HANDHELD TARGETING SYSTEMS
One of the modern nation-state’s most important tasks is to provide internal and external security. For good reason: A country needs the stability born of security for its citizenry to live in peace and enjoy prosperity. Emergency response units, police, armed forces and border guards around the world rely on optical and optoelectronic solutions in service of security. These devices help to win time and to give security forces the information edge. And this ability to identify threats early and to make well-informed decisions saves lives.

Civilian and military security forces count on the premium quality of our products for swift decision-making even when visibility is poor and the weather is inclement. Navy, Air Force and Army units benefit from our innovative surveillance, observation, range-finding and targeting technologies. Every product and each system attests to the deep well of experience that our engineers have to draw on. And every detail goes to show that we know our business. After all, we are rooted in a firm that led the field for more than a century.

The security forces and militaries of more than 30 countries rely on the excellent service and advice of our staff on site. Our meticulous documentation, effective training and proven services satisfy the most discerning customers worldwide. Modular solutions help streamline logistics, drive down lifecycle costs, and speed up service delivery. All this we do to ensure our products deliver on our performance promise. We aim to provide to security forces the powerful tools they need to respond to complex and fast-moving situations.
OPTRONICS EXPERTISE
IN SERVICE OF SECURITY

QUALITY MAKES THE DIFFERENCE

Our compact, easy-to-operate systems’ clarity and range are nothing short of remarkable. They are stabilised to perfection and peerless when it comes to quality in night-vision and laser technology. After more than 120 years of furnishing premium-quality products, customers expect no less than excellence from us. Yesterday it was Carl Zeiss Optronics that delivered the finest optronic devices and systems; today it is Cassidian Optronics that carries on this grand tradition.

OUR PRODUCT LINES:

- Sight Systems Hensoldt Line
- Surveillance Solutions
- Maritime Solutions
- High-Performance Optics
- Airborne Solutions
- Vehicle Solutions
- Handheld Targeting
- Sensor Components

PROVEN TECHNOLOGY
UNDER A NEW NAME

Cassidian acquired a majority stake in the defence and security division of Carl Zeiss Optronics GmbH on October 1, 2012. Renamed Cassidian Optronics, this new company pairs the optical and optronic skills of Carl Zeiss with the abilities and reach of a global leader in security solutions.

For more than 120 years, our company has developed and produced optical technologies and systems for customers worldwide. Their precision and reliability are prized in both military and civilian applications. Now, as part of the EADS division Cassidian, we are able to achieve our most important objective: To support the people whose mission is to protect the world.
Mobile surveillance and target acquisition

Artillery, recon and infantry units use handheld systems for mobile surveillance, observation and intelligence gathering. Much the same can be said for civilian police, customs and border guards. Targets have to be identified clearly, localised and tracked. When visibility is poor, this requires image intensifiers or thermal imaging devices. For example, wooded and mountainous frontiers often make it difficult for border patrols to get a good line of sight. Fixed observation systems can only cover some of the boundary area. Many corridors remain unwatched, open to be transgressed by individuals with potentially nefarious or illegal intent.

Our handheld systems provide the necessary surveillance capabilities and with maximum mobility and flexibility at that. They not only furnish the clear images observers need to spot and identify objects; they are also able to send precise target coordinates to other units. Threats do not go unrecognised, and security forces are able to respond immediately and effectively to avert crises.
Binoculars for target acquisition
Our TLS40 binoculars combine precision optics with a laser rangefinder and digital compass. Residual image intensifiers are optional. Relatively light for such robust devices, they deliver persuasive performance and stand up to the rigours of everyday use. Their batteries last for several days, enabling uninterrupted observation and target acquisition.

Night-vision devices
Although the sensors of our thermal imagers have been fine-tuned for night-time use, they also enable the observers to see many things that are normally hidden from sight during the day. The cooled NESTOR model is designed for long-range observation. OPUS-H, in turn, is uncooled, making it smaller and lighter. It is one of the leading target acquisition systems.

