



Obsidian™ Limited Signature IR Light

—

To See, But Not Be Seen

Joe Pimenoff, Tapani Hollmén

Telva, Finland
(joe.pimenoff@telva.fi)

1 INTRODUCTION

The capability to operate in the dark, either at night-time or in otherwise very poorly lit environments, is of paramount importance to most military forces and disciplines, including special operations forces (SOF), armoured infantry, artillery firing positions, military engineering operations and logistics. The ability to efficiently and safely carry out operative and tactical missions, undetected by enemy or other hostile observation, has become the intrinsic pre-requisite of all mission-critical actions.

2 BACKGROUND – THE PROBLEM

In order to enhance the possibilities to operate in the dark, a number of enabling technologies have been developed, the most common being those based on light intensifiers and their use in night-vision goggles (NVG's). In addition, to enhance the level of illumination, and simultaneously restrict it to wavelengths invisible to the human eye, illuminators tuned to the infrared (IR) regime of the spectrum have been applied.

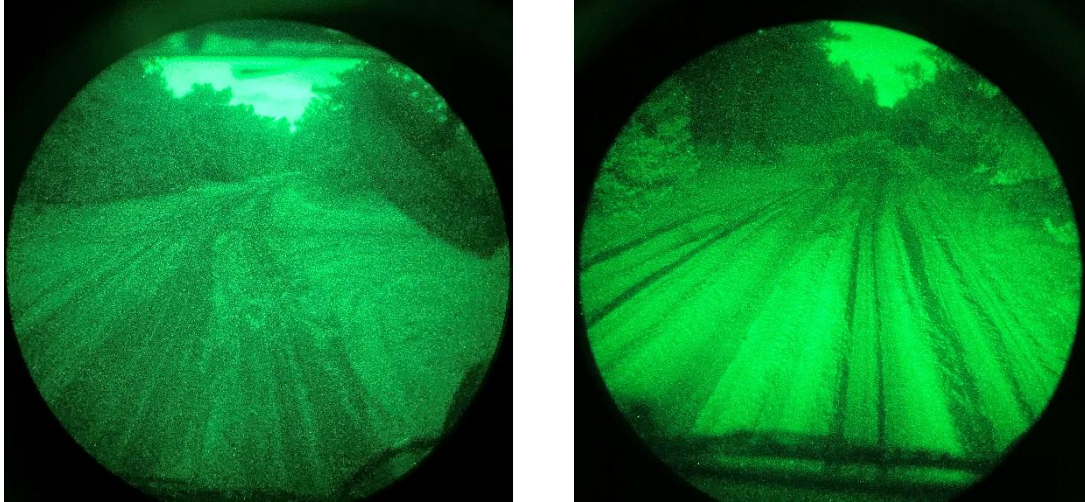
However, with time and especially the global proliferation of night-vision capability, predominantly up to Gen 3 devices, using IR illuminators has become a paradoxical element in the battlefield: while a conventional IR light grants the user enough light to operate, it also provides an enemy equipped with NVG's a clear and obvious indication of presence and activity. In short, it has become more and more precarious to rely on the use of conventional IR illuminators for covert lighting and operations.

3 OBSIDIAN - THE SOLUTION

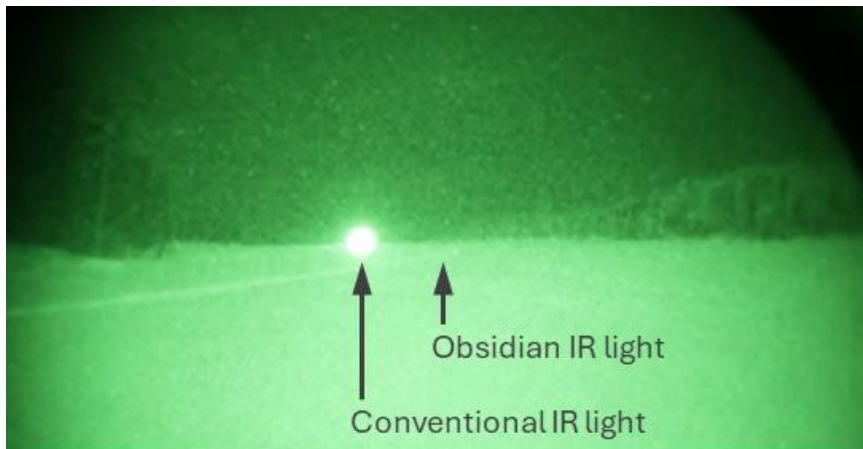
Telva has, in August 2023, launched Obsidian™, a game-changing IR illuminator (see Picture 1) with a controlled and limited signature for vehicle, static base illumination and similar uses. “Limited signature”, in this context, means that Obsidian has a limited and controlled signature, *i.e.*, range of detection. In other words, Obsidian illuminates the immediate vicinity (< 50 m) sufficiently to drive a vehicle at near-to daylight speeds (See Pic. 2), illuminate base and fire position areas, enable engineering functions such as bridge and mine laying, maintenance and more. The light, however, cannot be detected beyond a certain distance, typically ≈ 300 m, regardless of what observation equipment is used (See Pic. 3). See Picture 4 for a schematic explanation of the visibility range.



