



# Night Vision Devices

## Focus Group Report

May 2021



**Homeland  
Security**

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## Foreword

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) program to assist emergency responders making procurement decisions. Located within the Science and Technology Directorate (S&T) of DHS, the SAVER program conducts objective assessments and validations on commercially available equipment and systems and develops knowledge products that provide relevant equipment information to the emergency responder community. The SAVER program mission includes:

- Conducting impartial, practitioner-relevant, operationally oriented assessments and validations of emergency response equipment.
- Providing information, in the form of knowledge products, that enables decision-makers and responders to better select, procure, use and maintain emergency response equipment.

SAVER program knowledge products provide information on equipment that falls under the categories listed in the DHS Authorized Equipment List (AEL), focusing primarily on two main questions for the responder community: “What equipment is available?” and “How does it perform?” These knowledge products are shared nationally with the responder community, providing a life-and-cost-saving asset to DHS, as well as to federal, state and local responders.

The SAVER program is managed by the National Urban Security Technology Laboratory (NUSTL). NUSTL is responsible for all SAVER activities, including selecting and prioritizing program topics, developing SAVER knowledge products, coordinating with other organizations and ensuring flexibility and responsiveness to first responder requirements.

NUSTL provides expertise and analysis on a wide range of key subject areas, including chemical, biological, radiological, nuclear and explosive weapons detection; emergency response and recovery; and related equipment, instrumentation and technologies. In support of this tasking, NUSTL will conduct a night vision devices comparative assessment to provide emergency responders with reference information on currently available technologies. Night vision devices fall under AEL reference number [030E-02-TILA](#) titled, “[Optics, Thermal Imaging and/or Light Amplification](#)” and [04MD-01-LAMP](#) titled, “[Equipment, Light Amplification.](#)” As part of the project, assessment recommendations were gathered from a focus group and are highlighted in this report.

For more information on NUSTL’s SAVER program or to view additional reports on night vision or other technologies, visit [www.dhs.gov/science-and-technology/SAVER](http://www.dhs.gov/science-and-technology/SAVER).





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## EXECUTIVE SUMMARY

Night vision devices may be used by law enforcement, fire and emergency response personnel to provide enhanced vision, sensing and awareness in low or no light conditions. Through its System Assessment and Validation for Emergency Responders (SAVER) program, the National Urban Security Technology Laboratory (NUSTL) will conduct a comparative assessment of night vision devices to provide emergency responders with information that will assist with making operational and procurement decisions. Night vision devices fall under AEL reference number [030E-02-TILA](#), titled “Optics, Thermal Imaging and/or Light Amplification” and [04MD-01-LAMP](#) titled “Equipment, Light Amplification.”

As a part of the assessment process, NUSTL convened a virtual focus group from September 22 – 29, 2020. The virtual focus group occurred in three parts using Microsoft Teams with the primary objective of collecting responder recommendations on evaluation criteria, product selection criteria, products and possible scenarios for the assessment of night vision devices. NUSTL gathered recommendations from seven emergency responders from various jurisdictions who have experience using night vision devices; their recommendations are documented in this report.

The focus group identified 30 evaluation criteria. Capability, which refers to product features or functions needed to perform one or more responder relevant tasks, was determined to be most important and received the highest weight across SAVER categories. Image clarity, the ability of the night vision device to provide a clear, high-resolution image, was identified as the criterion of highest importance.

The focus group participants also recommended six assessment scenarios that will be used to plan the night vision devices assessment.

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## 1.0 INTRODUCTION

Night vision devices amplify the available visible light and detect wavelengths in primarily the infrared region of the electromagnetic spectrum or through digital image enhancement, which captures available light on a digital image sensor and then digitally enhances the images in a full-color display. These capabilities make these devices effective in low- or no- light environments. They operate in the visible spectrum and the near to longwave infrared regions of the electromagnetic spectrum. Night vision devices fall into three broad categories: image intensification, thermal imaging and active illumination. Integrated night vision systems combine image outputs from two different technologies into one composite image, thus taking advantage of the strengths of each type. This focus group was specifically interested in integrated devices that combined image intensification and thermal imaging.

