

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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VOLKSWAGEN GROUP OF AMERICA, INC.,  
Petitioner,

v.

YECHEZKAL EVAN SPERO  
Patent Owner.

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U.S. Patent No. 10,894,503 to Spero

Case No.: IPR2023-00328

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**PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION  
FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. § 42.107**

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**List of Exhibits**

| <b>Exhibit No.</b> | <b>Description</b>                                                                                                                                    | <b>Identifier</b>     |
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| 2001               | Declaration of Matthew A. Turk, PhD                                                                                                                   | Turk Decl.            |
| 2002               | Curriculum Vitae of Matthew A. Turk, PhD                                                                                                              | Turk CV               |
| 2003               | Best Practices and FAQs for Filing Requests for Reexamination Compliant with 37 CFR 1.510 and 1.915, PTAB, May 2010                                   | Best Practices        |
| 2004               | Petition challenging U.S. Patent No. 10,894,503, Volkswagen Group of America, Inc. v. Yechezkal Evan Spero, IPR2023-00197, Paper 2, November 30, 2022 | The ‘197 IPR Petition |
| 2005               | Petition challenging U.S. Patent No. 10,894,503, Volkswagen Group of America, Inc. v. Yechezkal Evan Spero, IPR2023-00335, Paper 2, December 23, 2022 | The ‘335 IPR Petition |

## **I. Introduction**

Pursuant to 37 C.F.R. § 42.107, Yechezkal Evan Spero (“Patent Owner”), submits the following Preliminary Response (“Preliminary Response”) to the Petition for Inter Partes Review of claims 26-36 and 65-70 (“Challenged Claims”) of U.S. Patent No. 10,894,503 (“the ‘503 Patent”) filed by Volkswagen Group of America, Inc., (“VW” or “Petitioner”). The Petition includes ten grounds predicated on anticipation by, or alternatively obviousness of a combination of A) U.S. Patent No. 6,144,158 (“Beam,” Ex.1005.) and U.S. Patent Publication No. 2001/01198486 (“Thominet,” Ex.1006.) (Grounds 1-2); and B) International Publication No. 1998/054030 (“Karlsson,” Ex.1010.) and International Publication No. 2001/001038 (“Harbers,” Ex.1011.) (Ground 8) for independent Claims 26 and 65.

Through a circuitous web of arguments, the Petition presents at least four different obviousness combinations to challenge the validity of each of the Challenged Claims. When unpacked, it becomes clear that Grounds 1 and 2 are actually three distinct grounds: 1) Grounds 1A and 2A—an incomplete argument that Beam anticipates Challenged Claims 26-27, 30-31 and 65. (Petition at 8 and 38.); 2) Grounds 1B and 2B—the combination of Beam and Thominet’s “software” renders the Challenged Claims obvious (Petition at 11 and 69 and 3.) Grounds 1C and 2C—the combination of Beam and Thominet’s hardware renders

the Challenged claims obvious (Petition at 14 and 71.) Similarly, for each Challenged Claim, the Petition also advances a separate ground with a conclusory allegation of anticipation by Karlsson or alternatively obviousness by the combination of Karlsson and Harbers (Petition at 78.)

Despite cramming in four grounds for each claim—and not justifying the need to do so—Petitioner fails to meet its burden of proof. The disjointed grounds fail to meet at least three limitations in all claims, and offer vague, unsupported motivation to combine arguments as to why and how a POSITA would combine the applied references.<sup>1</sup> Finally, the Petition format fails to satisfy the particularity requirements of § 314—arguments are intertwined, the actual combinations being proffered are unclear or inconsistent, the obviousness proofs often map to paraphrasing instead of the actual claim language, and much of the analysis and argument is exported to the expert declaration.

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<sup>1</sup> The obviousness shortfalls are exacerbated in Grounds 3-7 and 9-10, when Petitioner applies three other secondary references to construct hindsight-driven arguments for dependent claims 27-36 and 66-70. Nonetheless, given the serious defects with the arguments advanced in Grounds 1-2 and 8 involving independent claims 26 and 65, the Preliminary Response will focus on critical issues common to all Challenged Claims.

## **II. Overview of the ‘503 Patent – The Claimed Invention is Directed to an Adaptive Multi-LED Headlight System for Spatially Differentiated Light Distribution Based on the Detection of a Vehicle in the Field of View**

The ‘503 Patent is directed to “a novel multi-light source approach to the design and construction of solid-state lighting fixtures (vs. solid state lamps), which is termed a ‘Digital Lighting Fixture’, due to the control of individual lighting element ‘digits’ to provide the ‘correct’ lighting solution for the situation at hand.” (Ex.1001, 11:11-16.) The ‘503 Patent further explains that “[t]he terminology ‘digital’ as used herein refers to the discrete nature of the multiple LED lamps provided in the luminaire, whereby, ‘digital’ control results from the individual control of the discrete, i.e., ‘digital’ lighting elements, the LEDs, in the luminaire.” (*Id.*, 2:67-3:5; Ex.2001, ¶23.)



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More specifically, the '503 Patent describes methods of using a multi-LED light source to segment a field of view and deliver varied, optimized illumination to the different segments within the field of view based on the presence of a detected object therein, "covering a wide scope of applications", including transportation. (Ex.1001, 11:18-21, 4:20-24, 50:40-41; Ex.2001, ¶25.)

In the context of headlights,

[a]dditional features can include an optional very narrow flashlight type of beam. . . Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

(Ex.1001, 52:58-53:2.)

Additionally, a spatially differentiated illumination pattern can be determined to differently illuminate segments of a field of view based on the detection of an object:

Using color and pattern recognition techniques it is possible to determine what is a sign. It is then possible to provide the equivalent of "task lighting" and use the controller and properly aimed SLS to follow and illuminate distant overhead and roadside signs for a longer time, yet not blind oncoming traffic due to the narrow beam.

(*Id.*, 53:3-8.)

The claimed invention of the ‘503 Patent is thus directed to multi-LED headlight systems that precisely determine anti-glaring illumination output to optimize illumination for the vehicle operator under a myriad of driving situations, whilst reducing glaring illumination for oncoming vehicles. The dependent claims include additional innovative features that specify illumination strategies for a myriad of driving situations.

The Challenged Claims include independent claims 26 and 65. Both claims 26 and 65 are reproduced below with emphasis added to the Determining Second Subsections Illumination Limitations, the Directional Light Clusters/Sources Limitations and the Determining Control Strategy/Instructions Limitations (defined below):<sup>2</sup>

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<sup>2</sup> Petitioner asserts the ‘503 Patent Claims are not entitled to the earliest claimed priority date. (Petition at 4.) Petitioner’s argument is irrelevant because all applied references predate the earliest claimed priority date of the ‘503 patent. Therefore, Patent Owner does not further address Petitioner’s assertions in this response but reserves the right to do so if they become relevant.

26. *A method for generating a headlight beam in an adaptive<sup>3</sup> headlight system that provides illumination to at least a portion of a field-of-view, comprising:*

*utilizing one or more sensors of a vehicle including the adaptive headlight system to obtain and provide data predefined as relevant to a determination of illumination requirements for the field-of-view, the data including data indicative of at least one of one or more other vehicles or a pedestrian;*

*determining illumination requirements for the field-of-view based on the data based on the sensors, including determining illumination for at least a first subsection of the field-of-view including the other vehicle or pedestrian, as indicated by the sensor data, and for at least a second subsection of the field-of-view not including the other vehicle or pedestrian;*

*determining a control strategy for controlling one or more directional light clusters in a headlight assembly to create an output headlight beam meeting the determined illumination requirements, the headlight beam spatial light distribution shaped to provide high beam illumination for a driver of the vehicle, in at least the second subsection, while mitigating glaring light illuminating at least the first subsection including detected other vehicles or pedestrians;*

Determining  
Second  
Subsections  
Illumination  
Limitation

Directional  
Light  
Clusters/So  
urces  
Limitation

Determining  
Control  
Strategy/Inst  
ructions  
Limitation

---

<sup>3</sup> For ease of reference, claim terms are italicized.

*sending control signals implementing the control strategy to an electronic control circuitry configured to operate the light-clusters; and*

*controlling the light clusters via the electronic control circuitry to collectively emit the headlight beam meeting the determined illumination requirements.*

65. *A method for generating a headlight beam in an adaptive headlight system that provides illumination to at least a portion of a field-of-view, comprising:*

*utilizing one or more sensors of a first vehicle to obtain and provide data, the data including data indicating at least a second vehicle;*

*determining illumination for at least a first subsection including the second vehicle and at least one or more second subsections, to either side of the first subsection, including determining an illumination level for the first subsection that substantially illuminates the first subsection below a predefined illuminance, and determining an illumination level for the one or more second subsections that substantially illuminates the one or more second subsections above the predefined illuminance;*

*determining control instructions for controlling one or more directional light sources included in the adaptive headlight system to achieve the determined illumination levels for at least the first and one or more second subsections; and*

*controlling the light sources to emit the headlight beam in accordance with the control instructions.*

Determining  
Control  
Strategy/Instructions  
Limitation

Directional  
Light  
Clusters/  
Sources  
Limitation

Determining  
Control  
Strategy/  
Instructions  
Limitation

(Ex.1001, claims 26 and 65.)

