The Image Processing of Application in Target Detection and Image Clarity in Military

SCSV 3213
FUNDAMENTAL OF IMAGE PROCESSING

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Problems

- Soldiers must be ready to face important emergencies and harsh conditions.
- The emergencies can happen anytime during the day and night.
- It can also be challenging to focus in between hiding and targeting an enemy since the human eyesight is limited.
- Harsh weather and also night time hinders our eyesight.
- Accuracy of targeting an enemy will significantly decrease without a proper equipment.

ENVG-B
ENHANCED NIGHT VISION GOGGLE-BINOCULAR

The L3Harris ENVG-B is the most advanced helmet-mounted dual-waveband goggle with **RTA, AR** capabilities and can interface with the U.S. Army's Nett Warrior program.

- **Fusion Technology**

Soldiers get real-time, actionable intelligence through the process of Image Intensified (I2) white phosphor tubes and thermal imaging.

- **Augmented Technology**

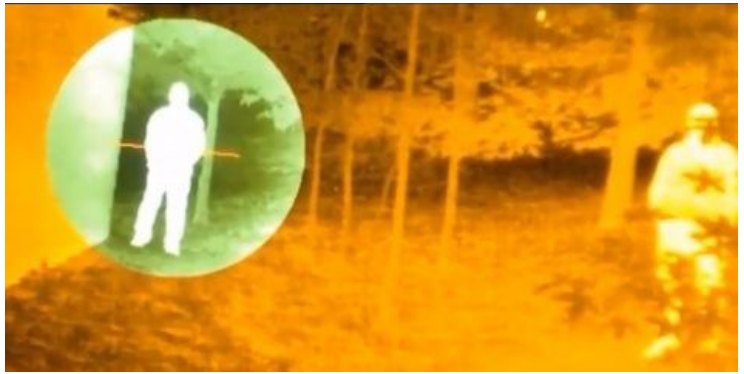
Having constant precise target while reading maps and radio check for critical information.

- **Rapid Target Acquisition**

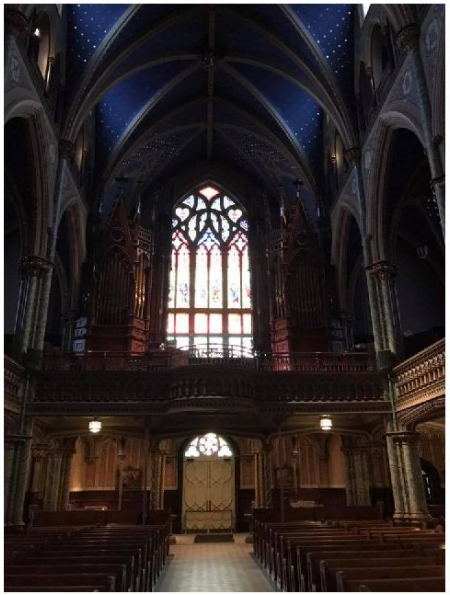
Solder can reduce risk of exposure as they can see around corners and allowing to identify, access and engage targets with better **accuracy and speed.**

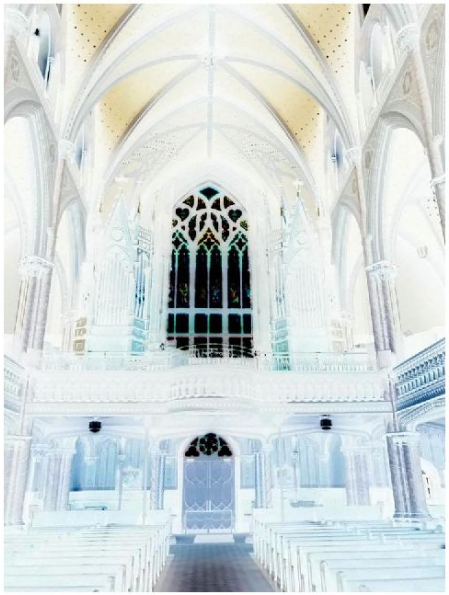
How ENVG-B Works in Image Processing

- ENVG-B has both **low light** image and **thermal imaging** capabilities.
- It uses white phosphor I2 technology in dual-tube google.
    - Improve target location, threat activity and access to imagery of operating environment.
- Low-light
- Lens detects infrared energy emitted by target which is converted into picture.
    - Blue to red colours to indicate hot and cold areas.