From September 22 through September 29, 2020, NUSTL conducted a focus group of night vision devices. The purpose of this focus group was to obtain information on night vision devices that will be useful to the first responder community in making operational and procurement decisions. The activities and recommendations associated with this focus group will be used for the operational assessment of night vision devices.

### 1.1 Participant Information

Seven emergency responders from various disciplines and jurisdictions, each with at least five years of experience using night vision devices, participated in the focus group.

**Table 1-1 Focus Group Participant Demographics**

Participant	Years of Experience	State
Emergency Management/Medical	35-40	NJ
Law Enforcement	25-30	TX
Fire Services Paramedic/Aviation	15-20	CA
Law Enforcement/Aviation	15-20	NY
Law Enforcement/Maritime	10-15	WA
Law Enforcement/SWAT	10-15	AZ
Law Enforcement/Program Management	5-10	DC

## 2.0 FOCUS GROUP METHODOLOGY

The virtual focus group was conducted in three parts using Microsoft Teams. The first session opened with overviews of NUSTL, the SAVER program, DEVCOM – The U.S. Army Combat Capabilities Development Command, night vision devices, and the focus group’s goals and objectives. DEVCOM, NUSTL’s partner on this project, has the ability to create testing environments for night vision devices and will serve as the venue for the assessment. Facilitator led discussions gathered each participant’s experience with and use cases for night vision devices as well as their recommendations related to:

- 1) **Evaluation criteria:** general criteria that are important to consider when making acquisition or operational decisions
- 2) **Assessment scenarios:** operational scenarios in which the products should be assessed to evaluate their performance
- 3) **Product selection criteria:** criteria that identify specifications, attributes or characteristics a product should possess to be considered for the assessment
- 4) **Products to assess:** products and vendors that are relevant to the emergency responder community and should be candidates for inclusion in the comparative assessment

Figure 2-1 highlights the process followed to gather these recommendations.

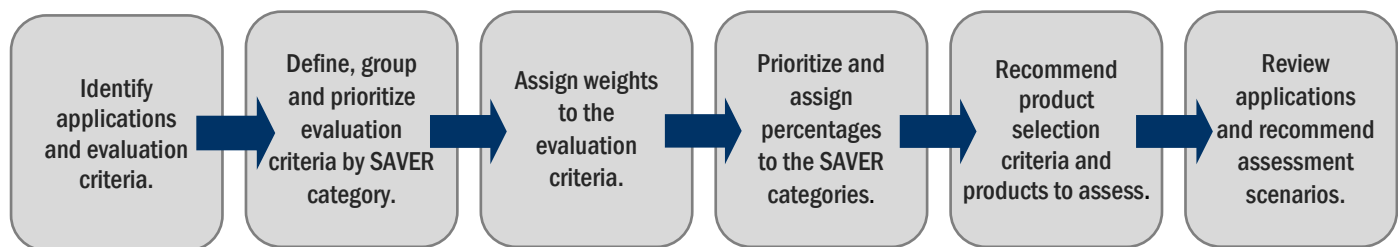


Figure 2-1 Focus Group Process

During the second part of the virtual focus group, NUSTL team members interviewed the individual participants as subject matter experts, asking them to identify common applications in which they use night vision devices. Next, participants identified and defined evaluation criteria.

During the final session, the criteria were reviewed, grouped and prioritized within the SAVER categories: Affordability, Capability, Deployability, Maintainability and Usability. The SAVER categories are defined as:

- **Affordability** groups criteria related to the total cost of ownership over the life of the product. This includes purchase price, training costs, warranty costs, recurring costs and maintenance costs.
- **Capability** groups criteria related to product features or functions needed to perform one or more responder relevant tasks.
- **Deployability** groups criteria related to preparing to use the product, including transport, setup, training and operational or deployment restrictions.



- **Maintainability** groups criteria related to the routine maintenance and minor repairs performed by responders, as well as included warranty terms, duration and coverage.
- **Usability** groups criteria related to ergonomics and the relative ease of use when performing one or more responder relevant tasks.