### **III. Level of Ordinary Skill**

A POSITA for the invention claimed in the ‘503 Patent, would have had a Master of Science Degree (or a similar technical Master Degree, or higher degree) in an academic area emphasizing electrical engineering, computer engineering, or computer science with experience or education in optics and imaging systems or, alternatively, a Bachelor’s Degree (or higher degree) in an academic area emphasizing electrical, computer engineering or computer science and having two or more years of experience in the field of optical and imaging systems. (Ex.2001, ¶¶31-33.)

### **IV. Claim Construction**

No claim construction is necessary to deny institution because Patent Owner’s arguments for denial do not hinge on the outcome of an actual controversy about claim interpretation. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed to the extent necessary to resolve the controversy”). The deficiencies of the Petition are readily identifiable without defining the bounds of any specific claim term or phrase. (Ex.2001, ¶34.)

## V. The Applied References for All Independent Claims

### A. Beam

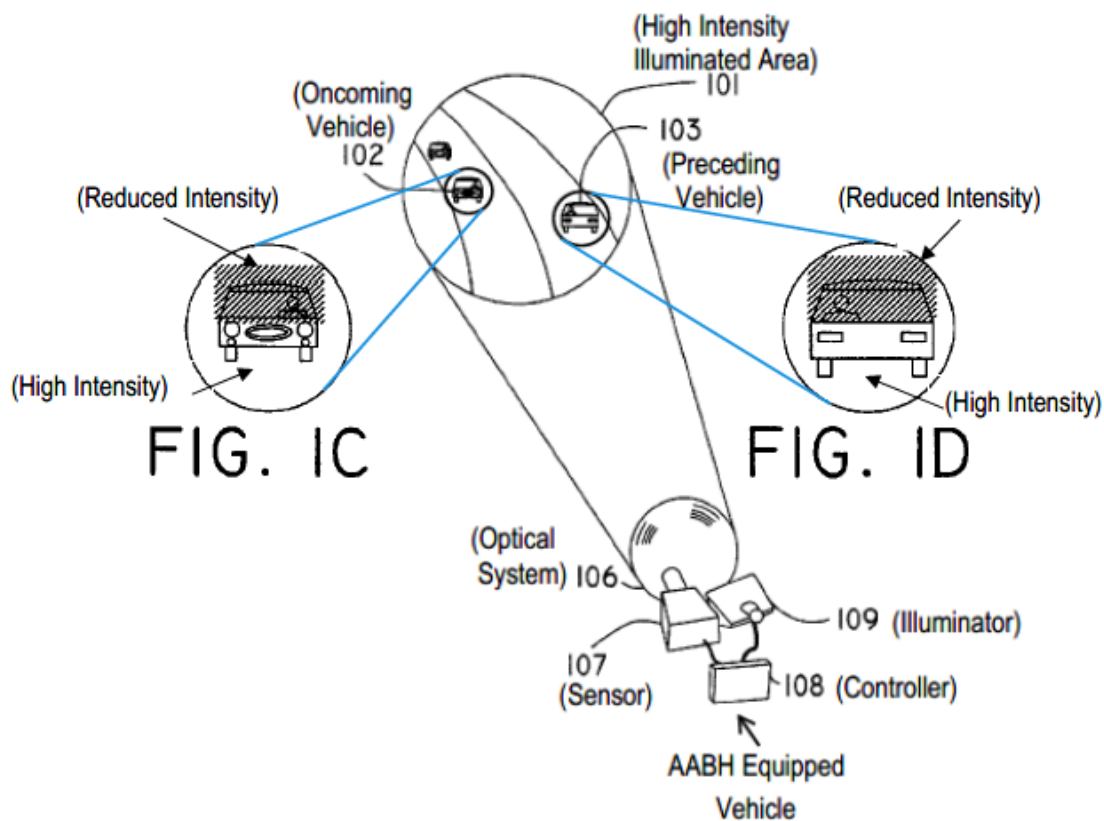
Beam discloses a complete, but generalized, Adaptive Anti-Blinding Headlight (“AABH”) system, where there is no need to differentiate among light sources, to aim the LEDs, or to provide any form of lateral illumination. (Ex.2001, ¶35.) The AABH system has a multiplicity of LED-produced microbeams that “operate at maximum intensity at all times” allowing “the driver to have the equivalent of high beam headlights or brighter on at all times, greatly enhancing the ability to see at night.” (Ex.1005, 6:11-12, 6:40-44.) Beam provides significantly reduced illumination only in those portions of the headlight beam that would otherwise dazzle or annoy other drivers. (Ex.1005, 6:40-44, 3:8-14; Ex.2001, ¶35.) This is accomplished by “darken[ing] those microbeams that would otherwise illuminate areas near to the source of the impinging beam, thus eliminating the blinding of a driver in an oncoming vehicle, while continuing to provide intense forward illumination.” (Ex.1005, 1:14-18, Claims 4, 5; Ex.2001, ¶35, emphasis added.)

Beam’s AABH system is non-mechanical and non-moveable, i.e. a system with no moving parts or mechanisms to change the direction of the light beam (“non-moveable”). (Ex.2001, ¶36.) Beam recognized that existing headlight systems operated “either as a ‘high beam’ or as a ‘low beam,’” often under manual

control, and various unsatisfactory attempts to solve this problem included “systems which attempt to control the intensity profile of the beam by using a reflector or lens shaped to control the output beam in some predetermined way; systems to move the headlamps in response to changes that occur to the automobile on which they are mounted; . . . movement of headlight beams in response to changes in the vehicle’s steering mechanism, etc.” (Ex.1005, 1:21-23, 1:63-2:5; Ex.2001, ¶36.) Beam also recognized the problem of headlamps being misaligned and illuminating unintended areas that could result in blinding of other drivers.

Beam solves the identified problems by providing a streamlined, non-moveable AABH system having a multiplicity of microbeams that “operate at maximum intensity at all times” thereby eliminating the complexity and potential failures of various prior art systems that attempt to change the beam direction or reduce overall intensity while still allowing “the driver to have the equivalent of high beam headlights or brighter on at all times, greatly enhancing the ability to see at night.” (Ex.1005, 6:11-12, 6:40-44, 6:54-56, 3:8-14; Ex.2001, ¶35.) Other than controlling intensity of individual microbeams in response to detected incoming light, Beam does not disclose or suggest directional light sources, processing incoming light to differentiate a vehicle from other light sources, or changing direction of any microbeams, nor would the AABH system benefit from such increased control complexity, as its normal mode is to “operate at maximum

intensity” to illuminate the field-of-view of the headlights, obviating a need to “add” or “increase” light anywhere. (Ex.1005, 1:15-19, 6:11-12; Ex,2001, ¶¶37.) Thus, Beam begins with a premise that a light, “operat[ing] at maximum intensity at all times,” is already maximally placing light everywhere it can, leaving nothing left to place, move, or add. (Ex.1005, 6:11-12.). Against such a fully and maximally illuminated field-of-view, Beam then concerns itself with determining where to remove light.

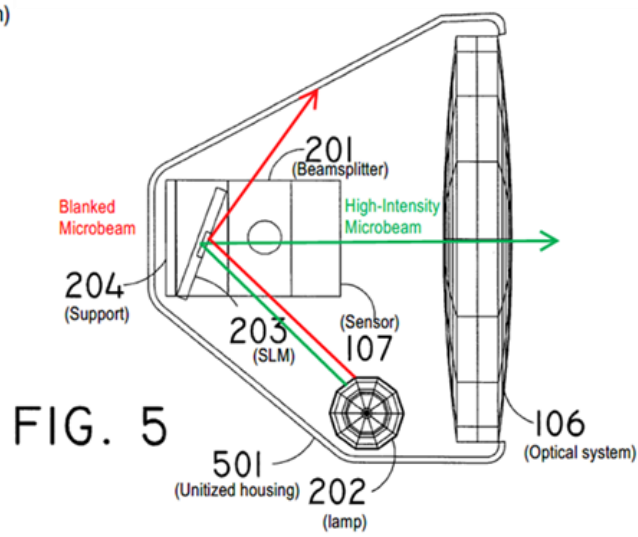
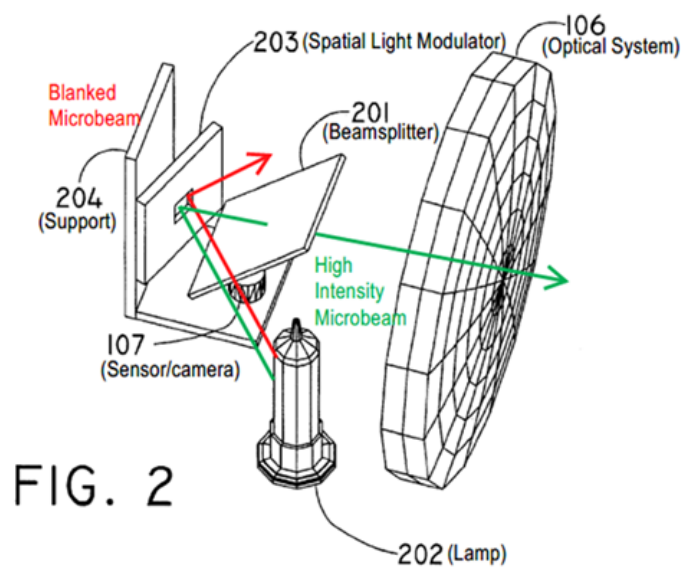


(Ex.1005, FIGs. 1, 1C, 1D, Annotated)

In the AABH system, illuminator 109 projects individually controlled narrow-angle microbeams to provide high-intensity illumination of illuminated

area 101. Incoming light—which could be associated with headlights of an oncoming vehicle 102 and/or taillights of a preceding vehicle 103, streetlights, motorcycles or other light sources—is transmitted through optical system 106 and detected by a sensor (camera) 107. Sensor (camera) 107 is boresighted with the headlight so that the field-of-view (FOV) of the camera is coincident with the FOV of the headlight beam. Data from sensor 107 is used by controller 108 to map the angular position of incoming light to a corresponding position/size of microbeams that must be significantly reduced in intensity corresponding to the shaded areas shown in Figs. 1C, and 1D. (Ex.1005, 4:9-24, 53-59, 62-64; Ex.2001, ¶38.)