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The TLS40 is an ingenious combination of a powerful laser rangefinder, integrated GPS, digital magnetic compass (DMC) and digital camera. Equipped with a single-pulse laser rather than a diode-driven laser, it is able to measure great distances even when visibility is dismal. A 7x magnifying day channel featuring Cassidian Optronics’ trademark optical quality enables even more effective target reconnaissance.

Once the tasks of reconnaissance and range-finding have been completed, the TLS40 uses the internal GPS and digital compass to project the target coordinates into the field of view. This enables both fast reporting and controlled high-angle firing. The device also offers interfaces to external GPS instruments such as PLGR. Another valuable feature is the integrated digital camera. It serves to capture and store target images along with all the key information such as range, coordinates and the like. Every image may be tagged with brief spoken remarks for later evaluation.

The TSL40i features a monocular day-sight with an image-intensified night channel for unrivalled, 24-hour observation capability at high-magnification levels.

### Main features & benefits
- Ultra long-range laser – even in fog
- Outstanding optical quality
- Simple, menu-guided operation
- Light weight (< 2kg)
- Compact design
Observe, identify, acquire
Observers whose missions require them to overcome line-of-sight issues in rugged terrain simply cannot do without handily portable target acquisition devices. They can be inconspicuously carried to a vantage point from which good intelligence can be gathered. Easy to assemble and very light, they deliver excellent performance in extreme situations. Light yet robust, the TLS40 is ready for use in a flash. It provides in one very handy package all the functions necessary to capture and communicate images, target coordinates, and other critical information.

The TLS40i enables continued observation in the twilight and at night. A residual image intensifier provides a clear view of potential targets. Crosshairs and grids are illuminated as daylight wanes.
The OPUS-H has earned a leading spot among all-weather target acquisition systems. It features a direct-view day optical channel and an uncooled IR channel, both of which are viewable through a binocular eyepiece. Other appointments include a laser rangefinder, GPS, digital magnetic compass and a near-infrared digital camera. The 640 x 480 pixel microbolometer provides crisp images at night. The iconic direct-view optics, highly prized among professionals, provide crystal-clear day images even when the unit lacks power. The fast and accurate class 1, eye-safe laser rangefinder is safe under all conditions. It effectively determines ranges even beyond 20 km. The OPUS-H’s single-pulse laser technology increases the probability of ranging to distant targets without requiring tripod stabilisation. The rangefinder detects and displays up to three targets at any range and permits user-adjustable minimum range gates. In combination with the integrated digital compass and GPS system, it also enables target acquisition.

The near-infrared and IR cameras provide daytime and night-time images of targets that may be transmitted via a high-speed serial interface to command & control and to digital mapping systems. The positional data for target verification and mapping are also sent. The system is compatible with GPS systems such as PLGR, so it may be interfaced with external GPS systems.

Main features & benefits
- Uncooled IR channel
- Direct view optical channel
- Laser rangefinder
- Digital compass
- Digital camera
- GPS
- Composite video output
- High-speed serial port

Unique: high-quality day optics
Practical battery cartridge for fast replacement
Uncooled thermal imager
Snapshots for subsequent evaluation
NESTOR is a handheld device designed for long-range day and night target observation and localisation. NESTOR offers numerous functions for localising objectives at any time and relaying their exact position to other security forces. NESTOR uses GPS to pinpoint its position. A digital magnetic compass enables the user to determine the azimuth and elevation. Featuring OPO (optical parametric oscillator) technology, the integrated eye-safe laser range-finding module determines the exact distance to the objective. This enables long-range recon patrols, artillery scout observers and special forces to provide critical information that can make the mission.

In contrast to OPUS-H, NESTOR comes with a very efficient cooled thermal image device and is therefore somewhat larger and heavier.

**Main features & benefits**
- Cooled IR channel
- Visual day channel
- Image fusion day/night
- Eye-safe laser rangefinder
- Digital magnetic compass
- GPS receiver

1 Simple, intuitive handling
2 Cooled thermal imager
3 Snapshots for subsequent evaluation
Mission accomplished with cooled and uncooled sensors
Police, rescue units, border patrols and the military need versatile night-vision devices to help them get the job done in very different contexts. A handy OPUS-H with an uncooled thermal image camera may be perfect for one task while a NESTOR with a cooled IR unit may be better suited to another. The choice will be determined by the customer’s priorities and the requirements of the given application.