Once the evaluation criteria were prioritized within the SAVER categories, focus group participants assigned a weight for each criterion’s level of importance on a 1-5 scale, where five is of utmost importance and one is of minor importance. Table 2-1 details the evaluation criteria weighting scale.

**Table 2-1 Evaluation Criteria Weighting Scale**

Weight	Definition
5	This evaluation criterion is <i>of utmost importance:</i> “I <i>would never</i> consider purchasing a product that does not meet my expectations of this criterion or does not have this feature.”
4	This evaluation criterion is <i>very important:</i> “I <i>would be hesitant</i> to purchase a product that does not meet my expectations of this criterion or does not have this feature.”
3	This evaluation criterion is <i>important:</i> “Meeting my expectations of this criterion or having this feature <i>would strongly influence</i> my decision to purchase this product.”
2	This evaluation criterion is <i>somewhat important:</i> “Meeting my expectations of this criterion or having this feature <i>would slightly influence</i> my decision to purchase this product.”
1	This evaluation criterion is <i>of minor importance:</i> “Other things being equal, meeting my expectations of this criterion or having this feature <i>may influence</i> my decision to purchase this product.”

After the evaluation criteria were assigned a weight, the focus group participants recommended whether the criteria should be assessed operationally, according to vendor-provided specifications or as information only. Next, considering the evaluation criteria in each category, the focus group participants determined the level of importance for the SAVER categories and assigned each category a weight.

After assigning weight (as percentages) to the SAVER categories, focus group participants identified product selection criteria. Lastly, the focus group participants reviewed the use cases identified during the opening focus group session and recommended operational scenarios for the assessment.

### 3.0 EVALUATION CRITERIA RECOMMENDATIONS

The focus group identified 30 evaluation criteria and concluded that capability was the most important SAVER category, followed by the deployability, usability, maintainability and affordability categories, respectively. The participants specified some criteria as “information only.” Weights of zero were assigned to these criteria, as they will not be scored; however, product specifications will be noted in the assessment report. Table 3-1 presents the category weights, the evaluation criteria and the evaluation criteria weights.

Table 3-1 Evaluation Criteria

SAVER CATEGORIES				
Capability	Deployability	Usability	Maintainability	Affordability
Overall Weight 35%	Overall Weight 20%	Overall Weight 20%	Overall Weight 15%	Overall Weight 10%
Evaluation Criteria				
Image Clarity Weight: 5	Durability Weight: 4	Comfort & Fit Weight: 4	Self-Maintainability Weight: 4	Extended Warranty Weight: 4
Battery Life Weight: 4	Mount Capability Weight: 4	Ease of Use Weight: 4	Vendor Accessibility Weight: 3	Initial Price Weight: 4
Focus Weight: 4	Size & Weight Weight: 4	Low Battery Indicator Weight: 4	Warranty Weight: 3	Life Expectancy Weight: 4
IR Illuminator Weight: 4	Accessories Weight: 3		Storage Weight: 2	
Light Range Operability Weight: 4	Covertness Weight: 3		Sacrificial Lens Weight: 1	
Thermal Integration Weight: 4	Start-Up Time Weight: 3			
Communication Integration Weight: 3	Battery Type Weight: 2			
Field of View Weight: 3				

## SAVER CATEGORIES

Capability	Deployability	Usability	Maintainability	Affordability
Overall Weight 35%	Overall Weight 20%	Overall Weight 20%	Overall Weight 15%	Overall Weight 10%
<b>Anti-Fog</b> Weight: 2				
<b>Magnification</b> Weight: 2				
<b>Depth Perception</b> Weight: 0				
<b>Humidity Range</b> Weight: 0				

### 3.1 Capability

Twelve Capability criteria were identified and defined by the focus group and are listed below in order of descending weight score (including two that will be “information only” (weight of zero).

**Image Clarity** refers to the ability of the night vision device to provide a clear, high-resolution image with minimal *defects*, *blooming* and *haloing*. Image clarity is also affected by the user’s ability to adjust the gain and focus with both manual and automatic controls.