Beam describes two distinct embodiments using alternative components that significantly reduce illumination intensity of individual microbeams in response to detecting incoming light. (Ex.1005, Figs. 3, 4; Ex.2001, ¶39.) However, neither embodiment discloses changing the direction of any of the microbeams. (Ex.1005, Figs. 3, 4; Ex.2001, ¶39.) Likewise, neither embodiment discloses processing signals from the incoming light sensor/camera to differentiate a vehicle from any other light sources. (Ex.1005, Figs. 3, 4; Ex.2001, ¶39.) Rather, Beam's AABH system significantly reduces intensity of microbeams associated with detected incoming light, regardless of whether the light source is a vehicle, streetlight, or any other source.

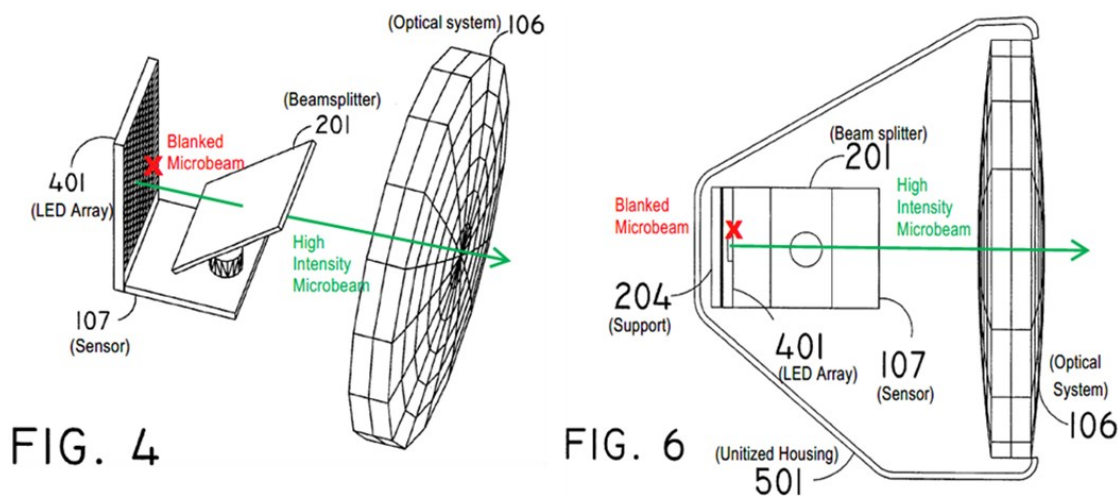


(Ex.1005, FIGs. 2, 5, Annotated)

In the first embodiment illustrated in Fig. 2 (perspective view) and Fig. 5 (top view), light from lamp 202 falls on spatial light modulator (SLM) 203, which is controlled so that the associated individual microbeams are either 1) reflected by SLM 203 at full intensity through beam splitter 201 and out through headlamp optical system 106, or 2) “blanked (attenuated by being either absorbed or deflected [by SLM 203] to an absorbing surface” so that they do not exit the headlamp optical system 106. (Ex.1005, 4:36-40, 5:65-66; Ex.2001, ¶40.)

SLM 203 does not change the direction or angular position of the headlamp beam exiting optical system 106 because the blanked microbeams are “diverted or attenuated at the source” and never exit the headlamp optical system 106. (Ex.1005, 5:66; Ex.2001, ¶41.) Furthermore, changing the direction of the microbeams exiting the headlamp optical system may result in misalignment of the

FOV of the microbeams exiting the optical system 106 relative to the FOV of sensor 107 detecting incoming light. (Ex.1005, 5:66; Ex.2001, ¶41.)



(Ex.1005, FIGs. 4, 6, Annotated)

The second embodiment is illustrated in Fig. 4 (perspective view) and Fig. 6 (top view). The second embodiment replaces both SLM 203 and lamp 202 used to generate and modulate (reduce) intensity of the microbeams of the first embodiment, with an X-Y array of light sources 401, such as an LED array, that generates the narrow-angle microbeams. (Ex.1005, 5:3-16, 5:28-31; Ex.2001, ¶42.) Microbeam blanking is accomplished by dimming selected LEDs, making the modulator of the first embodiment superfluous; it is thus omitted from the second embodiment. (Ex.1005, 5:3-16, 5:28-31; Ex.2001, ¶42.)

In operation, incoming light enters through optical system 106 and is reflected by beamsplitter 201 to sensor 107. (Ex.1005, 5:3-16; Ex.2001, ¶43.) The sensor signals corresponding to the angular position (azimuth/elevation) or the

spatial location of the detected light are mapped by controller 108 to associated microbeams to determine the size (number) and location of the LEDs within LED array 401 to be blanked or dimmed to prevent blinding/dazzling other drivers. (Ex.1005, 5:10-16; Ex.2001, ¶43.) Beam does not disclose processing by controller 108 to differentiate among various types of light sources. (*Id.*)

Beam's AABH system thus solves the various prior art problems identified without the associated complexity and is thus a complete but generalized system that eliminates moving components and potential misalignment of headlight beams, with no need to detect and differentiate between different types of light sources. (Ex.1005, 1:60-2:6; Ex.2001, ¶44.)

Notwithstanding Petitioner's assertions, a POSITA would clearly understand that Beam does not disclose 1) LEDs aimed at different angles or having controllable directionality; 2) an ability to process incoming light to differentiate or detect a vehicle relative to any other light source or detect a pedestrian; 3) the ability, or even a reason, to point or steer the headlight beam for any purpose; 4) the ability to segment the field of view ("FOV") into subsections based on the detection of a vehicle; 5) processing incoming light to minimize beams directed at "objects," or "vehicles," (in contrast to reducing microbeams directed at locations of incoming light) or 6) processing the incoming light to control LEDs to optimally and differently illuminate at least two distinct field of view subsections, one

including a detected vehicle, to mitigate glaring light illuminating the subsection including the detected vehicle. (Ex.2001, ¶46.)

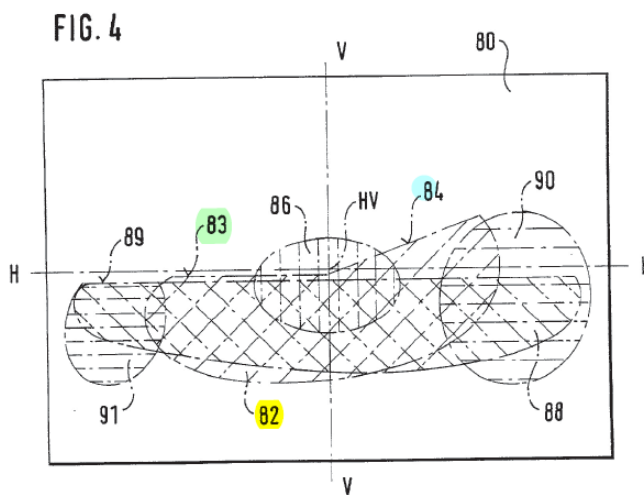
## **B. Thominet**

Like Beam, Thominet discloses an array of LEDs with independently controllable intensity. However, unlike the simpler Beam AABH system that uses the entire LED array to provide high beam illumination across the field of view (other than in areas of detected incoming light), Thominet discloses the concept of assigning different LEDs within the LED array to provide different illumination functions (low beam, high beam).

More specifically, the different illumination functions in Thominet are provided by LEDs “arranged in partial quantities in different defined partial regions of [the] matrix” and these partial regions are “operatable independently from one another.” (Ex.1006, claim 1; Abstract, [0020].) As such, Thominet improves upon prior art implementations having an LED array that has only one function (such as the Stam reference described below) by assigning the LEDs within a single array different functions e.g. to produce light of different colors (for a signal function and a headlight), a concentric high beam, a horizontally dispersed light beam with wider front illumination or to provide “one-side oriented light”. (Ex.1006, [2, 4-9, 25].) All embodiments teach LEDs arranged in functionally predefined regions actuated as a group to achieve an associated illumination function. (Ex.2001, ¶47.) While

Thominet discloses that LEDs can be arranged in one plane or distributed “over a concavely curved surface or a stepped surface,” Thominet does not suggest any advantages, disadvantages, functional differences or other reasons to select any of the possible arrangements for any particular application. (Ex.1006, claim 8, ¶0018; Ex.2001, ¶48.)

