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Light Challenge '26



Final presentations at ITGWO

takeaways &
recommendations



DARKER SKY

Interreg
North Sea



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Takeaways & recommendations

The prototype presentation of the Light Challenge during Into The Great Wide Open 2026 marks the end of this project, and opens up opportunities to further development and co-creation.

After several months filled with research, masterclasses, presentations, and a workshop, the final LIVE prototype presentation of the Light Challenge took place 26-30 August during Into The Great Wide Open at Vlieland. Protecting the darkness of the night and nature, while simultaneously designing an attractive light installation to guide festival visitors from one artwork to the next is a complex challenge that the participants in this Light Challenge tackled from various perspectives and backgrounds.

On the following pages, you can read about the experiences of two project teams regarding the testing and presentation of the prototypes during the festival, as well as their recommendations for further development—which they themselves would like to pursue.

Research and recommendations from team HVHL is to be found in a link below.

It's such a joy to see the various projects grow and take on surprising outcomes. We look forward to a bright and promising future for darker skies!

A massive 'thank you', of course, to the participants and representatives, as well as to our partners and masterclass presenters, who also provided the teams with feedback during the presentations.

May this be a wonderful step toward even more multidisciplinary adventures exploring light and darkness!

- Light Challenge'26 -

Light Challenge '26 | <https://www.light-challenge.eu/>
Interreg North Sea DARKER SKY | <https://www.interregnorthsea.eu/darker-sky>
Into The Great Wide Open | <https://intothegreatwideopen.nl/en/>
HVHL research & recommendations | <https://www.light-challenge.eu/presentations-reports-vanhalmlarenstein>



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LIGHT CHALLENGE
GLOWING NATURE – DARKER SKY

*Darkness where possible, light where necessary.
Wonder brings it all together.*

Protecting the darkness of night and nature while simultaneously designing an attractive light installation to guide festival visitors from one artwork to the next is a complex challenge that the participants in this Light Challenge have tackled from various perspectives and backgrounds. Under the banner of the EU Interreg North Sea Project DARKER SKY, Light Challenge '26 presents lighting prototypes along the ITGWO Art Route.

The Light Challenge is a design challenge that was first organized in 2011. Since then, the Light Challenge has challenged students from various programs to develop innovative lighting concepts for public spaces. Each edition focuses on a current social and spatial challenge.

The goal is not only to develop an innovative darkness and light solution for the festival's art route signage, but also to raise awareness around darkness, energy, ecology, and human experience.

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Light Challenge '26

DARKER SKY is an Interreg North Sea project (ERDF funding) which aims at reducing light pollution and increasing biodiversity and ecological connectivity in the North Sea Region (France, Germany, the Netherlands & Denmark) by providing municipalities and ports with innovative measuring, monitoring and co-design methods for the implementation of environmentally sound and energy-efficient light reduction benefitting biodiversity and communities.

Light pollution, the excessive, misdirected or inappropriate use of artificial light at night, is increasingly recognised as a cross-regional challenge and serious environmental stressor causing biodiversity loss & habitat fragmentation. A proper reduction of light pollution & biodiversity protection calls out for transnational exchange & intergovernmental management.

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DARKER SKY

**DARK WHERE POSSIBLE,
BRIGHT WHERE NEEDED**

Artificial light at night (ALAN) is increasingly seen as a threat to nature. It can affect how animals behave, move, reproduce, and use their habitats. Vlieland is part of the UNESCO World Heritage Wadden Sea, an area known for its dark natural landscapes.

At the same time, artificial light from roads, buildings, and other human activities is also present. This study investigated which areas on Vlieland may be most at risk from artificial light during the night.

Fieldwork took place during two one-week periods in April and May 2026. Six locations with streetlights were selected, representing different habitat types: water, buildings, species-rich grassland, dune forest, open dunes, and dune-salt marsh landscapes. The research focused on three groups of animals that are known to be sensitive to light: birds, bats, and moths. These were monitored using light traps and recording devices. Species diversity was measured using ecological diversity indices.