- *Defects* are cosmetic blemishes on the display surfaces of the intensifier tubes.
- *Blooming* is temporary loss of contrast in an image and resembles an area that has been blotted out.
- *Haloing* occurs when there is bright light source in the field of view that results in rings around the light source.

**Battery Life** refers to the amount of time the primary power source will power the system. Back-up batteries and the device’s ability for auto-shutoff should also be considered.

**Focus** refers to the mechanism and ability to focus the night vision device such as auto-focus or range of focus (near to far). Accessories such as an adjustable iris to help with focus should also be considered.

**Illuminator** refers a night vision device that emits infrared (IR) light which allows for night vision ability in areas of total darkness. The intended range of the illuminator should also be considered. For example, IR illuminators could be either IR lasers, which are used for long distance surveillance, or IR Light Emitting Diode (LED) illuminators which are used in confined spaces.

**Light Range Operability** refers to how well the device performs under varying light conditions and light controls such as automatic brightness control. The ability to adjust the gain allows the user to work for longer periods with reduced eye strain.

**Thermal Integration** refers to devices with thermal imaging capabilities as well as features for turning the capability on and off and color differentiability.

**Communication Integration** refers to image streaming, wireless communications, Bluetooth connections or augmented reality compatibility with the device.

**Field of View** refers to the degree of horizontal distance that can be viewed through the technology without additional lens options or accessories.

**Anti-Fog** refers to the device's ability to prevent fog or condensation from forming on the lens.

**Magnification** refers to the magnifying power of the lens (1x, 2x, etc.) and the availability of additional lenses to adjust the magnification.

**Depth Perception** refers to the ability to perceive relative distance of objects, which will differ between monocular and binocular devices.

**Humidity Range** refers to the moisture level the device can withstand without haloing occurring.

### 3.2 Deployability

Seven Deployability criteria were identified and defined by the focus group and are listed below by descending weight score.

**Durability** refers to the system's ability to withstand a variety of environmental conditions. This includes water, shock and drop resistance; varying temperatures; salt, fog, sand and dust conditions; and the ability for sanitization or disinfection. Military Specification (MILSPEC) or ingress protection (IP) ratings can serve as a means to evaluate night vision devices for durability.

**Mount Capability** refers to the ability for the night vision device to be affixed to various platforms such as the head, helmet and weapons.

**Size & Weight** refers to both the physical dimensions and weight of the device.

**Accessories** refers to ancillary equipment that comes with or can be purchased to complement the night vision devices such as illuminators, focus adjusters (e.g., iris), counterweights or stabilizers, lens caps and eye cups.

**Covertiness** refers to factors such as device color, the amount of light reflected off the device and the amount of light escaping from the eyepiece, that contribute to an end user's ability to use the technology without being detected. Some participants would only consider black devices.

**Start-Up Time** refers to the amount of time it takes from powering on to being able to see an image.

**Battery Type** refers to the ability of the technology to accept commercial off the shelf (non-proprietary) batteries and whether the batteries are rechargeable or hot-swappable.



### 3.3 Usability

Three Usability criteria were identified and defined by the focus group and are listed alphabetically, as they all carried the same weight score.

**Comfort & Fit** refers to fit adjustments, proper weight distribution, proper padding and the option to flip the lenses up or out when not in use.

**Ease of Use** refers to the intuitiveness of adjustments and configurations including use with personal protective equipment such as gloves and helmet, ease of changing batteries, and adjustment of the focus, gain, diopter and other settings.

**Low Battery Indicator** refers to how clearly the technology displays the remaining battery life (e.g., the percentage of battery left, amount of time left until battery depletion) and the type of alerts available (e.g., audible, visual, vibration).

### 3.4 Maintainability

Five Maintainability criteria were identified and defined by the focus group and are listed below in descending order of weight scores.

**Self-Maintainability** refers to the ease and ability to service the technology in-house. This includes the availability of instructions for maintenance, availability and cost of replacement parts and repair kits, and the ability to access the interior of the technology.

**Vendor Accessibility** refers to the resources and technical support provided by vendors, including manuals, reference materials, hours of vendor availability either by phone or online, response time, and training.

