



From starlight to street light

Tactics and techniques using contemporary low-light technology in diverse circumstances

Since 9/11 virtually all members of the law enforcement community have become soldiers in the war on terrorism. Even the more traditionally “peaceful” jobs, such as rural border control, park rangers and Bureau of Land Management scouts, are feeling the need for the latest technology and skills to deal with the unexpected.

Whether a result of the expanded role of law enforcement, increased emphasis on homeland security or dramatic data about dangers of the dark, the need for low-light technology and training has developed into a high priority. The importance of “owning the night” is no longer restricted to the battlefield.

From the front line to the blue line

Cutting-edge technologies such as image intensified night vision and thermal imaging were originally developed for and deployed by the military. These same technologies are becoming essential in protecting law enforcement agents in increasingly complex

Legal limitations to thermal imaging

Although thermal imaging is great for public searches — looking for a missing child in a wooded area or survivors in the rubble — there are legal limitations against the use of thermal imagers when searching private residences.

In the 2001 case *Kyllo vs. United States*, the Supreme Court determined that targeting a home with a thermal imager by is considered a search under the Fourth Amendment and requires a warrant gained through other evidence.

At question in this case was the 1992 arrest and initial conviction of Danny Kyllo for growing marijuana in his home. The U.S. Bureau of Land Management agent in charge of the investigation had gathered evidence, including Kyllo's utility records, indicating that Kyllo was cultivating the plants. Without a search warrant, he then asked an assisting agent to scan the home, at 3 a.m., with a thermal imager who found that high heat levels were coming from the garage roof and a side wall. Following the scan, the agent obtained a search warrant and found marijuana plants, weapons and drug paraphernalia in the home.



good low-light equipment is not cheap and circumstances in the field vary widely.

Are officers monitoring wild horse poachers on a Nevada desert or searching for a missing child in an urban area? Are they escorting explosive cargo through a city harbor or tracking an escaped convict through the woods?

Depending on the type of patrol, goals of the mission and ambient lighting factors, the choice in low-light equipment can vary greatly.

Image intensified night vision

The most popular and common type of night vision is based on image intensification technology. Image intensifiers amplify available visible and near infrared light to achieve better vision. This amplification has its benefits and its drawbacks. It provides users with high image resolution, but excessive ambient light can cause the device to be ineffective.

"Night vision is successful for us because we generally operate under a more rural night sky," says Col. Mike Bise of the Virginia Department of Game and Inland Fisheries. "In contrast, sudden bursts of ambient light, combined with the irregular lighting of the urban environment, has caused problems for users of early versions of night vision equipment in the urban setting."

Phillip Terenzi, harbormaster for the Boston (Massachusetts) Police Harbor Unit, has found a unique way to alleviate some of the ambient light issues.

"We discovered that our 3x magnification lens helps mitigate the interference of the bright lights of the urban night landscape," he says. "Now we have ordered a 5x magnification lens and expect this will help our inner

Photos courtesy of N-Vision Optics

and dangerous environments, as well as in enabling them to do perilous jobs more effectively and efficiently.

FBI data for law enforcement officers killed in the line of duty between 1995 and 2004 reveals that more than 65 percent of these deaths occurred between 8 p.m. and 8 a.m. It's widely agreed that nighttime is the best time for bad guys to sneak around and do bad things, and a time when low-light technology is powerful to possess. But



N-Vision Optics' GT-14 is shown here helmet mounted as a flip-up monocular.

harbor night vision even more."

According to Max Rivkin, president of Burlington, Massachusetts-based N-Vision Optics, magnification lenses narrow the device's field-of-view, therefore diminishing the adverse effects from bright light sources outside of the field-of-view.

The evolution of night vision devices to Generation 3 (Gen 3) also has led to significant strides in overcoming unexpected, and harmful, light exposure.

"Prolonged exposure to bright light can blow out the (image intensification) tube inside a night vision device," describes retired Lt. Col. Al Pavsner of the U.S. Marine Corp. "However, the more sophisticated Gen 3 products eliminate this danger. They offer a gated power supply which reduces halos on subjects, as well as alleviates the blooming of light, and protects the tube from bright source damage."

"Gen 3 devices are far and above a superior product to the earlier generations," agrees Bise.

However, supplemental infrared illumination is still required, even for Gen 3 night vision devices, when the light level is extremely low or an agent is working in total darkness.

Regarding infrared illumination, Sgt. William Frazier, supervisor of the Training Bureau for the Philadelphia (Pennsylvania) SWAT team, emphasizes, "Because of existing ambient light, we rarely require infrared illumination in urban SWAT operations. But when you need it, you need it!"