Thominet teaches using a screen 16 to create a bright-dark limit, which blocks a portion of light from light sources 10, creating illumination patterns similar to conventional high beam/low beam patterns. ((Ex.1006, [22]; Ex.2001, ¶49.)



**(Ex.1006, Fig 4, Annotated)**

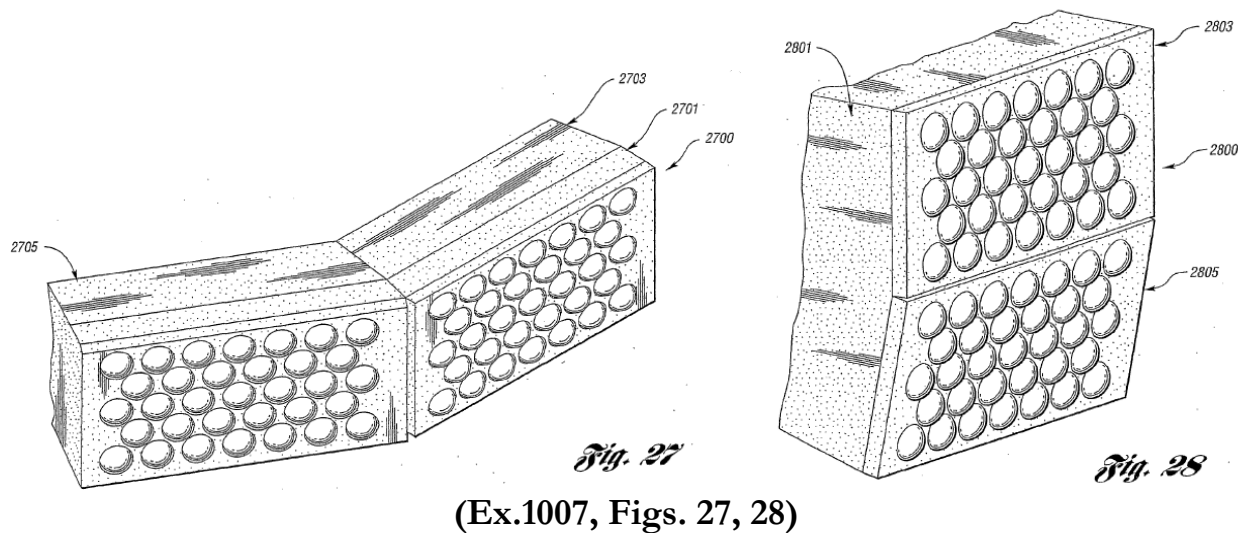
On review of Thominet, a POSITA would understand that the LEDs of the array are neither controlled as a single group (as in the recognized prior art) nor as individual light sources as in Beam’s AABH system to create the different

illumination patterns as shown in Fig. 4. (Ex.2001, ¶50.) Rather, predefined groups of LEDs are actuated depending on the associated desired functions to be operated. (*Id.*) A POSITA would also understand that by segmenting the LED array into sections with different functions, the intensity of the resulting beam is necessarily reduced relative to a maximum attainable intensity associated with actuation of the entire array of LEDs. (*Id.*) Separate from the lower attainable intensity and coarser control provided by the segmented groups, use of a screen to create a bright-dark limit blocks light generated by the actuated group of LEDs, further reducing intensity of the beam exiting the headlamp above the bright-dark limit. (*Id.*, ¶51.) A POSITA would also understand that Thominet describes conceptual arrangements and generalized automatic switching between illumination functions based on parameters such as speed, steering wheel action, wiper system, or a sensor system for recognizing counter traffic without describing any processing strategies to actuate one or more of the predefined functional groups of LEDs in response to a particular parameter to implement the different functions. (*Id.* ¶52.)

### **C. Stam**

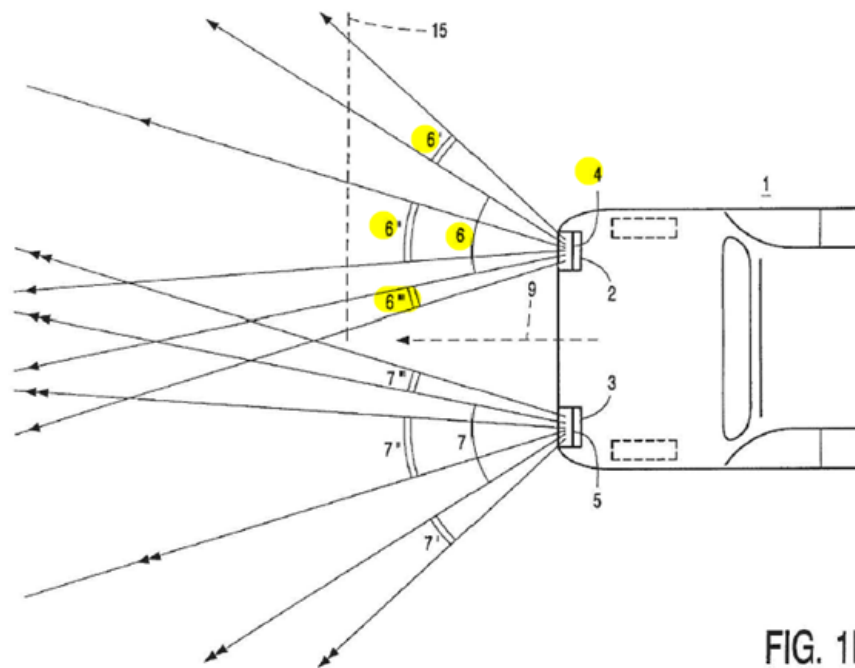
Unlike Thominet, but similar to the prior art disparaged by Thominet, Stam discloses a headlamp having single-function LED arrays with actuation of all LEDs within the array for a particular function, such as low beams or high beams. In the embodiment of Fig. 27, LED headlamp 2700 is controlled to actuate a first

LED array in a first lamp section 2703 or a second LED array in a second lamp section 2705. Similarly, in the embodiment of Fig. 28, headlamp 2800 is controlled to actuate a first LED array in a first lamp section 2803 to provide a high beam function, or a second LED array in a second lamp section 2805 to provide a low beam function. (Ex.1007, 77:30-78:9, 84:21-85:2; Ex.2001, ¶53.)



#### **D. Harbers**

Harbers discloses a headlamp system having fixed, planar LED arrays with groups of LEDs associated with different illumination functions. As depicted in Figure 1B of Harbers, a “headlamp (2;3) of a vehicle (1) has a light source (4;5) comprising a plurality of opto-electronic elements (11;12;13;14), preferably light-emitting diodes (LEDs). . . The light beam generated by the light source comprises at least two light beam segments (6, 6'; 7,7') which define the spatial distribution of the light beam.” (Ex.1011, Abstract; Ex.2001, ¶62.)



**(Ex.1011, FIG 1B, Annotated)**

As depicted in the asymmetric light distribution patterns of FIGS 3A and 3B, Harbers discloses a headlamp that provides light along multiple optical axes. (Ex.1011, FIGS 3A and 3B.) Spatial distribution of the light beam is achieved by selectively switching on and off individual LEDs and the corresponding light beam segments. (*Id.*, 7:15-19, 8:21-25; Ex.2001, ¶63.)

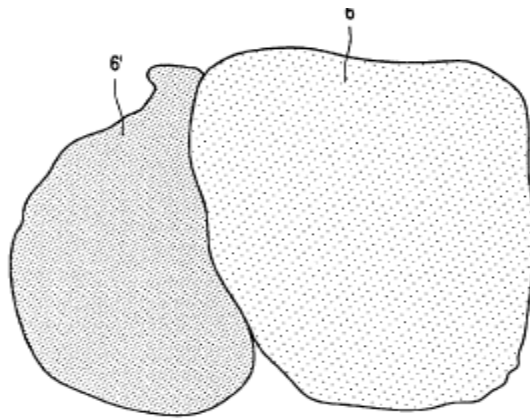


FIG. 3A

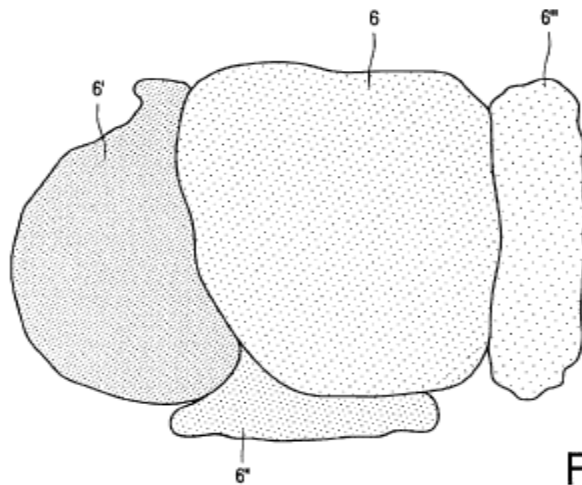


FIG. 3B

**(Ex.1011, FIGS 3A, 3B)**

Harbers identifies specific parameters that can be used to define the desired spatial distribution of the light beam: 1) velocity of the vehicle (Ex.1011, 3:28-34, Ex.2001, ¶64.); 2) the rotational position of the steering wheel of the vehicle (Ex.1011, 4:5-14; Ex.2001, ¶65.); 3) weather conditions (Ex.1011, 4:16-17.); and 4) manual adjustment by the driver. (*Id.*, 4:24-25.) Apart from the above-identified inputs that could be used to define the spatial distribution of the light beam,

