

The Use of Battlefield Lasers and the Effectiveness of DEFSEC's BLISS



BLISS (Battlefield Laser Identification Sensor System)

(Note: the displayed form factor is subject to change and will be more adapted to its final purpose)

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// Executive Summary

The prevalence of laser systems on the modern battlefield is increasing and Laser Range Finders (LRFs), Laser Target Designators (LTDs), LiDAR and beam-riding weapons are posing significant threats. Laser-aided weapons considerably increase lethality on the battlefield by enabling precise, rapid, and versatile strikes with conventional munitions. In Ukraine, systems like Russia's Krasnopol and Kornet, or Ukraine's APKWS, have demonstrated high lethality against armour, drones, and fortifications. Their accuracy has made them a critical asset in modern warfare. Russian forces employ laser systems to enhance precision, disrupt enemy operations and protect their own assets.

DEFSEC's BLISS (Battlefield Laser Identification Sensor System) offers instant warnings that buy precious seconds to take defensive action and initiate countermeasures to a laser threat. The low cost of BLISS allows it to be deployed as personal protective equipment (PPE) which enhances survivability of dismounted soldiers and force protection as a whole across the battlefield.

Compared to existing Vehicle Protection Systems the affordability allows for a wider application on logistic vehicles in addition to tactical vehicles. The price allows to dispense with costly in-service support (ISS) and turns the BLISS into a consumable. BLISS offers flexible deployment options on personnel and vehicles and will be offered in appropriate form factors.

By the fall of 2025 BLISS will be networked and integrated with existing battle management applications thereby increasing situational awareness across tactical and operational levels.

In addition to providing real-time detection, BLISS captures the laser pulse-train data enabling identification the laser to determine friend or foe (IFF) or initiate countermeasures.



// Key Technologies

At the core of the BLISS concept are three critical technological components that enable its effectiveness on the modern battlefield:

- **Advanced Laser Detection Sensors:** The BLISS detects laser emissions as low as 10 μW across the 900–1550 nm wavelength range, effective at over 2 km in all conditions. Ongoing advancements in signal processing continue to extend this range, ensuring reliable detection of laser-guided munitions and optical sensors.
- **Networked Force Integration (coming fall 2025):** The BLISS is designed for compatibility with existing battlefield management systems, including the Nett Warrior and ATAK systems, providing real-time situational awareness across command echelons. This connectivity allows for immediate threat communication, enabling rapid responses across the entire operational area.
- **Laser Pulse Train Capture:** A software-defined enhancement to BLISS, this feature will allow analysis of laser pulse patterns to identify the source, intent, and affiliation of laser emitters. By comparing real-time detections with a customer-built library of known allied and adversary signatures, the system can distinguish between Blue and Opposing Force and identify specific systems—supporting rapid, informed tactical decisions. Continuously updated through operational learning, the LPT capture ensures adaptability to evolving laser threats.

Significantly, the BLISS is designed as a low-cost, consumable product that requires no in-service support, offering a scalable and sustainable capability across large formations. Its affordability allows for widespread deployment at the individual soldier, vehicle, or infrastructure level, making it a practical solution for modern high-threat environments. BLISS will integrate easily with standard soldier and vehicle power systems.

