

ELBIT SYSTEMS OF AMERICA - NIGHT VISION

# OWN THE ENVIRONMENT

NIGHT VISION IMAGE INTENSIFIER  
AND GOGGLE SOLUTIONS



NIGHTVISION.COM | #ElbitAmerica

# WHEN NIGHT FALLS, ELBIT SYSTEMS OF AMERICA DELIVERS THE CLEAR ADVANTAGE

As darkness falls, tactical risks increase. Warfighters face extreme conditions, moving from light-polluted urban areas to the pitch blackness of remote areas of operation. When conditions are at their worst, Elbit Systems of America night vision technologies are at their best—proven in mission after mission to enhance tactical speed, agility, safety and performance. Day after day, we deliver the industry's best night vision products, customer training, service and support.

## THE SCIENCE BEHIND NIGHT VISION

Our night vision systems convert low- or no-light scenes to bright, precise images in a series of steps:

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The monocular lens gathers light from the visible spectrum and also near infrared, which cannot be seen with the naked eye

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Those light particles, photons, are focused on an image intensifier where a photocathode absorbs their energy and converts them into electrons

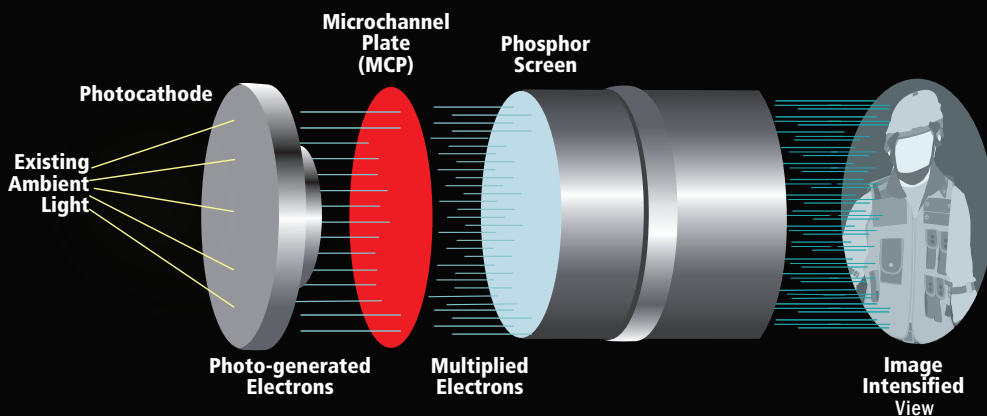
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Electrons are moved through a microchannel plate where they are multiplied nearly 70,000 times

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The multiplied electrons are drawn to a phosphor screen where they strike and excite the phosphor. In a process similar to that of a television's cathode ray tube, the phosphor screen projects illuminated, detailed views of a users' nightscape environment

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# BUILT IN ROANOKE, VA. SINCE 1959

Since World War II, U.S. and allied forces in over 99 countries have turned to us for a critical tactical advantage—night vision. Our legacy of innovation began with ITT, evolved into the digital realm with Exelis in the 21st century and continues today at Elbit Systems of America as we enter a new era of the networked battlespace.

1959

## GENERATION 0

Night vision aids were first used during World War II and the Korean conflict, and required an infrared illumination device to light up the target area.

We ship our first traveling wave tube from the Roanoke, VA. plant.

1964

## GENERATION 1

The starlight scopes in the 1960s Vietnam War were heavy, bulky and impractical for aviation.

We develop Gen 1 tubes, the first to intensify ambient light.

1972

## GENERATION 2

The development of the Microchannel Plate (MCP) improved image quality and reduced weight and size, allowing the design of smaller goggles and handheld devices.

Our engineering advancements provide night vision goggles and pocket scopes for aviation.

1989

## GENERATION 3

New Gallium Arsenide (GaAs) photocathode supported threat detection over greater distances and in darker conditions. A protective MCP ion film expanded tube life and reliability.

2007


We deliver our 1,000,000<sup>th</sup> Gen 3 image intensifier tube.

2020

Elbit Systems of America - Night Vision continues to enhance white phosphor night vision products with superior resolution, performance and operational life.