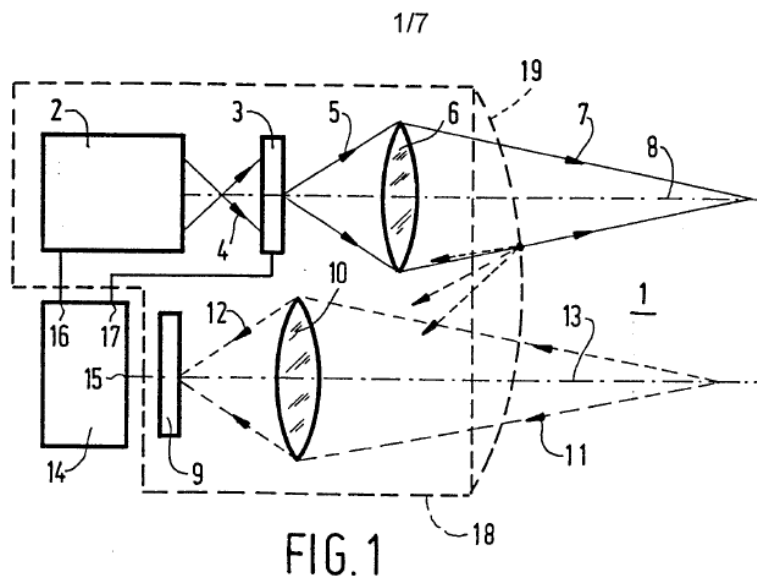
Harbers provides no control teachings related to sensors or map data and thus no ability to control the LEDs to illuminate a desired region. (Ex.2001, ¶66.)

**E. Karlsson**

Karlsson discloses a headlight system using fixed LEDs having individually controllable intensities to create “spotlight beams” providing intense forward illumination brighter than low beams or conventional dipped headlights. Spotlight sensors interspersed with the LEDs provide anti-blinding functionality by turning off LEDs corresponding to detected light, “whereby the field of view of the light-sensitive sensors and the illumination field of the light beam to be emitted, will coincide.” (Ex.1010, 3:29-31, Ex.2001, ¶67.) Like Beam, Karlsson’s LED array is a fixed planar array that does not include LEDs aimed at different angles relative to the vehicle. (Ex.2001, ¶68.) Likewise, the only individually controllable characteristic of the fixed LEDs is their intensity. Unlike Beam but similar to Thominet, Karlsson assigns groups of LEDs within a single LED array to associated lighting functions, such as a dipped beam, main beam, etc. (*Id.*)

In particular, Karlsson discloses “a lighting device 1 . . . [with] lighting means in the form of a light source 2 and light modulator means 3.” (Ex.1010, 8:10-12.) “The light source 2, the light modulator means 3 and the lens 6 are arranged on an optical axis 8” to form light 5 “into a desired emitted light beam 7.” (Ex.1010, 8:17-18.) The system includes “sensor means consisting of a light-

sensitive sensor 9 and a further lens 10 disposed on the side of sensor 9 that is exposed to the incident light, such that incident light 11 on the lens 10 is formed into an incident light beam 12 on light-sensitive sensor 9.” (*Id.*, 8:19-23; Ex.2001, ¶69.)



(Ex.1010, FIG 1)

“The light modulator means 3 are controlled by the control means 14 in such a manner that the light 4 emitted by the light source 2 is processed into a light beam 7 having a desired pattern and intensity” that is “determined on the basis of the light 11 that is detected by the light-sensitive sensor 9 via the further lens 10.” (Ex.1010 at 9:3-8.) Controlling “the pattern and the intensity of the light beam 7” of a headlight “in such a manner that no light at all or light having a low intensity is emitted in those directions from which light is detected by the light-sensitive sensor 9” prevents “glaring or blinding of oncoming traffic.” (Ex.1010, 9:19-23;

Ex.2001, ¶70, emphasis added.) “The sensor means and the lighting means according to the present invention can be advantageously combined into a single integrated lighting device, whereby the field of view of the light- sensitive sensors and the illumination field of the light beam to be emitted, will coincide.” (Ex.1010, 3:27-31.)

With reference to Figure 6, Karlsson discloses “a light beam 33 which is composed of separate, spatially distributed . . . spotlight beams 34.” (*Id.*, 13:31-32.) The “spotlight beams 34 can be obtained, for example, by using a light source 2 which is composed of a grid of separate light sources, such as LEDs, which can preferably be controlled either individually or in groups.” (*Id.*, 14:1-4, emphasis added; Ex.2001, ¶72.)

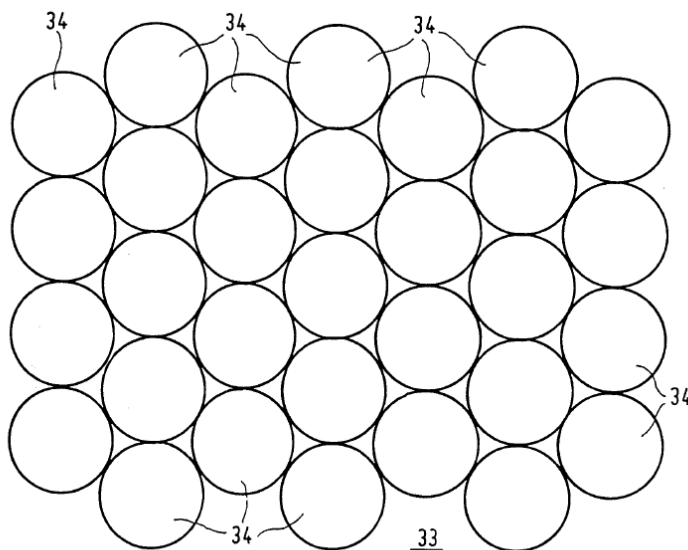


FIG. 6

(Ex.1010, FIG 6)

“[C]ontrol means 14 are preferably arranged to switch the incident light 5 on the lens 6 periodically on and off” and detecting incident light with the sensor 9 “during the time that the light 5 is off” avoids “reflected light being scattered by the cover glass 19 as indicated by dashed arrows.” (Ex.1010, 9:27-33; Ex.2001, ¶71.) Control means 14 are also illustrated and described with respect to Figures 14-15 below.

Referring to Figure 14, “a number of the spotlight sources are grouped in specified levels” where “non-shaded spotlight sources indicated at D provide the dipped light function in accordance with existing vehicle headlights, whilst the single-shaded spotlight sources indicated at I provide the main-beam light function of existing vehicle headlights.” (Ex.1010, 19:22-27.) Furthermore, “[t]he double-shaded spotlight sources indicated at D/I are both operative as dipped and main-beam lights.” (*Id.*, 19:27-28; Ex.2001, ¶73.)

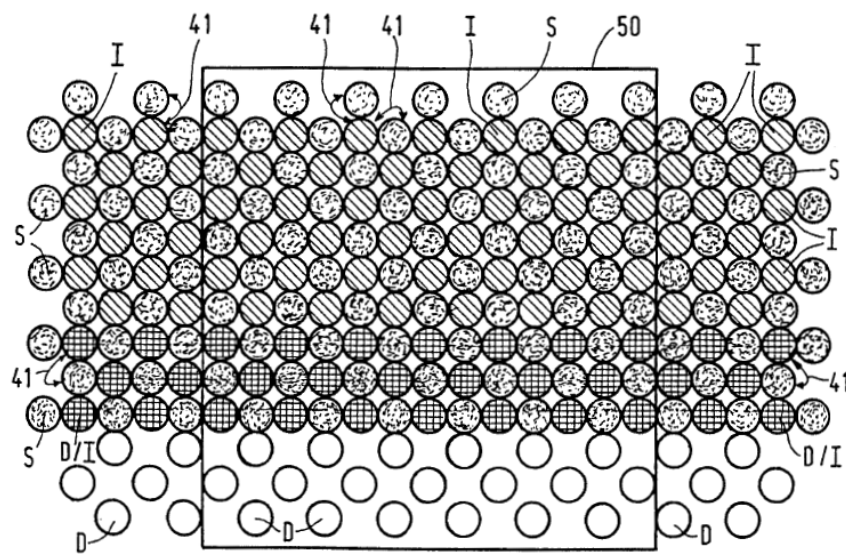


FIG. 14

(Ex.1010, FIG 14)

The “emitted light beam 50 is represented as a window which can shift in the plane of the drawings from the left to the right and from the top to the bottom, if desired, and vice versa, and which may vary as regards its shape and dimension in dependence on the desired pattern and direction of the beam” (Ex.1010, 19:29-33, emphasis added.) However, any shifting of the emitted light beam is constrained by the number and arrangement of LEDs within the LED array and is not capable of changing direction of the light emitted by the LED array. (Ex.2001, ¶76.)