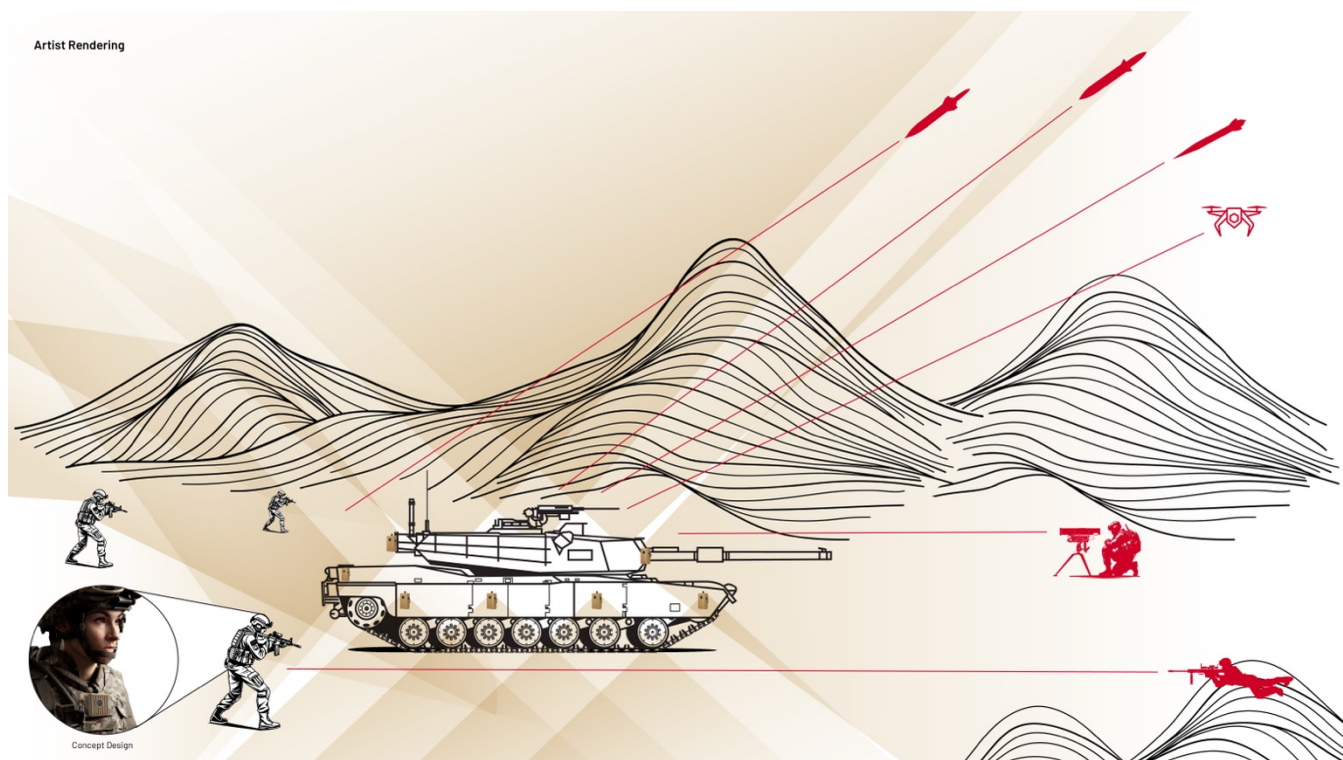


// Current Operational Context

Recent conflicts, particularly those in Ukraine and other high-intensity, peer-to-peer environments, have highlighted the need for advanced protection against laser-guided threats. Modern warfare increasingly involves a complex spectrum of laser-based systems designed to guide, track, and disable enemy assets. These threats pose unique challenges to conventional defensive systems, which were not originally designed to handle the rapidly evolving nature of lasers.

Laser-guided threats have become a prominent method of precision targeting, and while laser technology has been in use for decades, recent advancements have increased both the range and accuracy of these systems.

Furthermore, the increased prevalence of lasers underscores the necessity for military forces to adopt laser detection technologies capable of operating in a wide range of environments, including rapidly moving platforms, urban settings, and in the presence of countermeasures.





// Threats from Lasers

Laser-Guided Missiles and Precision Targeting Systems

- **Technical Details:** Laser-guided missiles use lasers to “illuminate” a target, with the missile tracking the reflected light to home in on the target. These systems often employ Class 3B or Class 4 lasers that emit high-powered beams in the near-infrared spectrum. Their range can exceed several kilometres, depending on the power of the laser and the accuracy of the targeting system.
- **BLISS Response:** The highly sensitive BLISS detects laser illumination from such systems emitting signals down to 10 μW across the 900–1550 nm wavelength range, including both pulsed and continuous wave lasers. Accurate detection enables the system to deliver critical early warning, allowing for timely activation of countermeasures such as evasive manoeuvres or the deployment of electronic warfare tactics to disrupt or deceive hostile tracking systems.