Thermal imaging

In comparison to night vision devices, thermal imaging devices are independent of the ambient light in the visible and near infrared parts of the spectrum. Thermal devices detect so-called far infrared light, emitted by all objects in the amount that is proportional to the object's temperature, then converts it into an electronic image.

According to Bise, thermal imaging is more complicated to use and interpret. He finds night vision optics relatively user friendly, easy to learn and easy to use in comparison.

Pavsner also notes thermal imaging limits the details in the image. "No sufficient facial details are seen in thermal — just the heat signature — so it's not good for individual identification," he says.

Yet, thermal imaging is the ideal technology for

manhunt operations.

"If an escaped inmate is in a wooded area — not hiding in houses — you can spot him fairly quickly using thermal imaging," says Capt. Chad Gilley, CERT commander for the Oklahoma State Penitentiary. "Thermal imaging shows the heat signature left by a recent handprint or a footprint, so you can see footprints glowing with heat if they've crossed over a field at night when the ground is cold."

Thermal imaging also is an important addition to night vision for successful border control. Border control agents are faced with the paradoxical task of halting illegal immigration, while at the same time preventing pain, suffering and possible death of these immigrants should they become stranded in the desert

"It is the more effective utilization of both thermal imaging and night vision assets that continues to give advantage to border law enforcement for now."

*— Chief Ranger Fred Patton,
Organ Pipe Cactus National Monument*

or trapped inside an abandoned vehicle.

"Thermal imaging devices can be used to see through material such as canvas — the type that might be used to cover a truck," explains Pavsner. "Night vision can't see through material to spot warm bodies that might be hiding under a tarp or canvas. On the other hand, thermal cannot see through windows, because the heat bounces off." Due to the limitations of each technology, good border control really requires the best of both.

Chief Ranger Fred Patton of Arizona's Organ Pipe Cactus National Monument concurs. "The thermal imaging technology currently available to us is not yet mobile enough. We can use the thermal devices to locate sources of heat along the border, but our agents need to use image intensified night vision devices to navigate across the desert and investigate the exact sources of these hot spots."

One of the most frequent uses of thermal imag-

ing is search and rescue. Whether it is a child or Alzheimer's patient who has wandered off, or people trapped after a natural disaster, thermal fits the need. "It is great for finding missing people who are still alive," says Daniel Fuller, direc-

tor of Urban Search and Rescue in Hilton Head, South Carolina. "It's also useful in locating people under rubble when a building has collapsed. When doing search and rescue away from buildings, thermal works best in cold weather because

of the dramatic temperature disparity between the missing person and the surrounding area."

Because thermal imagers tend to be more expensive than night vision, some departments have shied away from their use or developed a method to share the technology.

"We have thermal devices strategically located around the state, available to check out on an as needed basis," says Bisc.

Rivkin notes that state-of-the-art thermal imaging systems are very mobile and portable. However, these systems are not yet widely available to many users. Helmet and head mounts are available for both thermal imaging and night vision devices.

Monocular vs. binocular

Image intensifier-based night vision devices are available in both monocular and binocular designs. As the type of deployment determines the appropriate type of night vision technology, so does it determine the preference or necessity for monocular or binocular designs.

"Many of our officers prefer the monocular system to maintain clear use of weapons if the need arises," says Special Agent in Charge John Silence of the Bureau of Land Management, Colorado State Office.

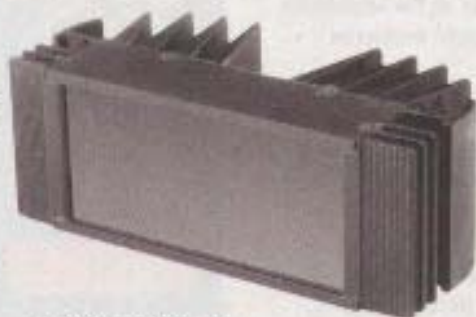
Frazier agrees, noting, "The monocular device allows for the flexibility of the natural eye to take over when you no longer need night vision. We put the night vision monocular over an individual's weaker eye. When natural vision needs to take over — to return fire, for instance — SWAT team members then have their stronger eye to use."



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Taking in two very different types of visual stimuli is not something that occurs under typical circumstances. Therefore, training is required. "During training, we find that our brains adjust to having a monocular on one eye and natural vision on the other," continues Frazier. "With proper training, it's amazing how quickly the human brain adjusts to having our eyes 'uncoupled' from each other so that one sees night vision and then shuts off to allow the other natural vision eye to take over."