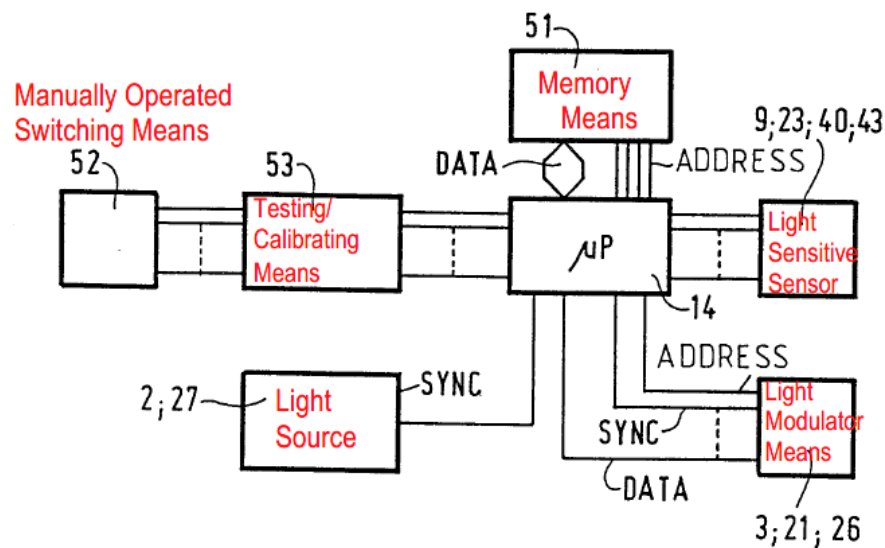


FIG. 15

(Ex.1010, FIG 15, Annotated)

As shown in Figure 15, “testing and/or calibrating means 53 are provided, which enable automatic adjustment of the lighting device according to the invention at a calibration station and storage in the memory means 51, in such a manner that a light beam [50, Fig. 14] is emitted which is adapted to the respective national and/or international regulations, as is schematically shown in Figure 16.” (Ex.1010, 20:16-21.)

In addition to the interspersed spotlight sensors, an inclination sensor may sense the angle of inclination of the car with respect to the road surface so that the emitted light beam is adapted to respective regulations at all times. However, Karlsson is silent with respect to how the control means 14 coordinates control of the LEDs based on signals from both the spotlight sensors and the inclination

sensor. (Ex.2001, ¶78.) Similarly, a direction sensor connected to the steering wheel may be provided “for determining when the car 56 is taking a bend, so that the light beam 7 can be adapted to prevent the traffic on the other side of the road from being blinded as much as possible.” (Ex.1010, 20:30-32; Ex.2001, ¶78.) However, Karlsson is also silent with respect to how the control means changes intensity of LEDs based on the direction sensor as opposed to the spotlight sensors detecting light from traffic on the other side of the road. (*Id.*)

On review of Karlsson in its entirety, a POSITA would understand that Karlsson does not disclose: 1) LEDs aimed at different angles relative to the vehicle; 2) processing detected light to identify subsections within the field of view including a detected vehicle; or 3) controlling the emitted beam to aim illumination below a predefined illuminance to the subsection including the vehicle while providing illumination above the predefined illumination to another subsection. (*Id.*, ¶79.)

## **VI. Institution Should Be Denied Because No Ground Has a Reasonable Likelihood of Success**

Petitioner failed to meet the requisite burden of showing a reasonable likelihood of prevailing on any of the Grounds for at least the following reasons: the Beam reference in Grounds 1A and 2A and the Karlsson reference in Ground 8 advanced as anticipatory references, fail to teach the Determining Second

Subsections Illumination Limitations, the Directional Light Clusters/Sources Limitations and the Determining Control Strategy/Instructions Limitations in all Challenged Claims.

The obviousness arguments advanced in Grounds 1B-1C, 2B-2C and Ground 8 also miss the mark; all proffered combinations suffer from a lack of motivation to combine. Petitioner's rationale for combining references: 1) renders the primary reference unsatisfactory or inoperable, 2) is impermissibly vague regarding how the references would be combined, 3) is in actuality disparaged or discouraged when the references are considered in their entirety and 4) suffers from hindsight bias as to why a POSITA would combine the applied references.

**A. All Grounds: The Proffered Combinations Fails to Teach the Determining Second Subsection Illumination Limitations and Determining Control Strategy/Instruction Limitations in Claims 26 and 65**

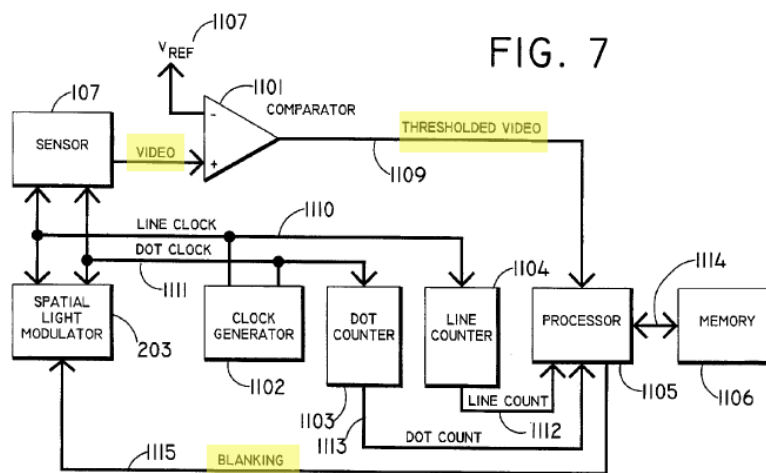
In all Grounds, the combinations lack disclosure of systems that employ methods of determining illumination requirements: 1) *for at least a second subsection of the field-of-view not including the other vehicle or pedestrian*, per [26.5] and 2) *for at least one or more second subsections, to either side of the first subsection*, per [65.4]. Rather than providing evidence that the applied references determine illumination requirements for the sections that *don't include* a vehicle and/or pedestrian, Petitioner simply points to operating illumination states.

Providing light is however not the same as *determining illumination requirements*. By conflating the **provision** of illumination—which is addressed in [26.10] and [65.10]-- with the **determination of illumination requirements** for the second subsection, Petitioner impermissibly removes the Determining Second Subsection Illumination Limitations in [26.5] and [65.4] and the corresponding Determining Control Strategy/Instruction Limitations in [26.8 and 65.9] and Determining Illumination Level Limitation in [65.7].

Petitioner's Grounds 1 and 2 argument for the [26.5] and [65.4] limitations is restricted to a single sentence and disconnected from the claim language: "Beam discloses determining illumination for a second subsection (without the vehicle) by **providing** '*higher brightness beam* in the areas which *do not dazzle* the drivers ahead' and 'the area...that would dazzle the driver will be darkened, *while maintaining f[u]ll intensity elsewhere*.' EX1005, 3:19-24, 2:59-3:3, FIGS. 1, 1C-1D, 7, 6:40-44, 6:11-12, 1:5-18; EX1003, ¶¶154-156." (Petition at 25, 43, emphasis added.) The mere provision of high intensity beams in the areas that "do not dazzle drivers ahead" does not, without more, equate to a method for determining the illumination requirements for the second subsections that don't include a vehicle/pedestrian.

Reading between the lines, Petitioner seems to incorrectly assume that by illuminating all areas where light is not detected, the Beam system must have

engaged in the step of determining illumination requirements for the second subsections. Petitioner's assumptions lack evidentiary support; Beam neither defines second subsections based on the absence of vehicles/pedestrians nor determines illumination requirements for the second subsections. Indeed, Petitioner's own citations contravene their position. Figure 7 of Beam illustrates how the system detects light and utilizes a pixel-by-pixel approach through its dot and line counters to determine "the locations to be blanked" and "the appropriate pixels to be reduced in intensity." (Ex.1005, 5:46-54.) Everywhere else, even according to Petitioner's own argument, illumination is merely **maintained** at the base "maximum" state at which it always operates when not intentionally dimmed.



(Ex.1005, FIG 7, Annotated)

Because Beam determines which pixels to block based on the detection of light (as opposed to the detection of a vehicle), it has no ability or reason to 1)

collect data on detected vehicles or pedestrians in the field of view, per [26.2 and 65.2]; 2) define second subsections based on the absence of vehicles/pedestrians and determine illumination requirements/illumination for second subsections that exclude vehicles or pedestrians, per [26.5 and 65.4]; and 3) determine control strategies/instructions for subsections that exclude vehicles or pedestrians, per [26.8 and 65.9].