Blinding and Dazzling Lasers

- **Technical Details:** Some laser systems are designed to temporarily blind or dazzle optical sensors, causing disorientation or damage to the target’s visual systems. These lasers typically operate in the visible or near-infrared spectrum (around 800–1100 nm) and can have power levels in the Class 3B to Class 4 range, depending on the specific type of system used. The purpose of these systems is to impair the enemy’s ability to see or effectively use their targeting equipment, particularly on vehicles and aircraft.
- **BLISS Response:** The BLISS can detect these high-intensity near-infrared lasers with rapid precision. With a detection time of under 300ms, operators receive immediate feedback, enabling them to employ countermeasures.

Range finding and Targeting Lasers

- **Technical Details:** Range finding lasers are often employed by adversaries to calculate distances or (Class 3R) and operate in the near-infrared spectrum. Though they are not inherently destructive, they provide crucial data to targeting systems, making them a critical component of modern military precision strike capabilities.
- **BLISS Response:** The BLISS reliably detects even these low-powered lasers, as low as 10 μW , across the 900–1550 nm wavelength range. This early warning allows operators to anticipate and disrupt the adversary’s targeting calculations, either by altering the target’s position or by deploying appropriate countermeasures to interfere with the laser’s accuracy.

Tracking and Surveillance Lasers

- **Technical Details:** Tracking lasers are commonly used for surveillance purposes, including the tracking of movements or the identification of targets. These lasers typically operate between 900 – 1550nm and include rangefinders, short, medium and long-range LIDAR, target designators and drone-based trackers. The information gathered by these systems is used to maintain continuous surveillance and track the movement of personnel, vehicles, or entire formations.



- **BLISS Response:** The BLISS can detect these tracking lasers. The system's high sensitivity ensures that even low-intensity laser threats, designed to provide intelligence rather than immediate damage, are detected with enough time for counteraction.

// The BLISS Advantage

The integration of the BLISS with military platforms provides several key advantages:

- **Real-Time, Actionable Intelligence:** The system delivers exceptional sensitivity and ensures reliable identification of low-power threats in diverse conditions. Tested at distances beyond 2 km under all ambient environments, it continues to push the limits of detection range through advanced signal processing—providing unmatched situational awareness and enabling rapid, informed threat responses.
- **Seamless Integration:** The BLISS integrates with existing battlefield networks, ensuring that threat data is disseminated quickly across all command levels, providing coordinated, timely responses.
- **Flexible Deployment:** Whether mounted on vehicles, worn by personnel, or integrated into infrastructure, the BLISS adapts to a wide range of mission requirements, offering protection across air, land, and sea.

// Conclusion

In an era marked by the rapid proliferation of advanced laser-based targeting and guidance systems, the ability to detect and counter these threats is critical to force protection, tactical flexibility, and mission assurance. DEFSEC's BLISS (Battlefield Laser Identification Sensor System) delivers a cutting-edge, real-time solution for laser threat detection and response. Designed for seamless integration into existing C5ISRT3 architectures, the BLISS acts as a force multiplier, enhancing individual soldier survivability and increasing the combat effectiveness of manoeuvre elements and fixed installations in contested environments.

Engineered as a low-cost, consumable asset, the BLISS requires no in-service support, enabling scalable deployment across dismounted troops, combat vehicles, and critical infrastructure. Its affordability and simplicity support mass fielding across large formations, delivering a sustainable and adaptable countermeasure against modern laser threats in high-tempo, high-threat operational settings.