# SEE THEM BEFORE THEY SEE YOU

YOU HAVE THE EDGE WITH OUR GEN 3 TECHNOLOGY



Generation 3 systems deliver significant advantages for warfighters rapidly moving through different mission scenarios. The technology in our image intensifier tubes is far superior to Gen 2, allowing warfighters to see more detail, at a greater distance in low- and varied-light conditions. They can recognize and identify threats faster, increasing mission performance while significantly lowering risks. Our Gen 3 image intensifier tubes are more reliable and have a longer life, reducing replacements, down time and related costs.

## ELBIT SYSTEMS OF AMERICA CONTINUES TO ADVANCE NIGHT VISION TECHNOLOGIES

### WHAT YOU RISK WITH GEN 2

Troops are at greater risk due to limited performance in low- or no-light environments

Military planning and effectiveness are limited by 20% fewer days of operation under optimum conditions

Replacement image intensifier tubes need to be purchased more often due to faster degradation and reduced operational life

### WHAT YOU GAIN WITH GEN 3

Four times greater photocathode response for more efficient conversion of light into an electronic signal

30% more gain, sending brighter images to users' eyes without sacrificing tube performance or life

Gen 3 image intensifiers last 4 to 5 times longer than Gen 2 tubes with little degradation after 10,000 hours of use

# EXCEPTIONAL IMAGE CLARITY

## GEN 3 NIGHT VISION IMAGE INTENSIFIER TUBES

Elbit Systems of America - Night Vision Gen 3 image intensifier tubes advance mission performance with enhanced threat detection and extended viewing range in all lighting conditions. These proven solutions deliver clear and crisp imaging, extended high-performance operation and environmental stability.

### GEN 3 18MM



#### MX-10160

Engineered for the AN/AVS-6, AN/AVS-9 aviation systems and the AN/PVS-23 ground system

F9400  
F9800



#### MX-10130

Engineered for the AN/PVS-7 tactical ground system

F9410  
F9810



#### MX-11769

Engineered for the AN/PVS-14 monocular system and weapon sights, with added capabilities to adjust tube gain or brightness in the field

F9415  
F9815

### KEY BENEFITS

Enhanced low-light performance with high photocathode sensitivity to low radiation levels of visible and near infrared light

Extended detection ranges in little-to-no light provided by very high signal-to-noise ratio

Exceptional image resolution and longer tube life supported by advanced MCP engineering

Available in white (94XX) and green (98XX) configurations

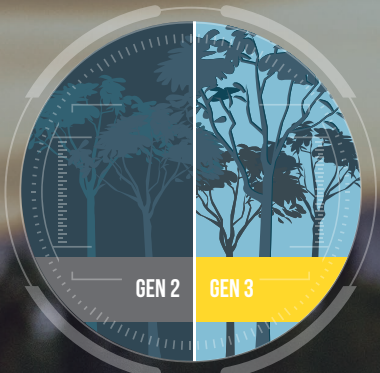
Resolution minimum 64 or 72 line pair, depending on FOM requirements

Photoresponse from a minimum of 1500 microamps per lumen or higher, depending on requirements



### EXTREME LOW LIGHT

Missions gain significant tactical advantages from covert operations during the darkest of nights.



### CHANGING SCENARIOS AND LIGHTING

On a single night, warfighters may move through changing visual conditions, from heavy foliage to moonlit skies, to light-polluted urban areas.



### INTENSIFIER PERFORMANCE AND LONGEVITY

Success and safety of nighttime forces depends on intensifier tubes they can count on for high-quality imaging in extreme conditions and over long periods of time.

### CUSTOM IMAGE INTENSIFIER TUBES

From standard configurations to the most advanced technology available, Elbit Systems of America engineering and manufacturing experts are committed to meeting unique customer specifications. Contact us today for your customized mission solution.

# FIRST CHOICE FOR GLOBAL AVIATORS

Elbit Systems of America night vision technologies are the first choice for aviators around the world. In extremely low-light conditions, our Gen 3 image intensifier tubes deliver crisp, defined imaging. In bright-light scenarios, they retain high-resolution and visual clarity, improving safety and Situational Awareness.



