NIGHT VISION

Swapnil N. Gawade.
Roll No. :3233.
Scope:

- What makes humans enable to view any object?
- What is Night Vision?
- Types of Night vision technologies.
- Infrared light.
- Thermal imaging.
- Image enhancement.
- NVDs.
- Applications.
- References.
What makes humans enable to view objects?

- When a light projects on any object the object reflects the light. This reflected light by the object enables humans to view the object.
- With this humans are able to distinguish the object from others, with respect to its properties like colour, size, shape, etc.
What is Night Vision Technology?

- Night Vision technology is the technology by which humans are able to view object at night in the absence of sun light.
- It is invented by the U.S. Army.
- Infrared light is used in this technology.
- Types of NVT:
  1) Thermal imaging.
  2) Image enhancement.
Infrared light

- The amount of energy in a light wave is related to its wavelength: Shorter wavelengths have higher energy.
- Infrared light can be split into three categories:
  - Near-infrared
  - Mid-infrared
  - Thermal-infrared
What is Thermal Infrared?

- Infrared light is emitted by an object because of what is happening at the **atomic** level.
- The electrons release energy when returns to ground state from excited state.
- This energy is called as photons which are actually thermal infrared light.
Thermal Imaging

- Thermal infrared is the light emitted by any object due to the atomic collision.
- We don’t have any light at night to project on the object to view it.
- So Scientist made use of this thermal infrared light to view the object.
- This technology is called as thermal imaging.
Working of Thermal imaging
Image Enhancement

• It is the improved version of Thermal imaging.
• In Image Enhancement two additional features are added.
  1) Ambient light is considered.
  2) Image-intensifier tube.
Image-Intensifier Tube
A Sample Night Vision Photo
Facts:

• Why only green colour shade is used in night vision?
• Why does an iron bar turns red when intense heat is applied to it?
Night Vision Devices (NVD’s)

- **Scopes** - Normally handheld or mounted on a weapon, scopes are *monocular* (one eye-piece). Since scopes are handheld, not worn like goggles, they are good for when you want to get a better look at a specific object and then return to normal viewing conditions.
NVD’s

- **Goggles** - They are most often worn on the head. Goggles are **binocular** (two eye-pieces) and may have a single lens or stereo lens, depending on the model. Goggles are excellent for constant viewing, such as moving around in a dark.
NVD’s

- **Cameras** - Cameras with night-vision technology can send the image to a monitor for display or to a VCR for recording. When night-vision capability is desired in a permanent location, such as on a building or as part of the equipment in a helicopter, cameras are used.
Applications

- Military
- Wildlife observation
- Security
- Hidden-object detection
Military Applications

- An army men using the night vision goggles.
References

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Any Questions?
Thank you!!!!!