// About DEFSEC Technologies Inc. (“DEFSEC”)

DEFSEC develops and commercializes proprietary next-generation tactical systems that advance operational effectiveness and survivability for military and public safety personnel deployed at the Tactical Edge: those commanders, soldiers, operators, and first responders conducting operations primarily in the dismounted domain (on foot and on and off vehicles). DEFSEC capabilities and market offerings are grouped into three main lines of business: Digitization, Counter-Threat, and Less-Lethal

Digitization encapsulates DEFSEC’s focus on the Integration and Exploitation of Digital Information at the Tactical Edge and represents the company’s core offering to the military and public safety market. DEFSEC’s team of highly experienced systems, software, mechanical and electrical engineers, as well as military veterans, have hundreds of years of collective experience in the military systems integration market leveraging the ground-breaking and force-enabling advantages of Team Awareness Kit (TAK).

Counter-Threat products are TAK-integrated and include: the BLISS (Battlefield Laser Identification Sensor System) designed to counter the growing threat of weaponized lasers and laser designators against ground personnel vehicles and infrastructure.

Non-Lethal products include the PARA OPS™ and ARWEN® less-lethal product lines for personal defence, public safety, and realistic training. Product offerings such as low-energy cartridges, specialized projectiles, and launchers for personal and professional use collectively introduce a new era in safe, reliable, and effective tools for next-generation non-lethal missions.

DEFSEC is headquartered in Ottawa, Canada; DEFSEC trades on the TSXV and Nasdaq under the symbol DFSC.



BLISS (BATTLEFIELD LASER IDENTIFICATION SENSOR SYSTEM)

TECHNOLOGY DEMONSTRATOR



ENGINEERED FOR PRECISION, BUILT TO PROTECT

The BLISS (Battlefield Laser Identification Sensor System) is a cutting-edge, compact technology demonstrator designed and purpose-built to protect military personnel and high-value assets from modern threats. With high-speed, interference-free laser detection and ruggedly designed, it enhances situational awareness and survivability beyond 2 km.

Through 2025, the BLISS will evolve into a fully networked system, seamlessly integrating soldier-worn and vehicle-mounted platforms with a threat identification application resulting in unparalleled battlefield awareness.



ENHANCED SITUATIONAL AWARENESS AND SURVIVABILITY

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// KEY BENEFITS

- **Unmatched Accuracy** - Captures subtle laser threats with precision.
- **Interference-Free** - Filters distractions for reliable alerts.
- **Ultra Sensitive Detection** - Detects fleeting signals instantaneously.
- **Immediate Feedback** - 300ms audible alert gives operators instant overmatch.
- **Power Versatility** - Supports Nett Warrior systems (10-17VDC).

// WHY CHOOSE BLISS SENSOR TECHNOLOGY

- **Speed and Precision** - Instant, actionable intelligence.
- **Reliability** - No false positives, only real threats.
- **Flexibility** - Adapts to all mission needs.

// APPLICATIONS

- **Personnel Safety** - Real-time warnings save lives.
- **Defends Assets** - Protects vehicles and command posts.
- **All-Domain Protection** - Protects across air, land, and sea.
- **Infrastructure** - Protects bases, buildings and critical sites.

// UPCOMING ROADMAP ENHANCEMENTS

- **Networking** - Onboard processing and integration with ATAK-based platoon connectivity.
- **Vehicle Integration** - Connects to battle management and active protection systems.
- **Threat Insights** - Pairs with DEFSEC's proven threat-classification technology for real-time response tailoring.

// TECHNICAL SPECIFICATIONS

- **Sensitivity Rating** - Detects photocurrents as low as tens of μ A.
- **Pulse Range** - Captures 30 ns to 1 ms signals.
- **Threshold** - Alerts at 5 mV above noise.
- **Power** - 10-17 VDC, ~2W, Nett Warrior-compatible (6-pin connector, Glenair 808-274 cable).
- **Battery** - Proven with Nerv Centr SoloPack (Galvion).
- **Range** - Proven detection of Class 1 & 3R lasers at ≥ 2 km (900-1550 nm).
- **Size** - 84mm (w) x 122mm (h) x 41mm (d)
- **Weight** - 250g



Soldier-worn application.