Picture 1. In August 2023, Telva launched Obsidian, an IR illuminator with a limited signature, intended for vehicle use, either retrofit or integration.

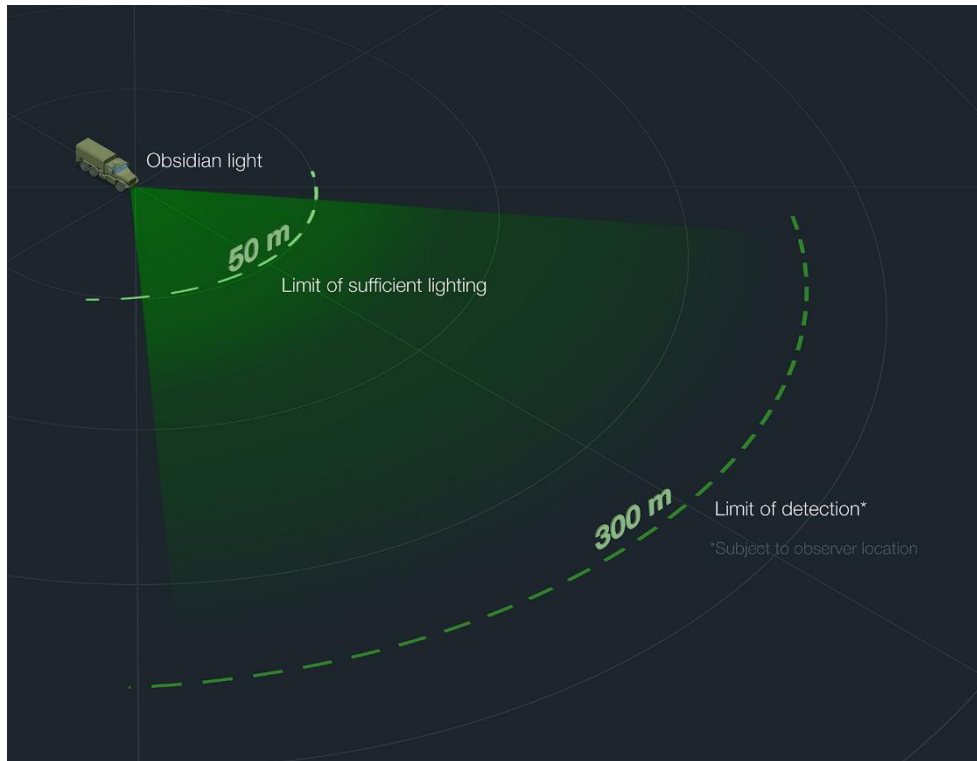


Picture 2. Two pictures showing what the road ahead looks like from the driver's point of view when using no light (left) and when using Obsidian Limited Signature IR Light (right). Please note how the Obsidian light emphasises the contours and tracks and illuminates the surroundings, enabling more accurate and safer driving.



Picture 3. In a picture taken over a frozen lake in winter, two IR lights are switched ON and are aimed at the observer. The light on the left is a rifle-mounted (small) conventional IR torch, the light on the right hand side is an Obsidian light. While the small IR torch is clearly visible, the Obsidian light cannot be detected.

Obsidian's range of detection is not limited because the light is weak. The launched vehicle version of Obsidian has adjustable output power and beam shape settings, depending on the need. The key to Obsidian's limited range lies in the calibrated, real-time monitored and optically tuned properties of the outbound beam. The beam is adjusted to exhibit very efficient dampening in the surrounding conditions.



Picture 4. Schematic rendition of the approximative limits of sufficient close-range lighting and the limit of detection* of the Obsidian light.

*subject to light angle and settings, ambient conditions etc.