Low-light Image Enhancement Process

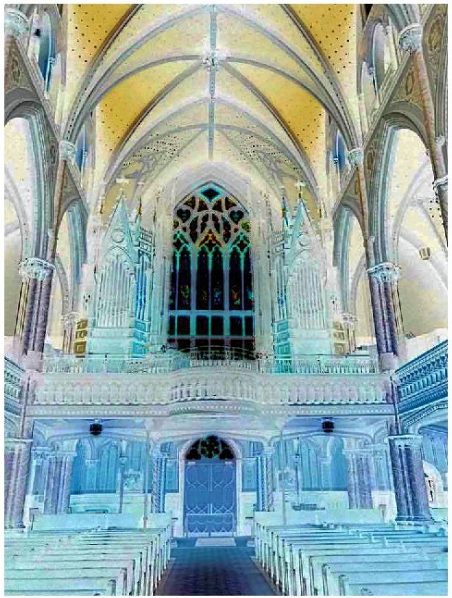




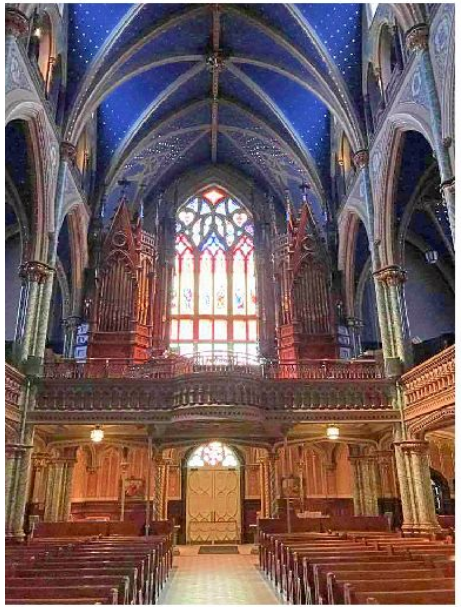
1. A low-light image is obtained from binocular.

2. The image is first converted. This is to detect areas where it is hazy.

Low-light Image Enhancement Process



3. Then, haziness is reduced.



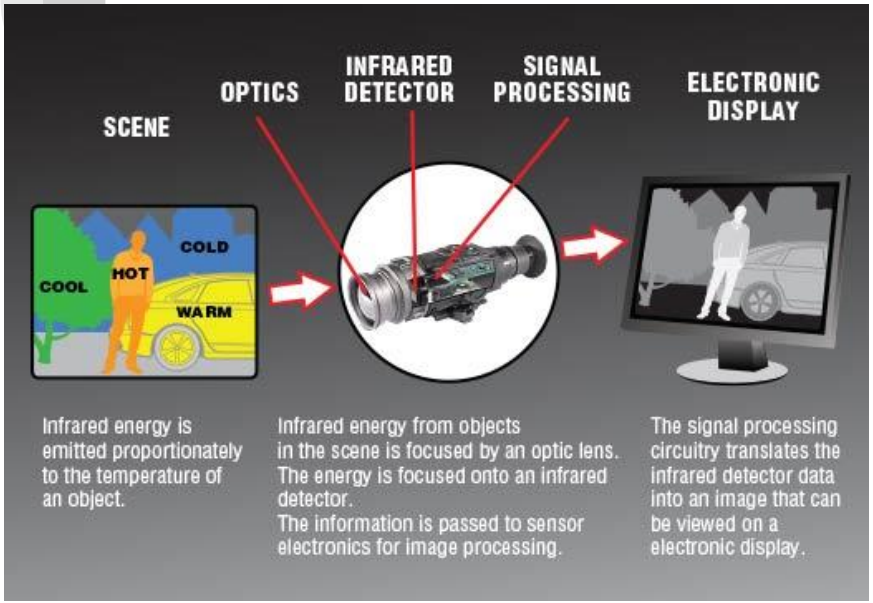
4. Lastly, the dehazed picture is inverted back resulting a much clearer picture. Details are greatly clarified using this process.

Thermal Imaging Process

- Thermal imaging works by using an infrared sensor to detect the **temperature** of different object.
- Human, vehicle and object can generate different temperature.
- Thermal imaging is used in military to see things that standard flashlights.

- By detecting their temperature, it will help them see the environment more clearly by detecting movement of object or human beings in battle field.

Thermal Imaging Process



In complete darkness and through smoke, tree and several obstacle, thermal imaging can detect suspicious activity by the enemy from a long distance.

Conclusion

- Infrared is used for thermal imaging since thermal detection **does not depend on surrounding light.**
- Low-light image enhancement improves the thermal imaging further by providing higher clarity of image.
- More than one approach can be combined to improve results.

FUNCTIONALITY OF THE ENVG-B GOOGLES

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