adapter bracket. 143

: require that the M60 machinegun be delivered to the supporting ordnance facility for installation of the saddle block after coordination with the platoon leader. 144

: inspect the M60 machinegun (with saddle block installed) for proper operation and functioning prior to mounting the night-vision sight. 145

: know that the saddle block will not interfere with normal operation of the machinegun and should not be removed after installation. 146

: install the sight-adapter bracket to the M60 machinegun, i.e.: 147

(1) Place sight-adapter bracket in place against saddle block.

(2) Install and tighten lock washer and screw through sight-adapter bracket into saddle block.

: know that the sight-adapter bracket may be removed from the M60 machinegun when the night-vision sight is not in use without further disassembly of the weapon. 148

He must : know that each weapon-adapter bracket, regardless of which weapon employed with, has an identical guide rail which mates with the groove in the telescope mount assembly of the night-vision sight. 149

: to mount the night-vision sight on the weapon: 150

(1) Mate the guide rail on the weapon-adapter bracket to the groove in the telescope mount assembly from the butt-end of the weapon and slide the night-vision sight forward carefully until movement is halted by the pin stop on the weapon-adapter bracket.

(2) Turn the locking knobs on the telescope mount assembly clockwise until tight to ensure that the telescope is securely mounted on the weapon.

12. THE IRSL WILL, DURING CONDITIONS OF DAYLIGHT AND DARKNESS, ZERO THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2, TO APPROPRIATE INDIVIDUAL AND CREW-SERVED WEAPONS, AND INSTRUCT AND SUPERVISE HIS SUBORDINATES AND ATTACHED PERSONNEL DURING THE ZEROING OF WEAPONS MOUNTING THE NIGHT-VISION SIGHT.

He must : know, and emphasize to his men, that the night-vision sight, individual-served weapon, AN/PVS-2, must be zeroed to any weapon upon which it is mounted to ensure the delivery of accurate, aimed fire. 151

: know that once a specific sight-weapon combination has been zeroed, the night-vision sight may be removed from the weapon to facilitate daylight delivery of fire or for cleaning and temporary storage when not in use and remounted without further zeroing, provided: 152

(1) The same night-vision sight is remounted upon the same weapon to which it was zeroed as indicated by recording the serial numbers of the sight-weapon combination after zeroing and by checking the serial numbers against the record upon remounting.

(2) The azimuth-adjustment knob and the elevation-adjustment knob have not been moved since the sight-weapon combination was zeroed.

(3) The weapon-adapter bracket has not been removed from or replaced on the weapon since the sight-weapon combination was zeroed.

(4) The telescope mount assembly of the night-vision sight telescope has not been removed from or replaced on the telescope since the sight-weapon combination was zeroed.

He will : anticipate the need for zeroing night-vision sights to weapons and conduct zeroing during full daylight when practicable to obtain a more effective zero in less time and with greater security than if zeroing were conducted during darkness, i.e., controls, shot groups, etc., are easier to see during daylight and breaches of light discipline resulting from muzzle flash and the use of lights can be avoided. (After zeroing in daylight, confirming shot groups may be fired during darkness if the tactical situation permits.) 153

He must : when zeroing during daylight, ensure that the objective lens cover, with the smoked glass in the center of the cover, is kept over the objective lens to avoid damage to the image intensifier assembly from excess light. 154

He will : use tracer ammunition when zeroing during daylight or darkness to facilitate observation of the bullet strike on the target. 155

He must : unless otherwise directed by proper authority, zero small-arms shoulder weapons and the M72, 66mm high-explosive antitank rocket to hit the point of aim at 150 meters to gain maximum image clarity over the greatest possible critical range without a requirement to adjust the objective lens of the telescope during visual search and the engagement of targets with the night-vision sight. 156

He will : know that the sight reticle pattern is T-shaped, with six horizontal lines on top and three vertical lines in the stem, and use the center of the top edge of the top vertical line in the stem of the "T" as the aiming reference. 157

: without notes or references, draw a rough sketch of the T-shaped sight reticle and use the sketch to explain the correct sight picture to his men prior to having them zero their weapons. 158

He must : to move the aiming reference point of the sight reticle during zeroing, adjust the night-vision sight by rotating the elevation-adjustment knob and the azimuth-adjustment knob of the boresight mount assembly. 159

