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NVG Repair Criteria

The following guidance is provided by Night Flight Concepts, Inc. The information provided is taken directly from the NVG operator's manual and applicable NVG repair and maintenance guidance.

The following information is provided to assist the NVG user in determining if the NVG is in need of possible repair. This information is being provided as informational only. Always refer to the appropriate NVG manufacturers operations manual for proper details of NVG operational defects or blemishes.

NVG Repair Criteria

Operational Defects (DO NOT FLY):

These defects relate to the reliability of the image intensifier and are an indication of instability. If identified, they are an immediate cause for rejecting the NVG. When a defect has been identified, record the specific nature of the problem on the maintenance forms and return the NVG for repair. The four operational defects are listed below:

- (1) **Shading** – Each monocular should present a full circle. If shading is present, a full circular image will not be seen. **Shading is indicative of a dying photocathode** caused by a defective vacuum seal of the image intensifier. Shading is very dark and images cannot be seen through it. Shading always begins on the edge and migrates inward eventually across the entire image. Shading is a high contrast area with a distinct line of demarcation. Do not confuse shading with variations in output brightness.

NOTE: Make sure the shading is not the result of improper tilt, eye-span adjustment, or vertical adjustment.

- (2) **Edge Glow** – Edge glow is a bright area (sometimes sparkling) in the outer portion of the viewing area. Edge glow is sometimes caused by **an emission point** (or series of emission points) just outside the field of view, or by **a defective phosphor screen** that permits light feedback to the photo-cathode. To check for edge glow, block out all incoming light by cupping a hand over the objective lens. If the image monocular assembly is displaying edge glow, the bright area will remain visible.
- (3) **Emission Points** – A steady or fluctuating pinpoint of bright light in the image area, and does not go away when all light is blocked from the objective lens of that monocular. The



position of an emission point within the image area does not move. Make sure any emission point is not simply a point light source in the viewed scene. Place a cupped hand over the objective lens to block out all light. If the bright spot remains, return the NVG to the maintainer to be checked for tolerances.

- (4) Flashing, Flickering, or Intermittent Operation – The image may appear to flicker or flash. This can occur in either one or both monocular, and is most commonly seen when adjusting the eye-span knob(s). If there is more than one flicker, check for loose wires, loose battery cap, or weak batteries. Indicate the rate of flashing or flickering on the maintenance forms.

Cosmetic Blemishes (NVG use at the discretion of the user):

These are usually the result of **manufacturing imperfections that do not affect image intensifier reliability**, and are not normally a cause for rejecting the NVG. However, some types of blemishes can get worse over time. Cosmetic blemishes are not a cause for rejection unless they become severe enough to interfere with the ability to perform the mission. When a blemish is cause for rejection, record the specific nature of the problem on the maintenance forms, identify the position of the blemish by using the clock method and approximate distance from the center (e.g., 5 o'clock toward the outside, 2:30 near the center, or 1:00 midway), and return the NVG for repair. The following is a list of the most common cosmetic blemishes:

- (1) **Bright Spots** – These are signal-induced blemishes in the image area, caused by a **flaw in the film on the microchannel plate**. A bright spot is a small, non-uniform, bright area that may flicker or appear constant. Bright spots usually go away when the light is blocked out. Not all bright spots make the NVG unserviceable. Make sure any bright spot is not simply a bright area in the viewed scene, by placing a cupped hand over the objective lens to block out all light. If the bright spot remains, an emission point exists and needs to be checked by authorized personnel.
- (2) **Black Spots** – These are cosmetic blemishes in the image intensifier, or **dirt or debris between the lenses**.
- (3) **Chicken Wire** – An irregular pattern of dark lines throughout the image area, or in parts of the image area. Under the worst-case condition, these lines will form hexagonal or square-wave shaped lines. These lines are caused by fibers that do not transmit light at the boundaries of fiber bundles in the output optic of the image intensifier.
- (4) **Image Distortion** – This condition is evidenced by vertical objects, such as trees or poles appearing to wave or bend when your head is moved vertically or horizontally, when looking through NVG. Distortion does not change during the life of an image intensifier. Each image intensifier should be screened for distortion before the first use.



- (5) **Veiling Glare** – Veiling glare occurs when light outside the field of view strikes the objective lens of a NVG and scatters instead of passing straight through the lens. This condition produces a reduction in contrast and occurs only under certain circumstances. It is not readily apparent during a routine checkout of the NVG. The cause may be an excessively scratched, pitted, or chipped objective lens. Dust, smudges, or fingerprints can also contribute to this condition; therefore, ensure the lens is clean. If this condition is present and cannot be remedied by cleaning; then the objective lens or image intensifier must be replaced.

- (6) **Fixed Pattern Noise (Honeycomb)** – This is usually a cosmetic blemish characterized by a faint hexagonal pattern throughout the viewing area that most often occurs at high-light levels or when viewing very bright lights. The pattern can be seen in every image intensifier if the light level is high enough.

- (7) **Image Disparity** – This condition may exist when there is a difference in brightness **between the two image intensifier assemblies within the same binocular.**

- (8) **Output Brightness Variation** – This condition is evidenced by areas of varying brightness in or across the image area **in an individual monocular.** The lower contrasts do not exhibit distinct lines of demarcation, nor do they degrade image quality. Do not confuse output brightness with shading.

If you experience any of the defects or blemishes described on this document, notify your NVG maintainer or contact Night Flight Concepts for further assistance.

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