In sum, Beam makes no determination about sections that do not correspond to detected light. (Ex.2001, ¶87.) In reference to claims 26 and 65, Beam fails in both its inability to determine illumination requirements for a second subsection not including the detected vehicle or pedestrian as well as its inability to differentiate between a subsection that does or does not include a vehicle or pedestrian. (*Id.*) Yet Petitioner never addresses these shortcomings – it never explains how Beam would discern between a section that includes a vehicle or pedestrian compared to those that do not, given that Beam merely detects light (which can come from any source and itself has no direct correlation to either a vehicle or pedestrian). Petitioner also never explains what portion of Beam, expressly or implicitly, **determines the illumination requirements** for the second subsection -- or what those requirements would be, how they would be determined, etc. Instead, Petitioner simply advances an argument that amounts to, without further explanation: the output of Beam includes light where there is not a vehicle

which is different from light where there is a vehicle, *ipso facto*, the claim limitations are met. (*Id.*)

Petitioner's Ground 8 argument similarly misses the mark. For the [26.5 and 65.4] limitations—directed to determining illumination for second subsections **excluding** vehicles—Petitioner's argument is yet again disconnected from the claim language:

Karlsson discloses “pattern and...intensity are automatically adjusted...permitting a light intensity...generally higher than that of conventional dipped headlights.” EX1010, Abstract, FIGS. 3, 14-15, 19:26-33, 2:7-9, 14:26-30, 5:16-32, 9:9-17; EX1003, ¶486. Karlsson thus determines illumination for a different subsection outside of the detected vehicle (e.g., high intensity area to either side of first subsection). EX1010, 5:16-23, 9:9-17, 12:19-24, FIGS. 14-15; EX1003, ¶¶486-487

(Petition at 95; Ex.2001, ¶88.)

When the above quoted sections are reviewed in their entirety and not modified through ellipses, they establish that Karlsson adjusts the illumination pattern and intensity responsive to light detection, in a manner very similar to Beam, but, by contrast, with even fewer operational details (Ex.2001, ¶89.) As before, Petitioner's citations are devoid of any teachings for **determining illumination for any sections that do not include a vehicle**. The Petition fails to

explain how Karlsson determines whether or not detected light corresponds to a vehicle and, relatedly, how to determine a section that does not include a vehicle.

Once again, Petitioner improperly points to the mere provision of light to satisfy the [26.5 and 65.4] limitations requiring *determining illumination* for second subsections that exclude a vehicle and the related step of *determining an illumination level* for the second subsections in [65.7-65.8]. (Petition at 95, 113.) In so doing, Petitioner impermissibly reads out the [26.5 and 65.4] Determining Second Subsections Illumination Limitations and [65.8] Determining Second Subsections Illumination Level Limitations, conflating these determining steps with the [26.10 and 65.10] limitations directed to controlling the light clusters/sources to emit the headlight beam in accordance with the illumination requirements/control instructions.

Because Karlsson, like Beam, determines which LEDs to switch off based on the detection of light by sensors, it has no ability or reason to 1) obtain sensor data on detected vehicles or pedestrians, per [26.2 and 65.2] and determine *illumination requirements for the field-of-view* based on the obtained data per [26.3]; 2) define and determine *illumination for second subsections that exclude a vehicle* in [26.5], which are located on either side of the first subsection that includes a detected vehicle per [65.3-65.4]; and 3) determine an illumination level for the second subsections, *per [65.7-65.8]*. (Ex.2001, ¶91.) Rather than engaging

in the step of determining illumination requirements for second subsections, Karlsson simply relies on nearby interspersed sensors to determine which LEDs to shut off. It bears emphasis that, since Karlsson is directed to the limited “purpose of accurately measuring ambient light and light on oncoming traffic” to improve detection capability and reliability, it lacks any details regarding whether/how a controller forms the desired light patterns. (Ex.1010, [7-21]; Ex.2001, ¶91.) Nonetheless, Petitioner confers Karlsson with a myriad of teachings that are wholly absent.

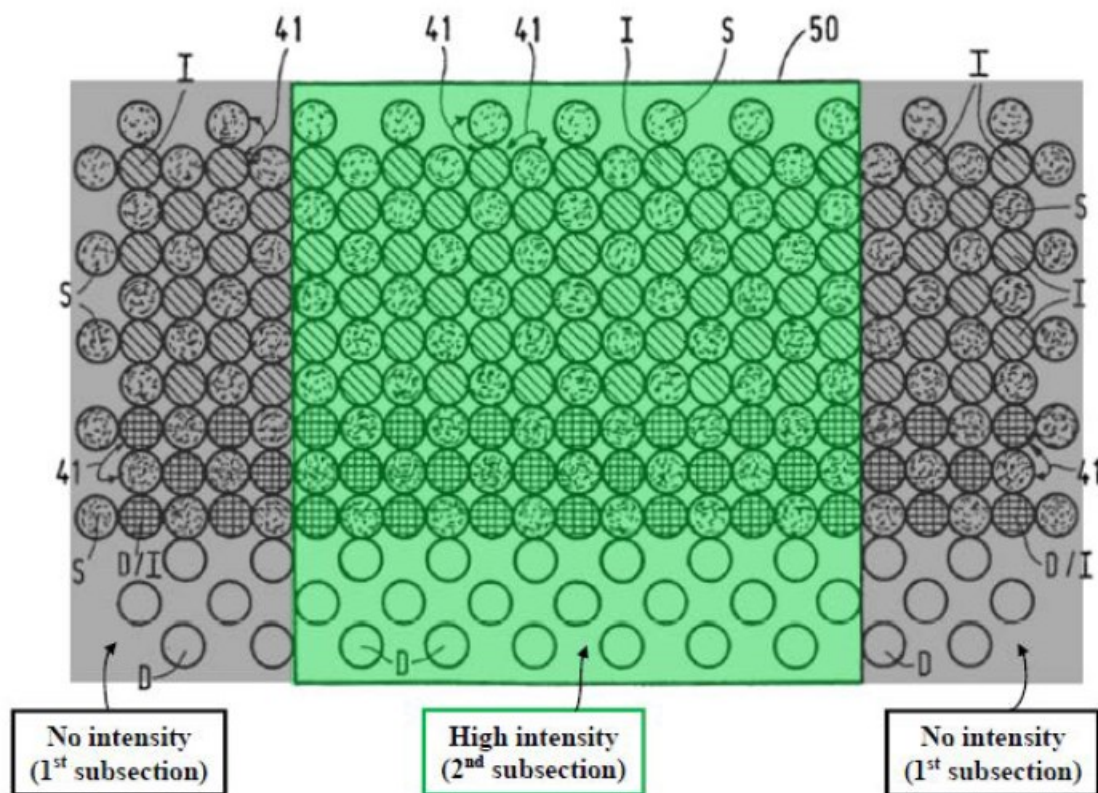
In an attempt to map the claims onto Karlsson, Petitioner takes great liberty in assigning specific functions to the controller, despite the utter absence of such teachings. By way of example, Petitioner states: “Karlsson discloses ‘incident light 11 on the light-sensitive sensor 9 . . . is processed into an electrical control signal on input 15 of the control means 14.’ [citations omitted] Thus, incident light data from the sensor determines ‘illumination requirements for the field of view.’” (Petition at 91.)

Since the sensor can’t determine “illumination requirements for the field of view,” but can only provide inputs, Petitioner seems to be implicitly arguing that control means 14 provides this functionality. (Ex.2001, ¶93.) It does not. (Ex.2001, ¶93.) However, in Karlsson, control means 14 is only ascribed two

functions:1) “to switch the incident light 5 on the lens periodically on and off . . .[so] the light detected by the sensor 9 is measured and processed without the measurement by the sensor being affected” (Ex.1010, 9:27-33.); and 2) “the electric signal fed to the input 15 of the control means 14 by the light-sensitive sensor 9 is processed by the control means 14 into output signals at outputs 16,17 thereof, so as to control the lighting means 2, 3 in such a manner that a light beam 7 having a desired pattern and a desired intensity is emitted.” (Ex.1010, 9:9-17.)

Apart from identifying the two controller functions and specifying that the pattern and the intension of the light beam 7 can be “controlled in such a manner that no light at all or light having a low intensity is emitted in those directions from which light is detected,” Karlsson offers no other details regarding how the controller generates the desired pattern and intensity. (Ex.1010, 9:19-22; Ex.2001, ¶94.) Thus, contrary to Petitioner’s arguments for [26.3], Karlsson fails to teach a system that determines ‘illumination requirements for the field of view.’ (Petition at 91; Ex.2001, ¶94.) The same evidentiary gap exists in the Petition for **all** of the claimed *determining* steps, *inter alia*, in [26.2 and 65.2], [26.3], [26.5], [65.3-65.4]; and [65.7-65.8].

As part of its unsupported and confusing argument, Petitioner relies heavily on its own annotated version of Figure 14—referring to it 17 times—to demarcate two “No Intensity” “first subsections and a “High Intensity” second subsection:



**(Petition at 80, 91, 94-95, 97, 99, 102-103, 105, 107-108, 110, 112, 114, 116, 118 and 139.)**

Notably, Petitioner's version of Figure 14—specifically regarding Petitioner's added annotations for the claimed first and second subsections—is not taught by Karlsson. (Ex.2001, ¶96.) As detailed below, Petitioner neither offers support for its “no-intensity” first subsection demarcations nor the conclusions that it draws therefrom.