**Warranty** refers to the period of time and terms of coverage in which the vendor will repair or replace equipment that is not functioning properly.

**Storage** refers to conditions required for storage (e.g. temperature) and the type of container the technology comes with (e.g., padded case, pouch).

**Sacrificial Lens** refers to the window that covers the objective lens and protects it from dust, scratches and abrasions. Specifically, responders are interested in the ease and cost of replacing the sacrificial lens.

### 3.5 Affordability

Three Affordability criteria were identified and defined by the focus group. They are listed alphabetically below, as all share the same weight.

**Extended Warranty** refers to the length and cost of the extended warranty and what resources it includes.

**Initial Price** refers to the base purchase cost per unit.

**Life Expectancy** refers to the amount of time the major components (i.e., lenses and tubes) of the technology are expected to operate before requiring replacement.

## 4.0 EVALUATION CRITERIA ASSESSMENT RECOMMENDATIONS

The focus group made recommendations on whether each of the evaluation criteria should be assessed operationally and/or according to vendor-provided specifications. In an operational assessment, evaluators assess criteria based on hands-on experience using the product. In a specification assessment, evaluators assess criteria based on product information provided by the vendor. In some cases, criteria may be assessed operationally and according to vendor-provided specifications. Two evaluation criteria – depth perception and humidity range – were categorized as “information only.” Their specifications will be listed in the assessment report but will not be scored as part of the assessment. The focus group recommended that almost half of the criteria should be evaluated both operationally and by specification. Table 4-1 presents the focus group’s assessment recommendations by evaluation criteria.

Table 4-1 Evaluation Criteria Assessment Recommendations

Category	Criteria	Operational	Specification	Information Only
Capability	Image Clarity	✓	✓	
	Battery Life		✓	
	Focus	✓	✓	
	Illuminator	✓	✓	
	Light Range Operability	✓	✓	
	Thermal Integration	✓	✓	
	Communication Integration	✓	✓	
	Field of View	✓	✓	
	Anti-Fog	✓	✓	
	Magnification	✓	✓	
	Depth Perception			✓
	Humidity Range			✓
Deployability	Durability		✓	
	Mount Capability	✓	✓	
	Size & Weight	✓	✓	
	Accessories	✓	✓	
	Covertness	✓	✓	
	Start-Up Time	✓		
	Battery Type		✓	
Usability	Comfort & Fit	✓		
	Ease of Use	✓		
	Low Battery Indicator	✓	✓	
Maintainability	Self-Maintainability		✓	
	Vendor Accessibility		✓	
	Warranty		✓	
	Storage		✓	
	Sacrificial Lens		✓	
Affordability	Extended Warranty		✓	
	Initial Cost		✓	
	Life Expectancy		✓	

## 5.0 ASSESSMENT SCENARIO RECOMMENDATIONS

The focus group identified Special Weapons and Tactics (SWAT) team, search and rescue, patrol and surveillance work as applications for night vision. Based on these applications, the focus group recommended four operational scenarios, described in sections 5.2 to 5.5, during which products could be assessed outdoors using the evaluation criteria recommended for an operational assessment. A fifth operational scenario (5.6) will check the light range operability and fog capabilities of the devices in a controlled indoor environment. A “start-up” scenario, described in section 5.1, will also be included during which evaluators will don tactical gloves prior to donning the night vision technology, then manually adjust the fit and desired settings prior to operation.

All scenarios will take place at the U.S. Army’s Picatinny Arsenal in New Jersey in low- or no-light situations. NUSTL’s project partner, DEVCOM, a U.S. Combat Capabilities Development Command - Armaments Center, is located at Picatinny Arsenal in northern New Jersey, which boasts 600 acres of space, including outdoor areas, meeting and conference spaces, a tactical village, mock train station, helipad and open roadways.

Information on Maintainability and Affordability criteria will be provided and assessed by specifications following the completion of all operational scenarios.