Because there is less potential for firearm use and the type of patrol, the Boston Police Harbor Unit prefers the binocular design. "We find that two connected night vision monoculars make an ideal binocular," says Terenzi. "Two monoculars hooked together provide the depth perception required while navigating — especially at high speeds. We are rarely involved in exchanging gun fire, so we don't require the quick switching between the night vision eye to the natural eye, something that is very important to a sniper or a SWAT team member. Additionally, the magnification we require for most of our work makes the binocular set up very natural."

Pavsner, now with GSA supplier Maxavision Technologies, noticed a trend that "agents, whose jobs in the past have been primarily surveillance, now have to think in terms of potentially engaging terrorists. As a result, in many cases, they are upgrading their equipment. In the past, many of these strictly surveillance agents preferred binoculars. Now we are recommending monoculars in case they need to return fire," he says.

What's coming and what's needed

The U.S. government tightly controls proliferation of night vision technologies outside of the United States. However, according to Rivkin and Pavsner, there is little

inside the U.S. borders to keep sophisticated devices, such as Gen 3 night vision, out of the hands of "bad guys" and only in the hands of "good guys."

"It is not unreasonable to predict that in the foreseeable future crimi-

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Photos courtesy of N-Vision Optics

N-Vision Optics' GT-14 monocular can be used as a weapon-mounted night scope.

nals in the United States will start using technologies that 10 years ago were strictly in the hands of military professionals," says Rivkin. "This change will have to be accounted for through adequate training and countermeasures that may be deployed by law enforcement against technologically advanced criminals and terrorists."

Patton agrees, saying, "Unfortunately, the concept of owning the night is known to smugglers as well as law enforcement. We seize a number of earlier generation

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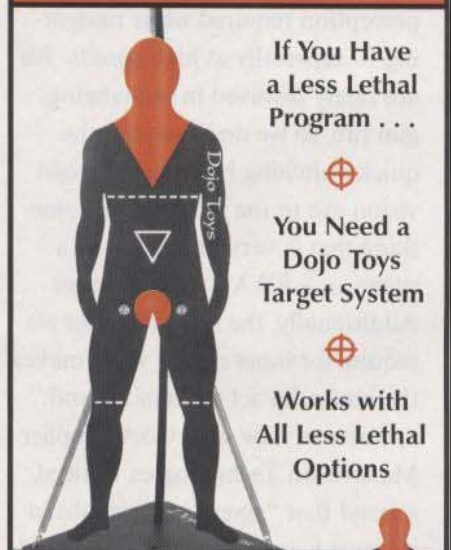
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night vision goggles each year from suspects involved in smuggling. It is the more effective utilization of both thermal imaging and night vision assets that continues to give advantage to border law enforcement for now."

Development of night vision technologies never stops. Law enforcement professionals soon will be able to evaluate benefits of so-called fusion systems. These systems combine functionality and user benefits of image intensification devices and thermal imagers. "But as with all new technology, cost will be a factor when being deployed in the law enforcement sector," reminds Pavsner.

There are some current funding opportunities for night vision equipment. For example, the GSA 1122 Counterdrug Program is one such opportunity. This program allows state and local governments to purchase law enforcement equipment, including night vision devices and cameras, through federal procurement channels, provided the equipment is used in

the performance of counterdrug activities. Other federal and state funding opportunities and grants are becoming available quite regularly and provide an excellent way for qualified users to obtain night vision equipment.

The need for low-light technology continues to rise on the list of essentials for law enforcement. "It would be ideal for every officer to have night vision devices, if only for safety," says Bise. "Night vision enhances the performance of any officer." ■

Condace Clemens is the vice president of marketing at N-Vision Optics LLC, manufacturer and distributor of tactical night vision equipment for military and law enforcement. Prior to joining N-Vision Optics, Clemens served as a communications executive with various public technology companies. For more information about N-Vision Optics, visit www.nvisionoptics.com.



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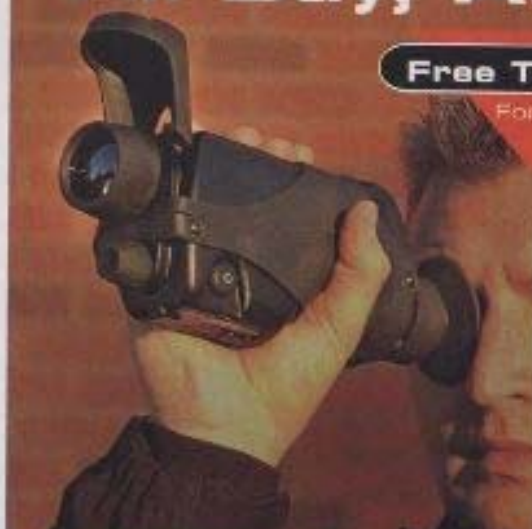
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