: move the strike of the bullet three inches (7.62 cm.) at a range of 150 meters with each click of either the elevation- or azimuth-adjustment knob on the boresight assembly. 160

: during zeroing, make elevation and azimuth changes <u>in the direction of error</u>, e.g., if the bullet strike is six inches directly <u>above</u> the point of aim at a range of 150 meters, rotate the elevation-adjustment knob of the night-vision sight boresight assembly to <u>raise</u> the elevation <u>two</u> clicks so that the bullet strike will coincide with the point of aim. 161

: turn the <u>azimuth</u>-adjustment knob <u>clockwise</u> to move the reticle <u>right</u> and vice versa; turn the <u>elevation</u>-adjustment knob <u>clockwise</u> to move the reticle <u>up</u> and vice versa. 162

He will : prior to zeroing, carry out the required operating instructions to ensure that the night-vision sight is functioning properly, i.e.: 163

(1) Check for secure mounting of the night-vision sight to the weapon.

(2) Make required adjustments to ensure that:

(a) The reticle is horizontal and clearly visible with the reticle lines appearing sharp and clear.

(b) The objective lens is focused so the target is clearly visible and in sharp focus at the range for zeroing.

He must : during zeroing, use the firing position that provides the greatest stability. 164

He will : ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can zero the night-vision sight, individual-served weapon, AN/PVS-2, to their individual weapons; the M72, 66mm high-explosive antitank rocket; the M60 machinegun; and the M67, 90mm recoilless rifle. 165

13. THE IRSL WILL ZERO THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2, TO THE M14, M14A1, AND THE M16A1 RIFLES AND SUPERVISE ZEROING BY HIS SUBORDINATES.

He will : conduct zeroing from a prone position and support the weapon with the bipod, sandbags, etc., to gain maximum stability. 166

: adjust the open sights (not the telescope) of the weapon for the desired range, e.g., 150 meters, and fire sufficient rounds at a clearly distinctive aiming point located at the center of mass of the target to obtain a good shot group, i.e., zero the weapon to hit the point of aim at the desired range by adjusting the weapon's iron sights. 167

: with the open sights of the weapon laid on the center of the shot group and without disturbing the lay of the weapon, transfer his eye to the telescope and manipulate to the elevation-adjustment knob and the azimuth-adjustment knob on the boresight assembly until the aiming, reference point of the night-vision sight reticle is aligned with the center of the shot group, i.e., with the center of mass of the target. 168

: fire confirming rounds and adjust the elevation and azimuth knobs on the boresight assembly to move the strike of the bullet three inches (7.62 cm.) for each click of elevation or azimuth at a range of 150 meters until shots called as hits fall within the shot group obtained with the open sights; then fire a confirming shot group at the same range at the center of mass of a clean target by aiming with the sight reticle of the telescope only to ensure that an acceptable shot group can be obtained, i.e., to ensure that the weapon and sight combination is zeroed to hit the point of aim at the desired range when the telescope of the night-vision sight is used for aiming. 169

: compensate for his night-vision sight setting when firing at ranges other than his zero by using an adjusted aiming point and aiming above or below the desired point of impact as demanded by the known trajectory of the weapon. 170

He must : recognize that the weight (approximately six pounds) of the night-vision sight will hinder the rapid delivery of effective fire during daylight when the sight is not required to see and engage targets; require careful dismounting and safeguarding of the night-vision sight when it is not required for use on a weapon. 171

: anticipate the necessity to dismount the night-vision sight to facilitate daylight employment of the weapon with a later requirement to mount the same night-vision sight on the same weapon again as darkness approaches, e.g., when manning security positions on the perimeter of a base area. 172

: when a night-vision sight is dismounted temporarily to facilitate the daylight delivery of effective fire, record the serial number of the night-vision sight and the serial number of the weapon; adhere to the provisions required for remounting (par. 152); and double-check the recorded serial numbers upon remounting the night-vision sight to ensure retention of the desired zero of the matched weapon and sight combination. 173

: require each rifleman to know the standard 250-meter battlesight setting for his (the rifleman's) individually assigned weapon and, after zeroing his rifle at a different range (e.g 150 meters) for use with the night-vision sight, to place his individual 250-meter battlesight zero on the iron sights of his weapon at once to facilitate the accurate delivery of fire at all effective ranges with his iron sights during daylight hours, i.e., the mounted night-vision sight will be zeroed to hit the point of aim at 150 meters during darkness and the iron sights will be zeroed to hit the point of aim at 250 meters during daylight hours. 174