The results showed clear differences between habitat types. By combining measurements of light intensity, biodiversity data, habitat sensitivity, and species sensitivity, a habitat risk map was created.

These findings suggest that artificial light can have different impacts depending on the habitat. The results provide valuable information for managing outdoor lighting on Vlieland and help support the protection of its unique nighttime environment.

Van Hall Larenstein | Wildlife management
Anouk Aalders - Anabel Boorman
Amarin Saathoff - Meud Muskens

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Find out more!





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Lumina Nocturna

Team TU/Eindhoven

Team TU/e | Audrey Emalieu Ngafa, Chiara Tesarova, Lotte Doods, Sjoerd Arts

1 Project recap

Lumina Nocturna is a motion-responsive lighting concept for the ITGWO art route: fixtures stay dark until a visitor approaches, then glow gently on the path ahead and fade once they've passed. Passive glow-markers (charged by daylight) mark the trail in between. The goal is to guide visitors through the forest at night while minimising disturbance to nocturnal wildlife, with no permanent infrastructure left behind.

2 Key takeaways from festival testing

2.1 Colour (red light)

Reactions were split. Several visitors read red as warm, easy on the eyes at night, and in tune with circadian rhythm. Others associated it with danger, aggression, or a "don't go there" signal. A third group read it as mysterious, romantic, or intriguing.

Takeaway: a single fixed red reads very differently depending on the visitor — the association is not neutral, and needs to be actively designed for rather than assumed. The darkness comment also suggests that comfort with low light is shaped by the place as much as by the design — Vlieland's existing character already makes darkness feel safer than it would elsewhere.

2.2 Sequential activation

The lights turning on one after another was similarly divisive: some found it mysterious and atmospheric, others found it stressful, specifically fearing the lights would switch off completely and leave them in the dark.

Takeaway: the anxiety isn't really about the sequencing itself, it's about the binary on/off — visitors don't trust that light will still be there if they need it, and one person's comment shows this isn't just a perception issue but a real failure-mode risk if the control system ever goes down. The dim-light comments are a strong, repeated signal in favour of a low baseline glow rather than true darkness between activations.

2.3 Activation timing

During walkthroughs, the light was triggered at the spot where the visitor's presence



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Lumina Nocturna

Team TU/Eindhoven

was detected — but by the time it finished glowing in, the visitor had usually already walked past that point. Effectively, the light was lighting up where people had been, not where they were about to step.

Takeaway: the system needs to anticipate the visitor's next step, not just react to their current position, or the lighting will always feel a beat behind.

2.4 Spatial pattern

Visitors clearly preferred the organic, zigzagging placement (in the trees) over a straight runway-style line. The irregular pattern was read as showing more of the surrounding space, not just the path. A straight line — like ground-level airport-style markers — was seen as creating a harder border, which people felt was worse for both wildlife and visitor experience.

Takeaway: irregular placement in the canopy supports the “no hard borders” goal better than any ground-based line would.

3 Recommendations for further development

3.1 Behaviour — dim, don't switch off

Move from a binary on/off state per fixture to a low, constant baseline glow that brightens as someone approaches and settles back to that baseline once they've passed, rather than going fully dark. This should directly address the “will it turn off on me” anxiety, and also fits Staatsbosbeheer's stated preference for keeping the total light footprint as low as possible — the baseline can be kept genuinely faint rather than off.

3.2 Anticipatory triggering — light the step ahead, not the step taken

The core problem: detection happens at the visitor's current position, but the glow-in takes long enough that they've already moved on by the time it's lit. To fix this, the trigger needs to predict where the visitor is heading rather than just react to where they are.

3.3 Colour — refine and contextualise rather than pick one red

- Test a few shades of red and warmer tones side by side, rather than a single fixed hue.
- Consider letting the hue warm gradually as the night gets later.



