OPTICS TRADE

Analog night vision devices

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ANALOG NIGHT VISION DEVICES

- Night vision devices amplify the rest light in the night so the user gets a brighter image for observing
- Night vision devices operate in the visible and also near-infrared spectrum
- Are classified by generations (1, 1+, 2, 2+, 3)
- The image is seen directly through the device, with no screen like on digital NV devices
- from the 2nd generation upwards, devices with black & white image are avaialble
- Not possible to take photos or videos

GREEN VS. BLACK&WHITE IIT

- The main difference makes the generation of the IIT and not the color of the image
- Black & white devices are available only from the 2nd generation upwards
- For many people, observing for a long period of time is more comfortable with a night vision device that features a green IIT
- Green IIT´s have often a brighter appearance
- The detail recognition is mostly better with a black & white IIT
- Night vision devices with a black & white IIT are more expensive

NV GOGGLES VS NV BINOCULARS

- Often feature the same housing
- The only difference is in the magnification
- NV goggles have true 1x magnification
- NV binoculars have a magnified picture (3x, 4x, 5x, etc.)
- NV goggles are widely used by professionals (Military, Police)

NV BINOCULARS VS NV SCOPES (NV MONOCULARS)

Pros and cons of each

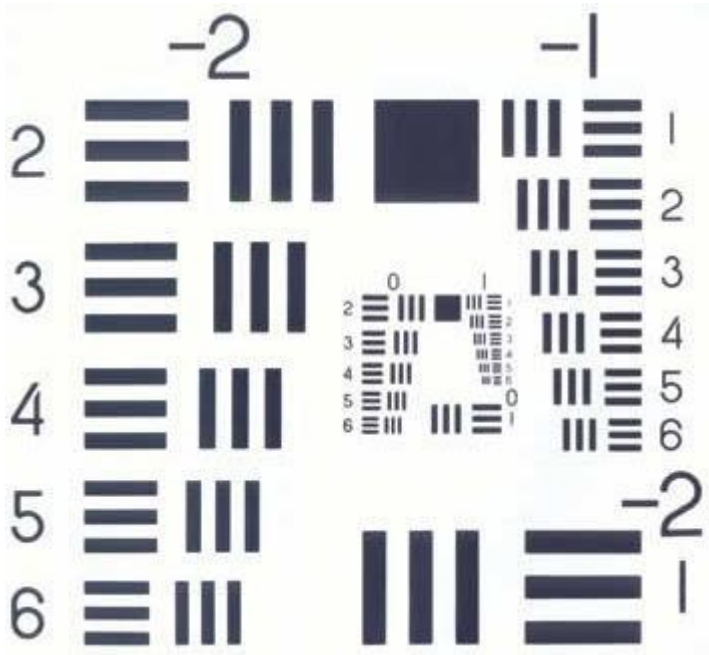
- Night vision scopes (monoculars)
  - Lighter in weight
  - Smaller, so easier to carry around
  - Cheaper – only one Image intensifier tube
  - Hard to combine rifle scopes and NV scope on the same eye
- Night vision binoculars
  - better viewing experiences
  - eyes were made to be used both at the same time
  - hard to set: both tubes need to be focused and proper diopter correction needs to be set

COMMERCIAL GRADE PHOTONIS IMAGE INTENSIFIER TUBES

- Photonis image intensifier tubes are the most common used IIT´s in Europe
- Made in Germany
- The “Commercial grade“ IIT´s are most common on the civilian market
- Can have some imperfections in the field of view
- Are rated by levels of imperfections (more imperfections is cheaper)
- Offer a great and intensified image.

RESOLUTION IN NIGHT VISION DEVICES

- The image intensifier resolution is measured in lp/mm, which means Line Pairs per Millimeter
- The IIT is tested on different-sized patterns of three horizontal and three vertical lines
- The smaller the pattern and the space between the lines can be discerned, the better the resolution
- The resolution does not tell us the generation of an IIT
- The performance is also measured in SNR, (Signal to Noise Ratio), which determines the IIT´s resolution in low light conditions
- So the higher the SNR number, the better can the tube resolve objects under low light conditions



FOM IN NIGHT VISION DEVICES

- FOM stands for Figure of Merit
- FOM = Resolution X Signal-to-Noise Ratio
- Because differences in the production of IIT´s can happen, the manufacturers give us rather the FOM number than some exact values.

NIGHT VISION DEVICES VS THERMAL DEVICES

Night vision

- (+) Realistic image
- (+) Better image quality at shorter ranges
- (+) Better detail recognition at shorter ranges
- (+) Cold objects are clearly visible
- (+) Antlers can be perfectly evaluated
- (+) Small energy consumption

- (-) Animals behind dense vegetation are not visible
- (-) More difficult to detect animals at all ranges
- (-) At complete darkness, an additional IR illuminator is needed
- (-) An IR illuminator under 850 nm can be visible to animals
- (-) Can not see through heavy fog, rain or snow
- (-) The flash from a firearm is longer noticeable (difficult to track animal after the shot)
- (-) Not possible to take photos or videos

NIGHT VISION DEVICES VS THERMAL DEVICES

Thermal imaging

- (+) Easy detection of animals at all ranges
- (+) Animals easy to see behind dense vegetation
- (+) No additional IR illuminator needed
- (+) Can see through heavy fog, rain or snow
- (+) Flash from a firearm is almost not noticeable
- (+) Possibility to take photos or videos

- (-) Small cold objects in front of an animal are difficult to see (trenches, grass, etc.)
- (-) Details are not well visible
- (-) Antlers not well visible and almost not visible at bigger distances
- (-) Bigger energy consumption

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