: recognize the probable existence of a felt need by the individual rifleman to confirm the zero of his weapon by firing it after changing open sight settings and after remounting any optical sight, despite the use of recorded sight settings based on earlier firing with the same weapon and sight combination; coordinate and supervise firing to confirm the desired zero of a weapon after sight changes when the tactical situation will permit. 175

He will : ensure through instruction, demonstration, and supervised performance that his IFTL's and selected squad members can zero their rifles with the night-vision sight mounted and follow standard procedures to maintain the desired zero of the weapon and sight combination when the night-vision sight is dismounted during daylight and remounted as darkness approaches, i.e., obtain and maintain a 150-meter zero when the night-vision sight is mounted during darkness and revert to the standard 250-meter battlesight when using iron sights during daylight hours. 176

14. THE IRSL WILL ZERO THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2, TO THE M60 MACHINEGUN AND SUPERVISE ZEROING BY SELECTED SUBORDINATES AND ATTACHED MACHINEGUN CREWS.

He must : apply basic marksmanship procedures; use the tripod with the elevating and traversing mechanism to control and fix the lay of the weapon; and use sandbags to gain maximum stability during zeroing. 177

: adjust the open sights of the machinegun for the desired range, e.g., 300 meters, and fire sufficient rounds at the center of mass of the target to obtain a good shot group, i.e., zero the machinegun to hit the point of aim at the desired range by adjusting the weapon's rear sight. 178

: with the open sights of the machinegun laid on the center of the shot group and without disturbing the lay of the weapon, transfer his eye to the telescope and manipulate the elevation-adjustment knob and the azimuth-adjustment knob on the boresight assembly until the aiming reference point of the night-vision sight reticle is aligned with the center of the shot group, i.e., with the center of mass of the target. 179

: fire confirming rounds and adjust the elevation and azimuth knobs on the boresight assembly to move the strike of the bullet six inches (15.24 cm.) for each click of elevation or azimuth at a range of 300 meters until shots called as hits fall within the shot group obtained with the open sights; then fire a series of short bursts at the center of mass of the target by aiming with the sight reticle of the telescope only to ensure that weapon and sight combination is zeroed to hit the point of aim at the desired range when the telescope of the night-vision sight is used for aiming. 180

: compensate for his night-vision sight setting when firing at ranges other than the 300-meter zero by using an adjusted aiming point and aiming above or below the desired point of impact as demanded by the known trajectory of the weapon. 181

: when a night-vision sight is dismounted temporarily to facilitate the daylight delivery of effective fire, record the serial number of the machinegun and the serial number of the night-vision sight zeroed to the weapon; adhere to the provisions required for remounting (par. 152); and double-check the recorded serial numbers upon remounting the night-vision sight to ensure retention of the desired 300-meter zero of the matched weapon and sight combination. 182

: recognize that once a night-vision sight has been zeroed for a specific range (e.g., 300 meters) on a specific machinegun, the iron sights on the machinegun may be adjusted as demanded by the daylight mission when the night-vision sight is not in use (dismounted), provided the gunner adheres to the requirements (par. 152) for remounting the same night-vision sight on the same machinegun, e.g., the iron sights may be zeroed for 500 meters for daylight use while the night-vision sight remains zeroed for 300 meters. 183

He will : when targets and a measured range are not available, use a field-expedient method of zeroing, i.e., fire a three-round burst at the desired estimated range (300 meters), note the bullet strike, and adjust the aiming reference point of the night-vision sight reticle to the point of bullet strike without changing the lay of the weapon. 184

He must : through instruction, demonstration, and supervised performance, ensure that his IFTL's and organic or attached machinegun crews can zero the night-vision sight to the M60 machinegun. 185

15. THE IRSL WILL ZERO THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2, TO THE M67, 90MM RECOILLESS RIFLE AND SUPERVISE ZEROING BY ANY RECOILLESS RIFLE CREW ATTACHED TO HIS SQUAD.