### 5.1 Start-up

Evaluators will remove the night vision device from its storage case and will then don and doff night vision devices to determine comfort, fit and ease of attaching to and detaching from various mounts. When complete, they will return the device to its storage case and assess storability by placing in pockets or affixing to belts. During this session, evaluators will also assess fit adjustability (e.g., eye relief, proper weight balance).

Evaluation criteria scored during this scenario will include: Accessories, Comfort & Fit, Focus, Mount Capability, Size and Weight and Start-Up Time.

### 5.2 SWAT Team

Evaluators using mounted night vision devices will begin by approaching, scanning and setting a perimeter around a tactical village. If available, evaluators will use the device’s communications integration to transmit images or videos to a mock command center comprised of NUSTL or DEVCOM staff members. Observers and objects will be staged outside and inside the tactical village. Evaluators will then plan for entry and will wear the device leading up to building entry. This scenario will potentially include light flashes to simulate flash pans in order to test the night vision devices when bright light is present in a dark environment.

Evaluation criteria scored during this scenario will include: Accessories, Anti-Fog, Comfort & Fit, Covertness, Ease of Use, Field of View, Focus, Illumination, Image Clarity, Light Range Operability, Low Battery Indicator, Magnification, Size & Weight, Start-Up Time, Communication Integration, Thermal Integration as applicable.

### 5.3 Search and Rescue

Evaluators using night vision devices, in either a mounted or handheld manner, will search and seek to rescue persons lost in a wooded environment. They will be asked to find and identify several objects (e.g. backpacks, articles of clothing, footprints, disturbed soil) that lead them to the missing person(s). Evaluators will repeat the course using different accessories available (e.g. thermal detection clip-on).

Evaluation criteria scored during this scenario will include: Accessories, Anti-Fog, Comfort & Fit, Covertness, Depth Perception, Ease of Use, Field of View, Focus, Illumination, Image Clarity, Light Range Operability, Low Battery Indicator, Magnification, Mount Capability, Size & Weight, Start-Up Time, Thermal Integration as applicable.

### 5.4 Patrol

Evaluators using night vision devices, in either a mounted or handheld manner, will patrol indoor and outdoor areas on foot. While patrolling, evaluators will encounter people, routine objects and obstacles. Evaluators will repeat the course using different accessories available (e.g. thermal detection clip-on).

Evaluation criteria scored during this scenario will include: Accessories, Anti-Fog, Comfort & Fit, Covertness, Depth Perception, Ease of Use, Field of View, Focus, Illumination, Image Clarity, Light Range Operability, Low Battery Indicator, Magnification, Mount Capability, Size & Weight, Start-Up Time, Thermal Integration as applicable.

### 5.5 Surveillance

Evaluators using night vision devices, in either a mounted or handheld manner, will attempt to detect objects at varying distances and in varying environments, such as outside of a train car, in a wooded environment or inside a building. Evaluators will repeat the activities using different accessories available (e.g. thermal detection clip-on). Objects shall be inter-changed and positioned slightly differently in each rotation and may blend into the background for an additional challenge.

Evaluation criteria scored during this scenario will include: Accessories, Anti-Fog, Comfort & Fit, Covertness, Depth Perception, Ease of Use, Field of View, Focus, Illumination, Image Clarity, Light Range Operability, Low Battery Indicator, Magnification, Mount Capability, Size & Weight, Start-Up Time, Thermal Integration as applicable.

### 5.6 Object Identification

Evaluators using night vision devices, in either a mounted or handheld manner, will search an indoor area for specified objects placed at varying distances. This scenario will start in a no-light environment and slowly increase to a full-light environment to gauge the light range operability. Evaluators will repeat the activities in a simulated fog environment.

Evaluation criteria scored during this scenario will include: Accessories, Anti-Fog, Comfort & Fit, Covertness, Depth Perception, Ease of Use, Field of View, Focus, Illumination, Image Clarity, Light Range Operability, Low Battery Indicator, Magnification, Mount Capability, Size & Weight, Start-Up Time, and Thermal Integration as applicable.



## 6.0 PRODUCT SELECTION RECOMMENDATIONS

The focus group identified three criteria that may be used to select products for the night vision assessment. Table 6-1 presents the product selection criteria in priority order.

