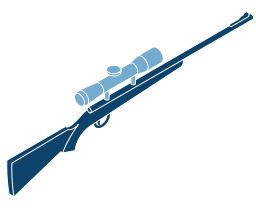
THE EVOLUTION OF NIGHT VISION

A night-vision device (NVD), also known as a night optical/observation device (NOD) or night-vision goggle (NVGs), is an optoelectronic device that allows visualization of images in low levels of light, improving the user's night vision. The device enhances ambient visible light and converts near-infrared light into visible light that the user can see, known as I^2 (image intensification). By comparison, viewing infrared thermal radiation is called thermal imaging and operates in a different section of the infrared spectrum. A night vision device usually consists of an image intensifier tube and a protective housing and may have some mounting system.[1]

1940s
GENERATION 0

INFRARED TECHNOLOGY



NIGHT SIGHTING

The initial forays into night vision technology happened during WWI and in Korea. Infrared emitters and scopes were used to see targets at night. This was very basic technology, but it set us on the path to modern night vision technology.

1960s
GENERATION 1

IMAGE INTENSIFIER (I^2)

STARLIGHT SCOPE

In the 1960s, the first image intensifier tubes were added to sniper scopes, creating the Starlight Scope. This was the first use of image intensifiers with a photocathode and phosphor screen triple-stacked in the scope. They could work with the moon, star, or other ambient light and did not have any form of emitters.

1970s
GENERATION 2

MICROCHANNEL PLATES

AN/PVS-5

Generation 2 of night vision devices was introduced in the 1970s, and a microchannel plate was added that significantly enhanced the brightness and image quality. Gen 2 improved the image-intensifier tube and added a microchannel plate with an S-25 photocathode, resulting in a much brighter image, especially around the edges of the lens.

This increased clarity in low ambient light environments, such as moonless nights. This increased clarity in low ambient light environments, such as moonless night light amplification, was around 20,000 greater than the previous generation.

1980s
GENERATION 3

GALLIUM ARSEDNIE PHOTOCATHODE

AN/PVS-7

& ION BARRIER MICROCHANNELS

AN/PVS-14

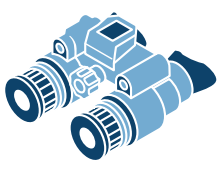
Generation 3 of night vision devices was introduced in the late 1980s. This was the first helmet-mounted night vision system we used, providing a 40° field of view (FOV) and up to 150M target identification.

The major advances in night vision technology were the introduction of a gallium arsenide photocathode and an ion barrier microchannel.

Light amplification with these devices is improved to around 30,000–50,000. Power consumption is higher than in GEN II tubes.

2000s
GENERATION 3+

ENHANCED &THIN-NER I^2 TUBES



AN/PVS 31

PANO-GOOGLES

GPNVG-18

FUSED THERMAL IMAGING

ENVG-B

Generation 3+ of night vision devices was introduced in the 2000s. While the based model of night vision did not change, many incremental changes increased the field of merit, which improved clarity, field of view, and clarity.

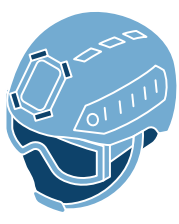
Generation 3+ saw the first panovision night vision devices, which used four I2 tubes to provide an extended field of view (FOV) of up to 97°.

Significant innovation was made by adding out-of-band near-infrared sensors, laser ranger finders, and fused night vision incorporating thermal outline imaging.

Light amplification with these devices is improved to around 30,000–50,000. Power consumption is higher than in GEN II tubes.

FUSED THERMAL IMAGING

2024
THE NEXT GENERATION



LGRIN OPTICS

HYBRID DIGITAL SYSTEMS

MODULAR OPEN SYSTEMS APPROACH

NEXT-GEN NIGHT VISION PLATFORMS

Night Vision technology is at a crossroads, and technological advances will be made in every dimension of hemlet-borne systems. Today, the US Army is working with industry to develop lighter systems to reduce soldier burden and integrate warfighters with command systems.

Peak is leading a revolution in optics systems to meet these demands with our LGRIN (Layered Gradient Refractive Index) technology. The expanded FOV is up to 50% lighter and extends target identification with an allied nation supply chain.

The Army is also looking to add mission scalability by applying the principles of MOSA (Modular Open Systems Approach) to night vision systems.

The Army is also working to create hybrid digital systems, such as IVAS (Integrated Visual Augmentation System), that can enhance warfighter capabilities with hybrid technology.

Sources:
[1] - https://en.wikipedia.org/wiki/Night-vision_device

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