

## NIGHT VISION DEVICES

Night vision technologies provide enhanced vision, sensing and awareness for first responders operating in low or no light conditions. This equipment falls under the Authorized Equipment List reference numbers 030E-02-TILA, “Optics, Thermal Imaging and/or Light Amplification” and 04MD-01 LAMP, “Equipment, Light Amplification.”

## Assessment Overview

From March 29–April 2, 2022, the Science and Technology (S&T) National Urban Security Technology Laboratory’s (NUSTL) System Assessment and Validation for Emergency Responders (SAVER) program, with the support of the U.S. Army Combat Capabilities Development Command (DEVCOM), assessed white phosphor, Gen-3 binocular night vision devices (NVDs) at Picatinny Arsenal in Dover, New Jersey. The purpose of the assessment was to obtain information on NVDs that will be useful for first responders making operational and procurement decisions. Assessment activities were based on recommendations from a focus group of NVD subject matter experts (SMEs). A report on that focus group as well as a market survey covering 39 devices – including binoculars, monoculars and bi-oculars formats – can be found in the SAVER Documents Library at [www.dhs.gov/publication/night-vision-technologies-image-intensifiers](http://www.dhs.gov/publication/night-vision-technologies-image-intensifiers).

Six SMEs from Arizona, New Jersey, New York and Virginia assessed six NVDs, (identified below), using them in four law-enforcement-focused simulated operational scenarios. Specifically, the scenarios focused on tasks related to search and rescue, surveillance, mass transit patrol and special weapons and tactics (SWAT). Throughout these scenarios the SMEs operationally assessed 15 criteria distributed across four SAVER Categories: Capability, Deployability, Usability and Maintainability. The criteria were: image clarity, focus, infrared (IR) illuminator, light range operability, thermal integration, field of view, anti-fog, durability, mount capability, size and weight, accessories, covertness, comfort and fit, ease of use and sacrificial lens. Six other criteria – battery life, battery type, self-maintainability, vendor accessibility, warranty and storage – were assessed by specification.

Focus group participants recommended assessing integrated night vision devices that combine image intensification and thermal imaging. To assess a device’s ability to integrate with a thermal accessory, an Optics 1 Enhanced Clip-On Thermal Imager (ECOTI) was used during three operational scenarios.



Figure 1. An evaluator wears an NVD.



Figure 2. During the SWAT operational scenario, an evaluator adjusts the focus on an NVD in order to manipulate a lock. This image was captured using the thermal accessory’s “white hot outline” setting.

## Products Assessed



**ACTinBlack DTNVS**  
MSRP: \$10,700



**Carson Industries BNVD**  
MSRP: \$7,500



**Elbit AN/PVS-31D**  
MSRP: \$10,985



**L3Harris BNVD-1531**  
MSRP: \$10,500



**Nightline, Inc. RNVG**  
MSRP: \$9,000



**PRG Defense NVG-51**  
MSRP: \$8,820

Listed MSRPs represent the base price. Device enhancements may be available at additional costs.

## Overall Results

Overall scores for the night vision devices ranged from 3.73 to 4.15 out of 5. The table below presents the overall score and category scores for each product. Products are listed from highest to lowest overall score. The overall assessment score for each product is calculated using the product's averaged criterion ratings and category scores. An average rating for each criterion is calculated by summing the evaluators' ratings and dividing the sum by the number of responses.

Company	Model	Overall Score	Capability	Deployability	Usability	Maintainability
Elbit	AN/PVS-31D	4.15	4.03	4.51	4.17	3.94
L3Harris	BNVD-1531	4.11	3.88	4.33	4.42	3.91
ACTinBlack	DTNVS	4.08	4.07	3.83	4.33	4.09
Carson Industries	BNVD	3.91	3.52	4.58	3.67	4.28
PRG Defense	NVG-51	3.85	3.73	4.06	3.75	3.95
Nightline, Inc.	RNVG	3.73	3.81	3.82	3.67	3.49