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Lumina Nocturna

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- At intersections or other decision points, shift to a slightly lighter tone to aid orientation without changing the character of the rest of the route.
- Use a colour opposite red on the colour wheel (green) for any signage text, so it stays legible under the red ambient light.
- Worth noting for the report: red is a reasonable ecological choice too — many nocturnal species are less sensitive to red wavelengths, and forest greens stay visible under red light, which supports both visitor orientation and the low-disturbance goal.

3.4 Sensor coverage and triggering logic

This still needs to be resolved and is worth flagging explicitly as open:

- Sensors only at the start/end of the route vs. distributed at every fixture (needed if the piece should respond no matter which direction someone enters from, and to support anticipatory triggering per 3.2)
- Whether fixtures are networked together or each has its own independent sensor and power.

Distributed sensing gives a better multi-directional experience but does mean more nodes can be triggered at once — worth weighing against Staatsbosbeheer's position that they don't support adding more light sources. This trade-off is worth quantifying (e.g. estimated simultaneous nodes lit) before committing.

3.5 Mounting and energy source

Keep developing the tree-mounted version — it's both the visitor and the better fit for solar charging, since canopy-mounted units can use whatever daylight filters through the leaves, consistent with how the passive glow-markers already work. A ground-mounted variant, if explored later, would need a different energy source suited to low-light ground conditions rather than solar (e.g. an alternative ambient or soil-based source), since it wouldn't get comparable direct light.

Learn more about Lumina Nocturna |

<https://www.light-challenge.eu/presentations-reports-TUeindhoven1>

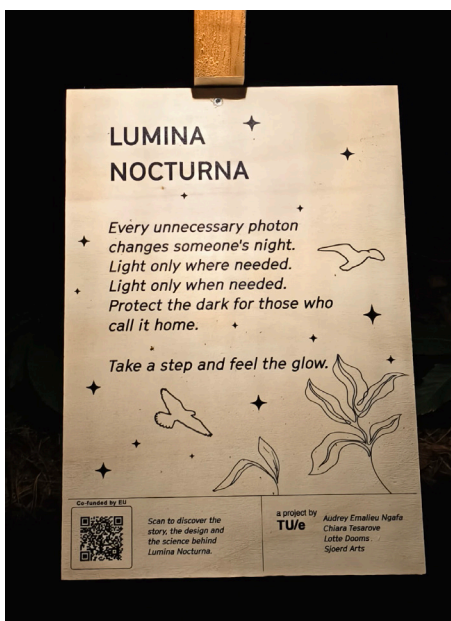
If you would like to know more and get in touch with the designers, please send an email to | lightchallenge26@gmail.com



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Guidelight

Jan Jenniskens | TU/Eindhoven

During LIGHTCHALLENGE 2026

the Guidelight project focused on exploring how lighting can guide visitors safely through dark natural environments while preserving atmosphere, ecological footprint, and the sense of nighttime mystery.

The process combined field research on Vlieland, prototype development, and testing during Into The Great Wide Open. Throughout the project, the aim was to find a balance between perceived social safety, acceptable lighting levels, and the sense of mystery, without contributing to unnecessary light pollution.

During ITGWO

visitors walked a short forest route illuminated by the Guidelight prototypes.

Three strings, each containing four lights, were hung along the path,

- one fully enclosed,
- one half enclosed, and
- one control string without fixture.

Visitors were invited to share their impressions of visibility, comfort, atmosphere, and ecological impact, which provided valuable insights into how the prototypes performed in a real festival setting.

- Many people noted that glare remained a significant issue, particularly when LEDs were directly visible, creating a bright foreground and reducing visibility of the surrounding forest.
- Several visitors suggested exploring fiber optic elements as an alternative, since these can offer clear guidance while emitting far less stray light.
- Others questioned whether the lighting should remain on continuously or be activated through motion based sensors, reducing ecological disturbance and energy consumption.
- The spacing of the fixtures also raised questions, with some visitors wondering whether the lights could be placed much farther apart, for example one every ten meters, without compromising safety or visibility.
- At the same time, the atmosphere of the route was appreciated, and a recurring positive remark was that “it still feels like we’re standing in the dark,” confirming that the design successfully preserves the nighttime experience.