Performance power
Optronic systems with cooled thermal imagers have far greater ranges than uncooled systems. In situations where the ability to detect minute details at maximum range matters most – for instance, for military observation and target acquisition purposes – cooled devices may be the preferred option.

Power consumption
Cooled systems consume between 20 and 50 watts; uncooled devices less than 3 watts, which can be an advantage on missions where it may not be feasible to recharge batteries at will.
Fast availability
An uncooled system is ready for use after a few seconds. With larger devices, it may take up to five minutes until the system has cooled sufficiently to be ready to go.

Operating noise
Systems with uncooled thermal imagers are silent. Cooled units, in contrast, have a noise signature that can compromise the observer.

Size
Uncooled systems are palpably smaller and lighter. The lighter weight is a decisive advantage for roaming forces.

Costs
Uncooled systems are clearly more affordable and therefore do represent a reasonable alternative to cooled thermal imagers.
# TARGETING SYSTEMS TECHNICAL DATA

## TLS40 / TLS40i

<table>
<thead>
<tr>
<th>Optical data</th>
<th>TLS40 / TLS40i</th>
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<tbody>
<tr>
<td>Magnification: day optics</td>
<td>7x</td>
</tr>
<tr>
<td>Dioptre adjustment</td>
<td>–4 to +4 D</td>
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<tr>
<td>Field of view (at 1000 m)</td>
<td>7° = 123 m</td>
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<tr>
<td>Recognition range (3Lp / 2.3 m x 2.3 m)</td>
<td>Day sight: ≥ 5 km</td>
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<tr>
<td>IR detector</td>
<td>–</td>
</tr>
<tr>
<td>Image intensifier tube</td>
<td>– / 2nd &amp; 3rd Gen options</td>
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<tr>
<td>NIR camera (optional)</td>
<td>–</td>
</tr>
<tr>
<td>Digital camera</td>
<td>1.3 megapixel, 24-bit colour</td>
</tr>
</tbody>
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## Laser

| Laser class | Class 1 |
| Laser type | OPO-shifted Nd: YAG |
| Measuring range | 80 m to 20,500 m |
| Measuring accuracy | ± 5 m |

## Electrical data

| External supply voltage | 6 – 15 V |
| Battery size | 3x CR123 Lithium |

## Miscellaneous

| GPS | 12 channel C/A |
| L x W x H in mm | 187 / 175 / 91 |
| Weight | < 2 kg |
| Interface | Standard ¼” tripod thread |
| Operating temperature | –35°C to +55°C |
# TARGETING SYSTEMS
## TECHNICAL DATA
### OPUS-H / NESTOR

<table>
<thead>
<tr>
<th>Optical data</th>
<th>OPUS-H</th>
<th>NESTOR</th>
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<tbody>
<tr>
<td>Magnification: day optics</td>
<td>7x</td>
<td>-</td>
</tr>
<tr>
<td>Dioptre adjustment</td>
<td>-4 to +4 D</td>
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<tr>
<td>Field of view (at 1000 m)</td>
<td>6.5° = 114 m</td>
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<td>Recognition range (3Lp /2.3 m x 2.3 m)</td>
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<td>Day sight: ≥ 5 km, IR: 5 km</td>
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<td>Image intensifier tube</td>
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<td>NIR camera (optional)</td>
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<tr>
<td>Digital camera</td>
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### Laser

<table>
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<tr>
<th>Laser</th>
<th>OPUS-H</th>
<th>NESTOR</th>
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<tbody>
<tr>
<td>Laser class</td>
<td>Class 1</td>
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<tr>
<td>Laser type</td>
<td>OPO-shifted Nd: YAG</td>
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<tr>
<td>Measuring range</td>
<td>80 m to 20,500 m</td>
<td>-</td>
</tr>
<tr>
<td>Measuring accuracy</td>
<td>± 5 m</td>
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### Electrical data