## Product Commonalities

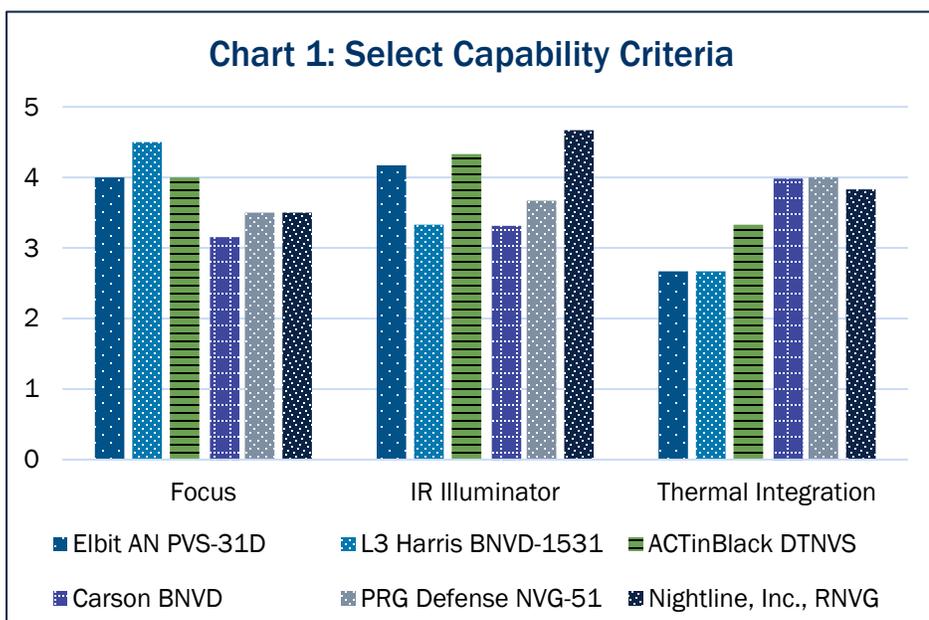
All products assessed included a visual low-battery indicator and a built-in IR illuminator, had a focus range of 25 cm to infinity, and had a diopter adjustment range of -6 to +2. Furthermore, all the devices could be equipped with the ECOTI via a bracket on a single lens.

### Commonalities

Magnification: 1x  
Focus Range: 25 cm to  $\infty$   
Adjustment Range: -6 to +2

## Key Takeaways

Graphical representations of scores for select criteria are displayed in charts 1–3, covering the criteria categories of Capability, Deployability and Usability. These select criteria highlight results between the devices. Products are listed on the graphs in order of their overall score.



### Chart 1: Capability

All NVDs met most or all of the evaluators' expectations. However, some noted the BNVD required more time and manipulation to focus on distant items. The RNVG scored the highest for the IR illuminator criterion as evaluators found its light strong and bright, which allowed it to project farther than others. The device also has an adaptor for a spot or flood light. Evaluators found the BNVD and NVG-51 the most compatible with the thermal accessory (ECOTI) because the location of the mount did not interfere with their ability to focus or easily adjust the device.