He must : know that the elevation indexing ring of the M67 weapon-adapter bracket will increase range at the rate of 50 meters for each clockwise click. 186

He will : use the known-distance method, i.e., select a known-distance target with a distinct aiming point and adjust the M103 90mm sight to the corresponding range of the target. 187

: adjust the elevation indexing ring of the weapon-adapter bracket to the same range setting as the M103 sight and align the aiming reference point of the night-vision sight reticle on the same point of aim. 188

He must : zero on an infinity target by aligning the boresight cross of the M103 sight on the target and adjusting the aiming reference point of the night-vision sight reticle on the same target with the indexing ring positioned on zero. 189

He will : through instruction, demonstration, and supervised performance, ensure that his IFTL's can zero the night-vision sight to the M67, 90mm recoilless rifle. 190

16. THE IRSL WILL ZERO THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2, TO THE M72 LAW AND SUPERVISE ZEROING BY HIS SUBORDINATES.

He must : know that the elevation indexing ring of the weapon-adapter bracket will increase the range 25 yards per click when turned clockwise. 191

He will : select a known-distance target at a range of 150 meters, place the M72 in a stable rest position, then look through the M72 sight and align the corresponding range line with the target. 192

: set the elevation indexing ring on the weapon-adapter bracket to the corresponding range and, without disturbing the lay of the weapon, adjust the aiming reference point of the night-vision sight reticle to the same point of aim. 193

He must : through instruction, demonstration, and supervised practice, ensure that his IFTL's and selected squad members can zero the night-vision sight to the M72 LAW. 194

17. THE IRSL WILL MOUNT THE NIGHT-VISION SIGHT, CREW-SERVED WEAPON, AN/TVS-2, ON THE CALIBER .50 HB M2 MACHINEGUN AND SUPERVISE HIS SUBORDINATES WHILE THEY MOUNT THE DEVICE.

He must : know that the night-vision sight, crew-served weapon, AN/TVS-2, is designed for use on the caliber .50 HB M2 machinegun as mounted on the armored personnel carrier (APC) or ground mount and that it can also be mounted on a tripod and used as a surveillance device. 195

He will : install the weapon-adapter bracket on the cleared caliber .50 machinegun, i.e.: 196

(1) Loosen the four wing-nuts and the four thumb-screws on the weapon-adapter bracket, ensuring that the screws clear the bottom of the bracket.

(2) Raise the cover of the weapon and slide the bracket onto the receiver group with the cut-away portion toward the rear sight of the machinegun and check to ensure the front of the bracket clears the receiver so the cover will close.

(3) Tighten the four thumbscrews securely with pliers or other appropriate tool to prevent slippage during firing, then tighten the four wing-nuts in the same way to lock the bracket in place.

: mount the night-vision sight, crew-served weapon, AN/TVS-2, to the weapon-adapter bracket, i.e.: 197

(1) Loosen the boresight locking knob by turning the knob counterclockwise.

(2) Slide the dovetail notch onto the adapter bracket from rear to front.

(3) Tighten the boresight locking knob by rotating it clockwise.

He must : anticipate that the night-vision sight, crew-served weapon, AN/TVS-2, frequently will have to be removed from the weapon-adapter bracket of the machinegun to prevent damage to the sight during movement; through instruction, demonstration, and supervised practice, ensure that his IFTL's and selected squad members can mount the weapon-adapter bracket and mount and dismount the night-vision sight as required. 198

18. THE IRSL WILL BORESIGHT THE NIGHT-VISION SIGHT, CREW-SERVED WEAPON, AN/TVS-2, TO THE CALIBER .50 HB M2 MACHINEGUN AND SUPERVISE SELECTED SUBORDINATES DURING BORESIGHTING.

He must : know that the sight reticle patterns vary among the different models (9927, 9927A, and 9927B) of the night-vision sight, crew-served weapon, AN/TVS-2; recognize the reticle patterns suitable for employment with the caliber .50 HB M2 machinegun for each of the different models; and ensure the mounting of a reticle pattern suitable for use with the caliber .50 HB M2 machinegun prior to attempting to boresight the weapon. 199

: without notes or references, make a rough sketch of the reticle pattern for any designated model suitable for use with caliber .50 HB M2 machinegun and use the sketch of the reticle pattern to instruct his subordinates in boresighting the machinegun and in aiming at the ranges within which effective fire can be delivered, including the interpolation of ranges not marked on reticle patterns and the use of lead to engage moving targets. 200

: recognize the Model 9927 reticle pattern and know that: 201

(1) The seven dots spaced vertically downward from the center of the reticle are used for the delivery of fire with the caliber .50 HB M2 machinegun.