<table>
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<th>Electrical data</th>
<th>OPUS-H</th>
<th>NESTOR</th>
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<tr>
<td>External supply voltage</td>
<td>10 – 32 V</td>
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<tr>
<td>Battery size</td>
<td>8x AA batteries</td>
<td>Li-Ion batteries</td>
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### Miscellaneous

<table>
<thead>
<tr>
<th>Miscellaneous</th>
<th>OPUS-H</th>
<th>NESTOR</th>
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<td>GPS</td>
<td>12 channel C/A</td>
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<tr>
<td>L x W x H in mm</td>
<td>300 / 220 / 120</td>
<td>360 / 250 / 155</td>
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<tr>
<td>Weight</td>
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<td>&lt; 4.3 kg</td>
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<tr>
<td>Interface</td>
<td>Standard 3/8” tripod thread</td>
<td>-</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-35°C to +63°C</td>
<td>-</td>
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</table>
TARGETING LOCATION – THREE STEPS TO ACQUISITION

All our handheld observation and targeting devices are GPS-enabled and equipped with a eye-safe laser rangefinder and digital compass. In other words, they provide all the tools necessary for accurate target acquisition.

1. Pinpointing one’s location
The system pinpoints its location via satellite using the integrated GPS device. This is the starting point for taking all other measurements, which will always vary from target to target.

2. Three target parameters: Distance, elevation and azimuth
The user determines the precise distance to the target using the built-in laser rangefinder. It can acquire objects that are far away as 20 km. The laser rangefinder can capture simultaneously and offer a selection of up to three possible targets at varying distances. The user may preset a minimum distance. The target’s coordinates can not be derived from the determined range, which is why a digital compass is on board. It indicates the exact azimuth and elevation to the targeted object.
3. Calculating and communicating GPS coordinates

The system then computes the target’s GPS coordinates. The user simply presses a button, and the device will indicate the distance, azimuth and elevation to the target, as well as the GPS coordinates of the target and those of his vantage point. Another touch of the button is all it takes to obtain a snapshot of the target. The audio capability enables the user to record brief remarks. All data are sent immediately via an external interface to the command centre.
Cassidian Optronics’ roots run deep: For more than 100 years, Carl Zeiss, the company from which we emerged, led the world in precision mechanical devices, optics and high-performance optronic systems.

If you wish to revisit some of the milestones of our history and heritage of innovation, consult the timeline at the bottom of the page.

Time after time, our handheld mobile observation and target acquisition systems have impressed the customer. On the right you will find some of these groundbreaking products.

Carl Zeiss builds the first scissor-scope. Enabling observers to see without having to abandon their cover, such scopes were often used by the military for observation and optical, parallax-driven range-finding.

Carl Zeiss unveils its first handheld stereoscopic rangefinder. It uses trigonometric relationships between the baseline, vector and angles to measure distance.

HALEM II, the first target location system with an eye-safe laser rangefinder, is manufactured on a large scale for the German Bundeswehr.

Perfection since 1846:

Carl Zeiss sets up his Werkstätte für Feinmechanik und Optik at Jena. Zeiss earns a stellar reputation in Germany for its scientific instruments, which are held to be among the finest available.

The correspondence between Baron Carl Beaulieu-Marconnay (lieutenant) and Ernst Abbe culminates in the first sight telescope for the Prussian army. This day marks the beginning of defence business at Carl Zeiss.

Raimondo Lorenzo D’Equeville-Montjustin designs the Forelle, a midget submarine subsequently built by the Germania shipyard at Kiel. Carl Zeiss delivers the periscope for the first German submarine suited for military use.
A 694 nm ruby laser marks the first success in military laser rangefinders, followed by the Nd:YAG 1060 nm laser in 1965 and an eye-safe Nd:YAG laser and 1543 nm Raman cell in 1983.

Although the inceptive heat-seeking device, the Donau, dates back to 1944, large-scale production commences much later. 10,000+ WBG-X thermal imagers designed for Leopard 1, Leopard 2, Marder and Luchs armoured vehicles are produced pursuant to the common module principle.

Cassidian acquires a majority stake in the defence and security division of Carl Zeiss. Renamed Cassidian Optronics GmbH, the new company carries on the tradition of excellence in optics that started in 1846.
DEFENDING WORLD SECURITY