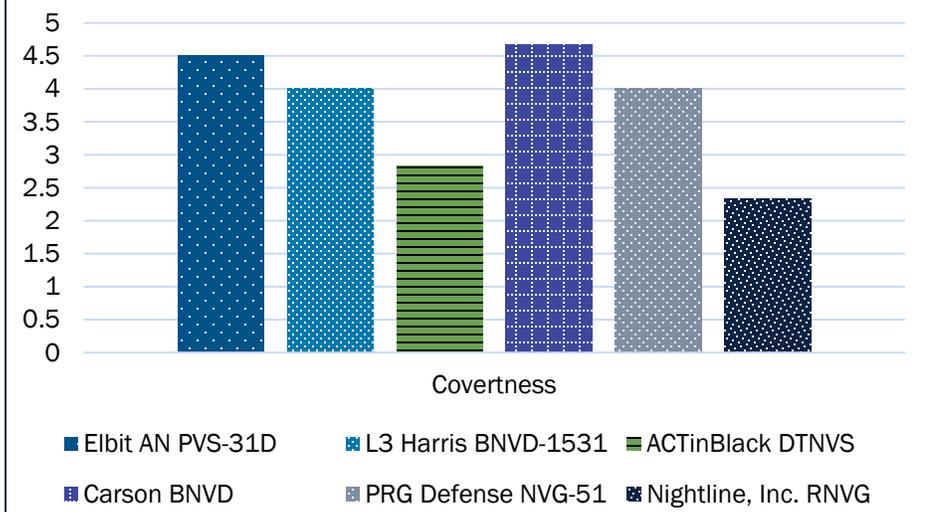


Figure 3. An evaluator wears the PRG Defense NVG-51 with ECOTI thermal accessory.



Figure 4. This profile of a helmet-mounted BNVD shows the distance between user and device.

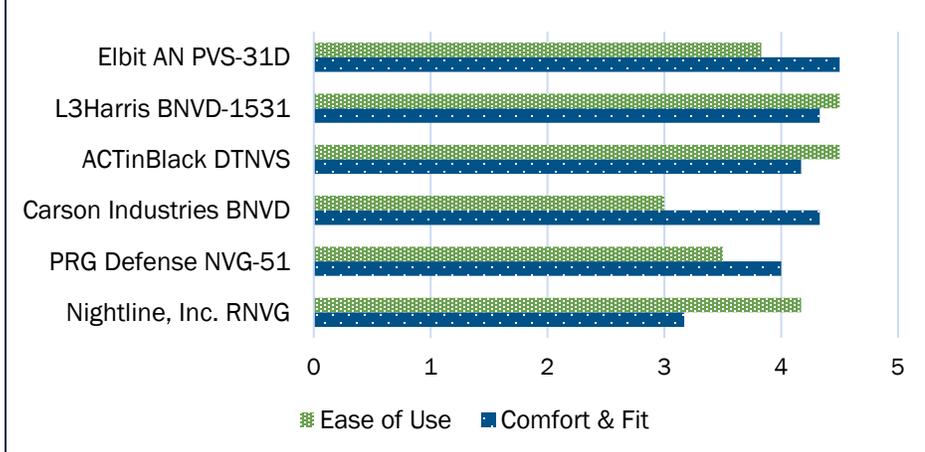
**Chart 2: Select Deployability Criterion**



**Chart 2: Deployability**

Evaluators deemed covertness important for operations such as SWAT. They scored the BNVD the highest as the device fit close to the eye, resulting in a snug fit and limited light from escaping. Evaluators scored the RNVG the lowest attributing it to its lack of an automatic shut off when the device was flipped up, which made the lights clearly visible. Evaluators also cited the far distance the RNVG sat from the face (see *figure 4 above*) and the corresponding light that escaped when eyecups were not used.

**Chart 3: Select Usability Criteria**



**Chart 3: Usability**

Evaluators provided conflicting scoring suggesting a tradeoff between the criteria “ease of use” and “comfort and fit.” Organizations should consider their operational use cases when determining the appropriate device for their needs. Those who use the devices infrequently might prioritize ease of use, while those who use the devices for lengthy shifts might prefer a more comfortable device.

## For More Information

This document provides information on the SAVER assessment methodology and a limited comparative analysis of night vision devices. Additional information on the night vision devices assessment and the complete comparative results will be shared in a final report to be published within the [SAVER Document Library](#), specifically the “Night Vision Technologies: Image Intensifiers” page found at [www.dhs.gov/publication/night-vision-technologies-image-intensifiers](http://www.dhs.gov/publication/night-vision-technologies-image-intensifiers).

More than 1,000 knowledge products can be found within the SAVER Document Library at [www.dhs.gov/science-and-technology/saver-documents-library](http://www.dhs.gov/science-and-technology/saver-documents-library). For more information on the S&T National Urban Security Technology Laboratory please visit our [website](#) or contact us at [NUSTL@hq.dhs.gov](mailto:NUSTL@hq.dhs.gov).

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Photos are provided by the National Urban Security Technology Laboratory unless otherwise noted. Images of the products from the Night Vision Devices Assessment were provided by DEVCOM.