(2) The top center dot is the boresight dot.

(3) The seven dots spaced vertically downward from the center of the reticle indicate 200-meter range increments from 0 to 1200 meters for fire delivery with the caliber .50 HB M2 machinegun and the range values of the dots must be memorized by the gunners.

(4) All other dots appearing on this reticle pertain primarily to the 106mm rifle, but the dots spaced vertically downward on either side of the caliber .50 HB M2 machinegun scale are used to aid lead estimates when engaging moving vehicles with the machinegun.

: recognize the Model 9927A M2 reticle pattern and know that: 202

(1) The seven dots spaced vertically downward from the center of the reticle indicate 200-meter range increments from 0 to 1200 meters, as labeled on the left of the dots, for fire delivery with the caliber .50 HB M2 machinegun.

(2) The top dot, bracketed on each side by a horizontal line and on top by a vertical line, is the boresight dot.

: recognize the Model 9927A M40 reticle pattern and know that: 203

(1) The M40 reticle is designed for use with the 106mm recoilless rifle and cannot be used with the caliber .50 HB M2 machinegun.

(2) If the M40 reticle is found in a night-vision sight meant for use with the caliber .50 HB M2 machinegun, the reticle must be replaced with one suitable for use with the machinegun, e.g., the Model 9927A M2 reticle.

: recognize the Model 9927B M2/HS reticle pattern and know that: 204

(1) The seven dots spaced vertically downward from the center of the reticle indicate 200-meter range increments from 0 to 1200 meters, as shown by the M2 range scale labeled on the left of the dots, for fire delivery with the caliber .50 HB M2 machinegun.

(2) The top dot, bracketed on each side by a horizontal line and on top by a vertical line, is the boresight dot.

(3) The HS range scale labeled on the right of the dots pertains to the 20mm HS cannon and is not for use with the caliber .50 HB M2 machinegun.

He will : mount the caliber .50 HB M2 machinegun on the tripod (ground mount) for initial boresighting and test-firing to gain the stability provided by the traversing and elevating mechanism on the tripod, then transfer the weapon and night-vision sight to the vehicular mount upon completion of boresighting and test-firing. 205

He must : boresight any model of the night-vision sight, crew-served weapon, AN/TVS-2, to the caliber .50 HB M2 machinegun, i.e.: 206

(1) Select a distant aiming point beyond the range of a likely target.

(2) Remove the backplate, driving-spring assembly, and bolt group from the weapon.

(3) Sight through the barrel and align the center of the barrel on the distant aiming point by adjusting the traversing and elevating mechanism of the weapon.

(4) Recognize the specific model of the night-vision sight mounted on the machinegun and adjust the controls of the sight according to the procedure for the specific model to ensure that:

(a) The boresight cover is in place to avoid damage to the image intensifier assembly from excessive light.

(b) The tube and reticle are turned on.

(c) The reticle is vertical and the dots appear bright, sharp, and clear.

(d) The objective lens is adjusted so the aiming point is clearly visible and in sharp focus.

(5) Without disturbing the lay of the machinegun, align the boresight dot of the night-vision sight reticle on the same distant aiming point by rotating the azimuth boresight screw and the elevation boresight screw on the night-vision sight.

He will : know that once a particular night-vision sight has been boresighted to a specific machinegun, the night-vision sight may be removed from the machinegun, cleaned, stored when not in use, and remounted to the same machinegun without again boresighting provided the elevation and azimuth boresight screws are not moved and the weapon-adapter bracket is not moved. 207

: record matching night-vision sight and machinegun serial numbers or color code matched sight and weapon combinations to ensure that each night-vision sight is regularly mounted upon the same weapon to which it was boresighted and test-fired. 208

He must : through instruction, demonstration, and supervised performance, ensure that his IFTL's and selected squad members can boresight any available model of the night-vision sight, crew-served weapon, AN/TVS-2, to the caliber .50 HB M2 machinegun and maintain the accuracy of the matched sight and weapon combination when the mission requires dismounting and remounting of the sight. 209

19. THE IRSL WILL PERFORM AND SUPERVISE OPERATOR MAINTENANCE ON THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2, AND ON ALL MODELS OF THE NIGHT-VISION SIGHT, CREW-SERVED WEAPON, AN/TVS-2.