# EXCELLENCE IN FLIGHT

## GEN 3 NIGHT VISION AVIATION SYSTEMS



F4949

### AN/AVS-9

With enhanced visual clarity, fixed and rotary-wing aviators gain the advantage to clearly identify targets and avoid obstacles. The Elbit Systems of America F4949 series is the standard night-flying system for the U.S. Air Force and Navy.

- Objective lens coatings filter glare from cockpit instrument lighting
- 25-mm eye relief eyepieces easily accommodate eyeglasses
- A low-profile battery pack improves head mobility while increasing battery life



F4212  
F4210

### AN/AVS-6

Aviators get the best low-light performance available today from our F4212 and F4210 night vision imaging systems. Currently in fixed and rotary-wing use around the world, technologies in these binoculars deliver maximum image resolution and clarity in all light conditions.

- Independent eye span adjustment and 25-mm relief eyepiece accommodate eyeglasses and unique user requirements
- Low-profile battery pack improves head mobility



### INCREASES OPERATIONAL RANGE

Our MX-10160 intensifier tube is field-proven for superior clarity and resolution in high-light or low-light environments.



### ADVANCES SITUATIONAL AWARENESS

Gives aviators superior target recognition and identification regardless of operational conditions.



### ENHANCES AVIATOR PERFORMANCE

Objective lens coatings filter glare from cockpit instrument lighting.





# OWN THE ENVIRONMENT

On the battlefield and under fire, Elbit Systems of America night vision tactical ground systems maximize user performance in light-polluted to low- or no-light environments. They deliver high-quality image intensification without sacrificing field of view.



# DELIVERING THE DECISIVE EDGE

## GEN 3 NIGHT VISION TACTICAL GROUND SYSTEMS



### F6025 ENHANCED NIGHT VISION GOGGLE

The ENVG-B provides overmatch capability to the warfighter with a platform that integrates heads-up situational awareness and un-matched capabilities to own the networked battlefield. Wireless connection to the rifle mounted thermal weapon sight allows for rapid target acquisition, augmented reality, and Nett Warrior interface and provides the warfighter lethal capability to engage in close combat operations.

- High performance white phosphor image intensifier tubes for better scene contrast
- 10  $\mu$  Thermal Sensor
- Intra-Soldier Wireless (ISW) capability for networked growth capability to include remote sensors such as range finders and additional video feeds to be presented to the warfighter
- Integration with ARA Augmented Reality and Nett Warrior for forward facing engagement and vision for situational awareness, blue force tracking, navigation GPS and battlefield marking



### F5032 LIGHTWEIGHT NIGHT VISION BINOCULAR

The F5032 features industry-leading close-focus range, giving soldiers near-eye clarity to read detailed intelligence, aid in medical support and operate radios even in low- or no-light scenarios.

- Accommodates unique optical requirements and reduces eye strain with fixed or adjustable diopter lens configurations
- Optimized SWaP profile reduces user fatigue
- Controllable, integrated Infrared (IR) illuminator provides immediate lighting in zero-light scenarios
- Swappable image intensifier modules speed tube replacement and reduce maintenance time
- Vertical viewing feature prevents inadvertent shut-off at inopportune times



### SQUAD BINOCULAR NIGHT VISION GOGGLE

The SBNVG enhances warfighter performance and agility with capabilities for overlaid image intensified and infrared imagery. This Gen 3 system combines the Optics 1 E-COTI with our F5032 for superior nighttime viewing under a variety of environments and conditions.

- Features high-performing white phosphor image intensifier tubes
- Lightweight system design with maximum battery life also exceeds industry standards for target detection, thermal highlighting, focus range and mechanical backlash
- Integrated compass provides heading information and forward projecting near infrared (NIR) illuminator enables subterranean (SubT) operations. These combined features maximize stand-off protection and increase situational awareness



### AN/PVS-23 NIGHT VISION BINOCULAR

The ruggedized Elbit Systems of America F5050 binocular delivers advanced depth perception for off-road driving and high-speed navigation at sea.