**Table 6-1 Product Selection Criteria**

Product Selection Criteria	Description
Device must produce a clear image with very little distortion	Gen-3 Intensifier Tubes <sup>1</sup> , the fourth generation of intensifier tubes characterized by the use of gallium arsenide photocathodes and the ion-barrier film on the microchannel plate produce the desired image clarity
Head- or helmet-mountable	Night vision device that can be mounted on the head or helmet
Adjustable gain	Ability to adjust gain both manually and automatically, aids in working under changing light conditions

The focus group did not recommend specific products to assess but instead recommended products ranging in cost from \$4,000 to \$8,000 which are used most frequently by first responders. The participants recommended using Portable Visual Search-14s (PVS-14s) often referred to as monocular night vision devices, which fall into this price range, as a baseline for assessing other products. Most of the evaluators at the focus group had extensive experience with PVS-14s.

Additionally, the participants recommended assessing integrated night vision devices that combine image intensification and thermal imaging. This could be an integrated device or the result of combining an image intensification device with a thermal imaging accessory. They expressed interest in seeing the operational value of adding thermal imaging and determining if it was worth the additional cost. The participants were interested in assessing the more expensive night vision devices, up to \$30,000, so they would know what would be most beneficial if their budgets allowed for it, especially if the devices become more affordable in the future.

<sup>1</sup>Image intensifier tube technology is generally categorized within four generations, Gen 0, Gen 1, Gen 2 and Gen 3 as established by the U.S. Army. The microchannel plate (MCP), a metal coated glass disk that multiplies electrons produced in the photocathode, allowed for the development of Gen 2 tubes in the 1970s. The electron multiplication or “gain” provided by the MCP eliminated the need for back-to-back tubes leading to improvements in image quality and brightness and lighter, less bulky tubes permitting the device to be attached to a helmet or other headgear. The gallium arsenide (GaAs) photocathode and the ion-barrier film on the MCP were two major advancements that led to the Gen 3 tubes in the 1980s. GaAs is a semiconductor material which has a very high sensitivity in the visible and near-infrared regions (450 to 950 nanometers). The GaAs photocathode enabled detection of objects at greater distances under much darker conditions. Gen 3 devices can amplify low ambient light levels 30, 000 to 50,000 times. The ion-barrier film increased the operational life of the tube from 2,000 hours (Gen 2) to 10,000 hours (Gen3).

## 7.0 FUTURE ACTIONS

The focus group's recommendations will be used to guide the development of a night vision assessment plan and the selection of products to evaluate in the assessment. Once the assessment is complete, the results will be available on [www.dhs.gov/science-and-technology/saver-documents-library](http://www.dhs.gov/science-and-technology/saver-documents-library).

## 8.0 CONCLUSION

The focus group, which consisted of seven subject matter experts with five to 40 years of experience, identified 30 evaluation criteria for night vision devices that will be used when scoring products during the assessment.

The highest weighted SAVER categories were Capability (weight of 35%) and Deployability (weight of 20%). Participants assigned one criterion, image clarity, the highest weight of five, while there were 15 criteria assigned the weight of four:

- Battery Life
- Comfort & Fit
- Durability
- Ease of Use
- Extended Warranty
- Focus
- Illuminator
- Initial Price
- Life Expectancy
- Light Range Operability
- Low Battery Indicator
- Mount Capability
- Self-Maintainability
- Size & Weight
- Thermal Integration

After identifying, defining and prioritizing the evaluation criteria, the focus group provided recommended test scenarios and activities to be performed during the assessment. The information gathered during the focus group will be used to develop the test plan for the SAVER assessment on night vision devices to be led by NUSTL.

## 9.0 ACKNOWLEDGEMENTS

NUSTL thanks the focus group participants for their valuable time and expertise. Their insights and recommendations will guide the planning and execution of the assessment as well as future SAVER projects. Appreciation is also extended to the home jurisdictions of the participants for allowing them to participate in the focus group. NUSTL also acknowledges the subject matter expertise support provided by DHS S&T's Operational Experimentation and DEVCOM in planning and facilitating the focus group.