He will : know that the operator of the night-vision sight, individual-served weapon, AN/PVS-2, is authorized to remove and replace only the following: 210

(1) Objective lens cap.

(2) Battery cap and battery.

(3) Rubber eyeshield.

(4) Low-temperature adapter assembly (if required by climate).

: know that the operator of the night-vision sight, crew-served weapon, AN/TVS-2, is authorized to remove and replace the following: 211

(1) Battery cap and battery.

(2) Rubber eyeshield.

(3) Reticle lamp.

(4) Cant level lamp.

(5) Low-temperature adapter assembly (if required by climate).

: recognize the failure of any available night-vision sight to function efficiently, apply the prescribed probable remedies to restore the sight to service within the limitations of operator maintenance, and request organizational maintenance as required. 212

He must : know that the wrenches, batteries, lens paper, and brushes provided in the shipping containers are the only tools required by the operator to perform maintenance on the night-vision sights. 213

He will : inspect the main housing of the night-vision sights for dents, cracks, and loose or missing parts. 214

: do authorized disassembly to replace malfunctioning or broken parts and to facilitate cleaning and drying. 215

: clean all exposed metal parts with a soft cloth (dampened, if necessary). 216

: inspect the objective lens and the eyepiece lens for cracks, scratches, and signs of moisture or fogginess on the interior. 217

: clean lenses with the soft-bristled brush and lens paper provided in the shipping container; remove frost in cold climates with alcohol obtained from the medical corpsman. 218

: inspect rubber eyeshield for cracks, holes, or other damage and replace if required. 219

: remove battery cap and battery from housing and inspect for corrosion, leakage, rust, cracks, dents, and damaged battery spring; then replace battery. 220

: install and maintain the low-temperature adapter assembly as required by freezing or colder weather. 221

: use no lubricating materials for maintenance of the night-vision sights except a light coat on the weapon-adapter brackets to prevent rust. 222

He must : inspect the metal shipping container and inserts for dirt, dents, holes, damaged latches and latch clasps, missing parts, identification and instruction plates, and movability of the pressure relief valve; clean and repair or request replacement as required. 223

He will : prevent corrosion and deterioration by thoroughly drying all components of the night-vision sight after exposure to rain, snow, or high humidity. 224

: when operating in cold climates, recognize that if weapons and night-vision sights are brought from the cold outdoor air into heated bunkers or shelters, the moisture in the warmer air will condense on the cold metal and glass and then freeze when again exposed to the cold outdoor air; avoid exposing weapons and night-vision sights to such changes in temperature when practicable; and remove condensed moisture prior to exposure to freezing air to prevent jammed weapon actions and frosted or fogged lenses. 225

: avoid the exhalation of warm breath on the surfaces of lenses in cold weather to prevent the formation of vision-obscuring frost or fog on the lenses. 226

: avoid storing or carrying night-vision sights in damp or water-soaked carrying cases or shipping containers to prevent corrosion and fogging of lenses. 227

He must : conscientiously perform all daily maintenance services outlined in the operator's manual to ensure continuous and trouble-free operation. 228

He will : through instruction, demonstration, supervised performance, and impromptu inspections, including supervision and inspection by IFTL's, ensure that the night-vision sights issued to his unit are properly and promptly maintained. 229

20. THE IRSL WILL EMPLOY NIGHT-VISION SIGHTS TO INCREASE THE EFFECTIVENESS OF HIS SQUAD DURING NIGHT OFFENSIVE OPERATIONS.

He will : use night-vision sights during night patrols to detect ambushes, to bypass enemy patrols and obstacles, to increase aimed-fire capabilities, to gain combat intelligence, and to assist in reentry into friendly lines. 230

He must : use night-vision sights for night river crossing to determine good landing areas, to find covered approaches to the far bank, to detect obstacles (both in the water and on the far bank), and to maintain the direction of movement and control. 231

He will : employ night-vision sights to aid evasion when isolated behind enemy lines during darkness. 232

He must : employ night-vision sights during night ambushes to aid observation of the ambush area, to aid timely triggering of the ambush, to permit rapid withdrawal from the ambush site, and to aid observation by the security force against counter-ambush. 233

He will : use night-vision sights during land navigation in darkness to recognize landmarks, to read signs, to detour difficult terrain, to avoid enemy obstacles and installations, and to aid in determining the best route of travel. 234