- Equipped with aviation-standard optics and high-resolution Gen 3 F9400 and F9800 image intensifier tubes
- Independent eye span adjustment and stereoscopic vision
- Handheld or helmet-mounted operation and includes adjustable IR illuminator



### TRANSFORMS TACTICAL ABILITIES

Soldiers have unique capabilities to record and share battlespace video, data and graphics, keeping the Common Operational Picture updated in real-time, and allowing forces to be faster, safer and more lethal.



### DELIVERS REAL-TIME CONNECTIVITY

Isolated units networked with the TOC provide continuous access to UAV feeds, GPS mapping, text messages and other mission-relevant, actionable data and intelligence.



### IMPROVES WARFIGHTER EFFECTIVENESS

Fusion thermal overlay technologies allow soldiers to keep eyes on target despite smoke, fog, overgrowth or other environmental factors that might interfere with image intensifiers.

# DELIVERING THE DECISIVE EDGE

## GEN 3 NIGHT VISION TACTICAL GROUND SYSTEMS



### AN/PVS-7 NIGHT VISION BI-OCULAR

Ground forces rely on our F5001 night vision systems for top mission performance during the darkest nights of the year.

- Lightweight, engineered for long-wearing comfort
- Handheld, helmet-mounted, or head strap-mounted for hands-free operation
- Includes IR-on indicator and automatic highlight cutoff protection for the image intensifier



### AN/PVS-14 NIGHT VISION MONOCULAR

The versatile technology of the F6015 allows soldiers to move rapidly and effectively in all night conditions without the need to carry multiple types of specialized equipment.

- Engineered for handheld, head/helmet, weapon mounted, or camera-adapted use
- Features Gen 3 F9415 and F9815 intensifier tubes with variable gain
- Dark-adapted unaided eye technology provides Situational Awareness and close-range vision
- Night vision aided eye provides long-range sighting of potential threats



### TM-NVG

The F6044 keeps commanders and tactical edge forces connected with real-time sharing of tactical intelligence.

- Instantaneous capture, upload and sharing of graphics and video
- Full-color access to UAV feeds, GPS information and target locations
- Supports information sharing with other goggles, data radios and smart phones



### F7030 CLIP-ON WEAPON SIGHT

Engineered for maximum sighting accuracy, the F7030 is one of the most sensitive and advanced night vision scopes available for military and commercial use today.

- Ideal for front-line and long-range rifles and day scopes
- Developed in conjunction with Knight's Armament Company
- Patented technology and extended focus accuracy of day scope boresight
- Single Interchangeable Battery® exceeds 24 hours of continuous operation





## CUSTOMER SUPPORT DOESN'T END WITH PRODUCT DELIVERY— IT INTENSIFIES.

The world-class technicians who develop and produce our night vision systems are the same who provide customers with training, equipment assessment, maintenance and repairs. You can rely on Elbit Systems of America for unfailing support throughout your product's life cycle, year after year—night after night.

### OPERATOR TRAINING

- Theory of night vision
- Pre-use inspection and adjustment
- Basic system evaluation
- Maintenance and repair
- Proper use and storage

### MAINTENANCE TRAINING

- Equipment set-up and adjustment to meet specifications
- Image intensifier testing and inspection
- Repair and replacement of parts or assemblies
- Preventative maintenance

### SERVICE, SUPPORT AND SYSTEM MAINTENANCE

- On-call assistance or scheduled maintenance
- Performance testing
- Calibration and adjustment
- Tools and test equipment
- Parts and repairs, including retrofits and system upgrades

## OUR DEDICATION TO YOUR MISSION

Our night vision research and development team continues to push technology's limits to develop the next industry-leading innovation. From improved ergonomics, SWaP and tube performance, to advanced network connectivity, our team is dedicated to warfighter safety and mission success.

For more information, including product demonstration, please call  
+1- 540-563-0371  
or email  
nvsales@elbitsystems-us.com

## ABOUT US

Elbit Systems of America, LLC is a U.S.-based wholly owned subsidiary of Elbit Systems Ltd., a leading global source of innovative, technology based systems for diverse defense and commercial applications

Learn more at [elbitamerica.com](http://elbitamerica.com)

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