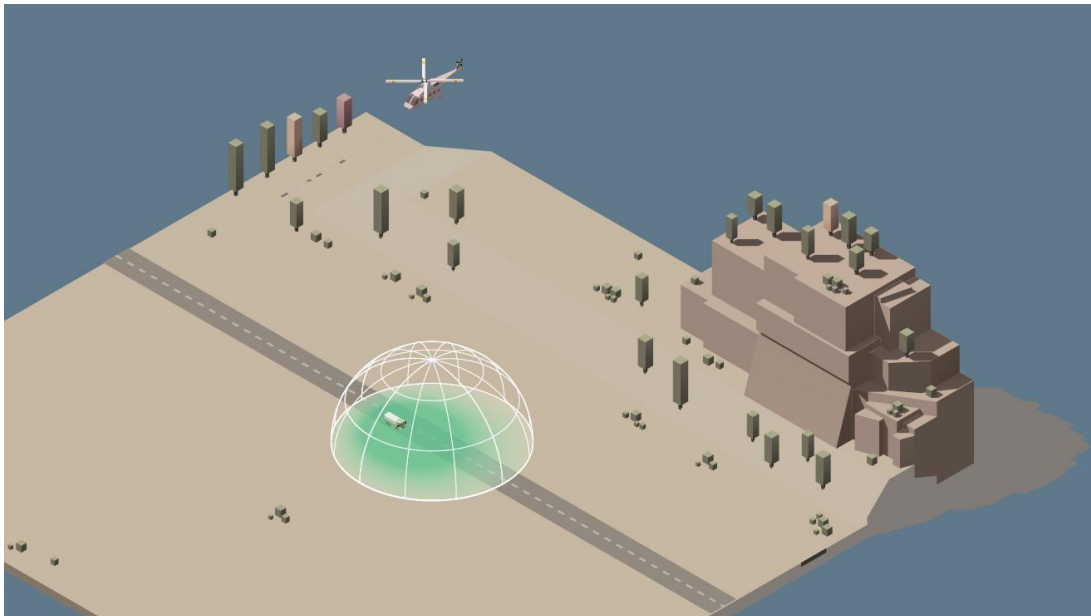
Obsidian is based on technology developed in Finland and productised by Telva. The concept has been extensively tested and verified, including comprehensive field tests in challenging conditions in Finland. During the conceptualisation and product development stages of Obsidian, FINSOF has participated in both setting the functional requirements and testing the resulting product against said requirements. The first customer deliveries took place in Q4/2024.

4 CONCLUSION

Using conventional IR lighting for covert operations, be that military, border control, law enforcement or customs related, comes with an increased inherent risk of detection, due to an increase in night-vision capabilities worldwide. In order to significantly reduce the risk of detection, Telva has introduced Obsidian, the IR light with a limited signature. While Obsidian enables normal close-range activity when using NVG's, it is virtually undetectable from afar.

Seen through the eyes (and NVG's) of the user, Obsidian clearly unlocks a number of night fighting capabilities, including:

- Operating undetected under enemy observation (see Picture 5), which lends well to SOF, mobile infantry, support functions such as logistics, maintenance and more.
- Improved visualisation and situational awareness, both from within and outside a vehicle.
- Increased safety during vehicle handling and operations in the dark, mainly due to better perception and visibility.



Picture 5. Obsidian creates a virtual illuminated bubble, beyond which detection is impossible.

Technically, Obsidian offers a number of benefits, including:

- Better imaging than conventional thermal imager systems, due to increased 3D perception, presence of light patterns and shadows, better sense of depth of field and stable high contrast rendition.
- Efficient and safer use of vehicles over a full 24 h cycle.
- Extended product lifetime of NVG's up to and including Gen 3, because both the older and newest models benefit from adding a light source to the field of view.

- Obsidian is easy to install as a retrofit accessory on most known platforms because of the limited number of cables, wide power supply range and integrated fixture solutions. See Picture 6.



Picture 6. An Obsidian light unit assembled on the roof panel of a 6 × 6 armoured vehicle.

The first deliveries of Obsidian lights were completed in Q4/2024. Obsidian light products are subject to export control and end-user certificate (EUC) measures as prescribed by the Finnish national authorities. Telva is keen to present Obsidian and the game-changing capabilities it offers to military units, vehicle manufacturers and system integrators.

Copyright © 2025 Oy Telva Ab. All rights reserved. Telva and Obsidian are trademarks of Oy Telva Ab. Technical and commercial information in this document is subject to change without notice.