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Guidelight

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Stakeholders from ITGWO also expressed interest in the broader, multi-use potential of the concept. They noted that a modular, low-impact guidance system could be valuable not only for festivals but also for cycling paths and nature trails around the island. This raised wider questions about how the design could become more flexible and scalable across different environments.

In my own research, I looked closely at the specific ecological context of Vlieland and the species present there.

However, an important question emerged: how often do you need to repeat this level of ecological analysis? Urban areas have different species than forests, and it is not realistic to conduct species-specific assessments every few meters.

This highlights the need for a lighting system that minimizes ecological impact in a general, robust way, without relying on constant detailed mapping. The festival context made clear that the concept has strong potential, but it also emphasized the need for further refinement, particularly in glare control, modularity, and activation strategies.

Recommendations

- Based on the insights gathered, several recommendations can be made for ITGWO. The next technical steps should focus on reducing glare through improved shielding, diffusers, or fiber optics, and on developing a modular slinger system that can be deployed without requiring detailed ecological analysis for each location.
- Sensor based activation should be explored to make the system plug and play, which would reduce energy use and ecological disturbance.
- It will also be important to test wider fixture spacing to determine safe and comfortable distances for different terrains.
- From an ecological perspective, continuing the use of green light remains a balanced option for both humans and local species, and collaboration with local ecologists can help establish general guidelines for nature friendly lighting.

Strategically, Guidelight can be positioned as a scalable solution for festivals, nature trails, and low impact mobility routes, offering a flexible approach to guiding visitors through dark environments while preserving atmosphere and ecological integrity.



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In conclusion

Guidelight demonstrates that darkness preserving signage is both feasible and valuable for natural environments. The festival tests showed strong potential, clear areas for improvement, and enthusiastic interest from visitors and stakeholders.

With further refinement, especially in glare control, modularity, and ecological sensitivity, the concept can evolve into a practical and scalable solution for Vlieland and beyond.

Learn more about Guidelight |

<https://www.light-challenge.eu/presentations-reports-TUeindhoven2>

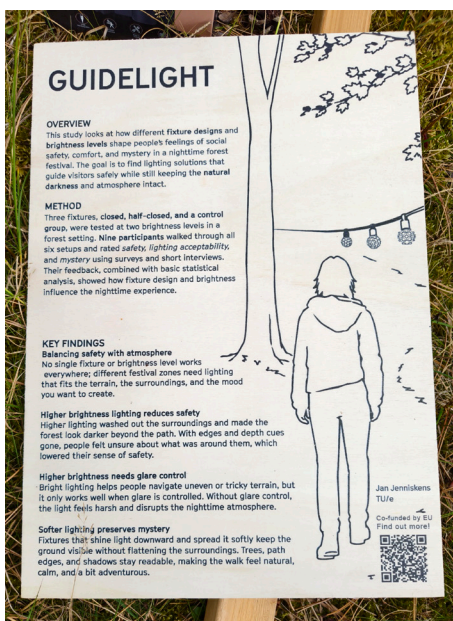
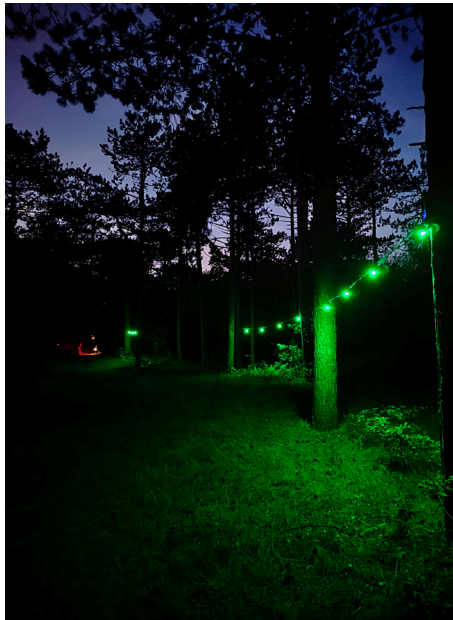
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