: use night-vision sights during night foot and motor marches to locate obstacles, to maintain direction of travel, and to maintain contact with security elements or with the main body when serving with a security element. 235

He must : employ night-vision sights during a night attack to aid in the selection of avenues of approach, to direct automatic fire in support of the assault by direct observation, to designate targets for attached fire support, to detect enemy forward positions, and to observe and maintain control of attacking personnel. 236

He will : use night-vision sights during reorganization on the objective after a night attack to select and designate principal directions of fire, to locate and cover avenues of approach, to determine and assign FPL's for automatic weapons, and, in the event of a counterattack, to deliver aimed and controlled fire on the enemy while friendly forces are concealed by darkness. 237

He must : use infrared devices for signaling during operations that require secrecy and surprise. 238

He will : use night-vision sights to increase effectiveness of observation posts near or behind enemy lines by increasing ability to observe movement and activities and count and identify vehicles and troops during darkness. 239

: use night-vision sights to provide snipers with an accurate sighting aid and a means of detecting more profitable targets during darkness. 240

21. THE IRSL WILL EMPLOY NIGHT-VISION SIGHTS TO INCREASE THE EFFECTIVENESS OF HIS SQUAD DURING NIGHT DEFENSIVE OPERATIONS.

He must : know that unit security, effective fire delivery, and reconnaissance for planning often will be facilitated by the use of night-vision sights during darkness. 241

: on occupation of any position, make initial hasty, self-preservation search of entire area for immediate detection of enemy, then make systematic, detailed examination of overlapping strips of area, paying particular attention to suspected positions. 242

: use the night-vision sights to improve observation of fields of fire; to cover minefields, wire entanglements, and other defensive barriers with aimed fire; to deny enemy use of key terrain and avenues of approach; and to assist in the all-around defense and mutual support. 243

: when time and the enemy situation permit, clear fields of fire to obtain maximum observation and aimed-fire delivery because the infrared weapon-sight and image intensification devices are line-of-sight instruments. 244

He will : employ the night-vision sight, individual-served weapon, AN/PVS-2, as a hand-held viewing device and continually and systematically observe to the front, flanks, rear, and overhead, paying particular attention to his own area of responsibility with emphasis upon the areas covered by detached security personnel, i.e., listening posts, road or trail blocks. 245

: use the night-vision sights to increase the effectiveness of snipers, outposts, and main battle positions by assisting in the detection, identification, and effective engagement of enemy infiltrators, night patrols, and assaults. 246

He must : employ night-vision sights on or near an automatic weapon to aid in delivery of effective fire on targets of opportunity; covering unoccupied frontage in the squad or platoon defensive plan; distribution of fire on wide targets; and coordinating his squad's fire with that of adjacent units. 247

He will : use the night-vision sights to determine the principal direction of fire for attached antitank and direct fire support weapons during occupation of a position after nightfall. 248

He must : employ the night-vision sights with the combat outpost to detect enemy advance and to enable the combat outpost to deliver effective fire at ranges greater than would normally be possible with the naked eye during darkness. 249

He will : use the night-vision sights with the detachment left in contact during darkness to assist in detecting enemy movement and advance, to adjust direct and indirect fires on the enemy, to provide a means of signaling with the infrared devices, and to control withdrawal. 250

He must : locate infrared devices as far forward as possible in a defensive situation due to their relatively short range. 251

: know that the range of the infrared weaponsight may be increased by use of more powerful infrared light sources, i.e., Xenon searchlight, 30-inch searchlight. 252

: use the viewing element of the infrared weaponsight as a surveillance telescope when powerful infrared light sources, such as filtered searchlights, are available. 253

: coordinate the employment of infrared equipment with other units in the area so that visible light will be suppressed to assure maximum effectiveness. 254

: employ the infrared devices as a means of signaling and recognition between the main force and listening posts, outposts, and night patrols. 255

He will : anticipate the placement of friendly troops manning the night-vision sight, tripod-mounted, AN/TVS-4, within his squad defensive positions. 256

: know the characteristics of useful sites for ground surveillance with the night-vision sight, tripod-mounted, AN/TVS-4. 257

: provide suitable space and assist the section chief in pinpointing the selected site within his defensive position. 258

: integrate the surveillance equipment and operating personnel into the squad defensive organization to provide protection without interfering with the mission of the surveillance section personnel or the mission of his squad. 259

: establish and maintain coordination with the ground surveillance section chief to ensure the exchange of useful information and the enforcement of light and noise discipline. 260

22. THE IRSL WILL USE NIGHT-VISION SIGHTS TO ASSIST IN THE EFFECTIVE CONTROL AND EMPLOYMENT OF INDIRECT SUPPORTING FIRES DURING THE HOURS OF DARKNESS.

He must : use night-vision sights to detect, identify, and locate targets suitable for engagement with mortar and artillery fires; to maintain surveillance of registered target areas and areas covered by indirect final protective fires; and to shift or adjust indirect fires on suitable targets of opportunity. 261

: make night-vision sights available to attached mortar or artillery forward observers within his area of responsibility when the devices will increase the effectiveness of observed indirect fires, e.g., in defensive positions or ambush sites. 262

: know that range estimation by untrained operators of image intensification devices is normally unreliable and should be employed with caution. 263

: require all users of night-vision sights to report immediately when they detect targets suitable for engagement with indirect fires or crew-served flat trajectory weapons to achieve surprise, obtain maximum enemy casualties, and to employ friendly weapons best suited to the engagement of specific enemy targets such as armored vehicles and massed personnel. 264

23. THE IRSL WILL, WHEN DIRECTED BY HIS PLATOON LEADER OR AS THE SITUATION MAY DICTATE, DESTROY THE INFRARED WEAPONSIGHT TO PREVENT CAPTURE BY THE ENEMY.

He must : train all personnel in the prescribed methods of destruction and disposal. 265

He will : know that guerrilla and irregular enemy forces habitually seek to equip their own personnel with captured equipment and that capture of operating equipment by the enemy may facilitate entry by the enemy into friendly sites and may aid duplication of the equipment by the enemy. 266

He must : abandon infrared devices without destruction only on order and retain enough explosives and ammunition to complete destruction on order or in any situation where capture appears to be imminent. 267

He will : destroy the device as completely as possible within the limitations of time and equipment by one of the following methods: 268

(1) Use a rock, rifle butt, or any other suitable tool to smash the weaponsight and ensure that the image tube in the telescope and the light source filter are destroyed.

(2) Remove the eyepiece, light source filter, batteries, image tube and reticle, and bury the parts, scatter them in dense foliage, or throw them in a large body of water to destroy the weaponsight by scattering and concealment.

(3) Destroy by submersion, by removing the eyepiece, high-voltage power supply end caps, light source filter, and storage battery filler caps, and throw the parts into a body of water, preferably salt water, to cause greater damage to metal parts.

(4) Destroy by means of gunfire, ensuring that all optics are broken and destroyed.

He must : ensure that the same parts are destroyed on each weaponsight so that the enemy cannot rebuild a complete weaponsight by salvaging parts. 269

He will : destroy, short-out, bury, or throw into a large body of water all used batteries to prevent salvage by enemy guerrillas who would use them to detonate mines. 270

24. ON ORDER OR AS DEMANDED BY THE SITUATION, THE IRSL WILL DESTROY THE NIGHT-VISION SIGHT, INDIVIDUAL-SERVED WEAPON, AN/PVS-2; THE NIGHT-VISION SIGHT, CREW-SERVED WEAPON, AN/TVS-2; OR THE NIGHT-VISION SIGHT, TRIPOD-MOUNTED, AN/TVS-4, TO PREVENT CAPTURE BY THE ENEMY.

He must : train all personnel in the prescribed methods of destruction and disposal. 271

He will : destroy the devices as completely as possible within the limitations of time and equipment by one of the following methods: 272

(1) Fire sufficient rounds through the side of the device to ensure destruction of the image intensifier tube and as much of the objective lens and eyepiece assembly as possible.

(2) Attach a fragmentation hand grenade to the image focusing tube and image tube housing assembly ensuring that the grenade is securely attached to the device to prevent the grenade body being pulled away before it explodes and detonate the grenade.

(3) Smash with a heavy object on the image focusing tube, eyepiece, objective lens, and power supply assemblies (use only when weapons fire and grenade method cannot be used).

(4) Burn as much of the equipment as is flammable using gasoline, oil, flamethrowers, and other comparable flame agents.

: dispose of damaged or destroyed equipment by throwing in near-by waterways, burying, or scattering the debris when time and situation permit. 273