When the maze of citations are unpacked, the Petition provides no support for its conclusion that “Karlsson determines illumination for a different subsection outside of the detected vehicle (e.g., high intensity area to either side of first

subsection).” (Petition at 95.) Indeed, Petitioner’s own conclusions are not even supported by Petitioner’s homemade version of Figure 14, which actually shows something different from what Petitioner argues. Petitioner argues that there is a high intensity second subsection to either side of the first subsection, but the modified Figure 14 shows first subsections to either side of the high intensity second subsection. If Patent Owner or the Board is supposed to assume there is an additional high intensity subsection not shown, Petitioner never explains that this would exist, let alone why or how it would exist. Further, Karlsson lacks any such teaching, suggestion or recitation. (Ex.2001, ¶97.)

Addressing each failing individually, Karlsson fails to support Petitioner’s Figure 14 “no-intensity” first subsection demarcations; at best, Karlsson teaches that certain LEDs within the first subsections would be switched off. In Karlsson, each LED functions independently based on indication of detected light from a nearby sensor. (Ex.2001, ¶98.) Specifically, spotlight sensors (S) interspersed with the LEDs (I) provide anti-blinding functionality by turning off LEDs corresponding to detected light. (Ex.1010, 3:29-31; Ex.2001, ¶98.)

Karlsson is unclear as to which or how many LEDs are turned off, and there are certainly no teachings of a “section” including a vehicle and/or other “sections” not including a vehicle. (*Id.*, ¶99.) Karlsson’s teachings are further muddled, as it assigns groups of LEDs within a single array to associated lighting functions and

doesn't explain when/how those associated lighting functions are integrated with the anti-blinding functionality. (Ex.1010, 19:22-27; Ex.2001, ¶99.)

Finally, Petitioner's own Fig. 14 version contradicts Petitioner's argument that "Karlsson determines illumination for a different subsection outside of the detected vehicle (e.g., high intensity area to either side of first subsection)."

(Petition at 95.) In the Petitioner-created version, Fig. 14 includes two no-intensity first subsections to either side of a high intensity "second subsection." This is neither congruent with what Petitioner argues Karlsson teaches, nor claim 65, the latter claiming that the first subsection that includes the lower illumination is *between* the second subsections of higher illumination. Petitioner's modified Fig. 14 places the first and second sections in positions neither claimed by Patent Owner nor otherwise argued by Petitioner.

Even assuming Petitioner's version of Fig. 14 was supported by Karlsson, the "no-intensity" first subsections on either side of a "high intensity" second subsection, are the opposite configuration from the one called for by limitation [65.4]. Limitation 65.4 requires *determining illumination for second subsections to either side of the first subsection*, but where the first subsection of diminished illumination is bounded on either side by second subsections that are *more brightly* illuminated than the area between them (not unlit, as shown).

Thus, Petitioner's arguments fail to establish how Karlsson teaches the

Determining Second Subsections Illumination Limitations in [26.5 and 65.4] and by extension, the interrelated Determining Second Subsections Illumination Level Limitation in [65.7] and Determining Control Strategy/Instructions in [26.6 and 65.9].

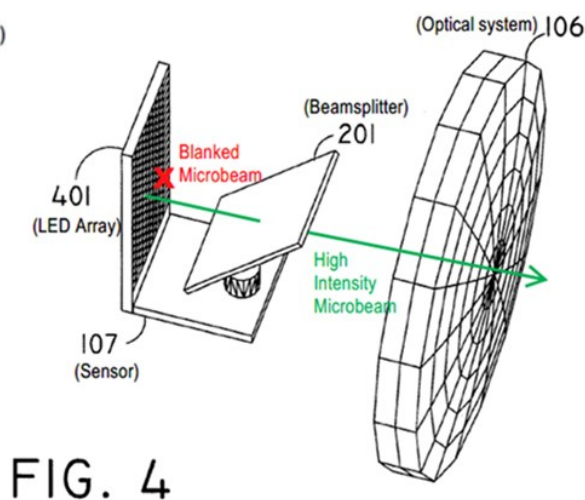
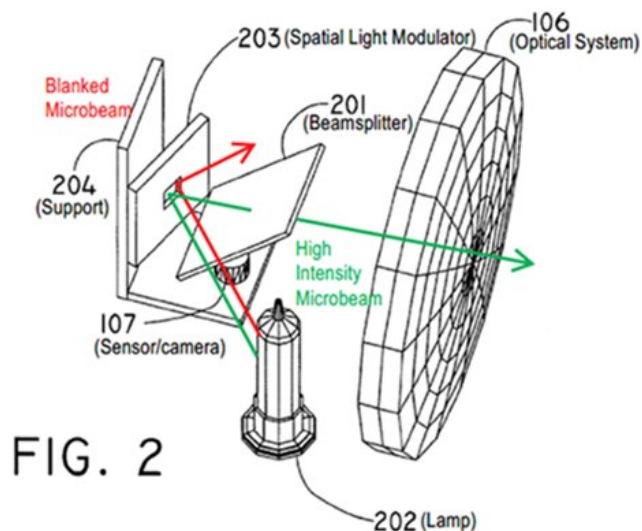
When reviewed in context, the applied references lack any teachings to support Petitioner's positions on interrelated limitations [26.3-26.8] of claim 26 and likewise the [65.4], [65.7] and [65.9] limitations of claim 65. As such, Petitioner has failed to meet its burden on all Grounds.

**B. Grounds 1A and 2A: Beam Does Not Teach The Directional Light Clusters/Sources Limitations**

In Grounds 1A and 2A, to satisfy limitations [26.6]/[65.9], Petitioner improperly asserts “[e]ach microbeam is a directional ‘cluster’ or ‘source’ having its own independent angular position, that combines to form the headlamp beam so Beam’s lamp 202 and SLM 203 (*see* Figure 2) form at least one directional light cluster/source to provide illumination in desired subsections.” (Petition at 8-9 and 29) Tellingly, Petitioner takes two distinctly contradictory positions to satisfy the Directional Light Clusters/Sources Limitations — arguing on the one hand for purposes of claim construction that the light source “includes any headlamp light source” and then undermining its own construction to assert that “each microbeam is a directional ‘cluster’ or ‘source’” Petition at 7-8. Notwithstanding Petitioner’s

machinations, a reflected **beam** of light cannot constitute *a light source*. (Ex.2001, ¶104.)

The foundation for Petitioner’s house of cards, is the fictional narrative that Beam’s LED array embodiment in Figure 4 has “the same functionality as lamp 202 and SLM 203,” in the Figure 2 embodiment—essential to Petitioner’s argument that “Beam’s LED array also includes directional light clusters/sources. . . . “--independently controllable angular microbeam clusters/sources—that ‘create an output headlight beam meeting the determined illumination requirements’/‘achieve the determined illumination levels’ as recited in [26.6]/[65.9].” (Petition at 9-10; Ex.2001, ¶105.)



(Ex.1005, FIGs. 2, 4, Annotated)

In reality, as detailed in Section V.A, *supra*, the lamp 202 and SLM 203 in the Figure 2 embodiment is replaced in the Figure 4 embodiment with an LED array 401 having LEDs fixed in place — i.e., with no ability to provide independent angular positioning. (Ex.2001, ¶106.) Beam’s AABH system is thus incapable of operating as Petitioner contends. (*Id.*)

Because Beam’s **blanking** of selected microbeams from the LED array forming the output beam is controlled in response to incoming light, and specifically the location of incoming light relative to the corresponding microbeams generated by the LED array, Beam maps the angular position of incoming light with each LED in the X-Y matrix to facilitate selective darkening, not to control or change the angular position of each LED, as Petitioner contends. (Ex.2001, ¶107.) “The output and reflected wavefronts are used to determine range and angular position of the vehicles ahead in the usual manner. The output drives controller 108, of FIG. 1, which uses range data to determine size and azimuth/elevation data to determine the position of the area of the microbeams to be dimmed.” (Ex.1005, 4:62-5:1; Ex.2001, ¶107.) Indeed, Beam is incapable of controlling the angular position of each LED—the LEDs are fixed in place within the X-Y matrix. (Ex.1005, 5:3-16; Ex.2001, ¶107.)

Petitioner improperly relies on two separate embodiments of Beam to meet the Challenged Claims, without showing how a POSITA would have thought that

these embodiments and teachings are the same or interchangeable. *Facebook, Inc. et al v. Uniloc USA, Inc. et al*, IPR2017-01524, Paper 7 at 19-20 (December 4, 2017) (denying institution stating that Petitioner “inconsistently maps the recited [claim element] to different elements of [the prior art] within its proffered analysis of [the claims].”)

Petitioner exposes the fallacy of its own arguments in IPR2023-00315, when it admits that “blanking” in the LED embodiment is achieved by turning off the LEDs and not through the spatial light modulator:

This “blanking” means that the microbeams are “attenuated by being either absorbed or deflected to an absorbing surface” by spatial light modulator 203. (Ex.1005, 4:35-40.) When LEDs are used as the microbeam source, this means that the LEDs would be turned off as the equivalent to being ‘absorbed’ by the spatial light modulator. EX1003, ¶193.

(IPR2023-00315 at 47.)

Petitioner also repeatedly notes, and even relies on, the fact that when an LED array is present, it actually **replaces** the spatial light modulator that would exercise any degree of control over the microbeams. (*See e.g.*, Ex.2005 at 43. “Beam’s LEDs have the same functionality as lamp 202 and SLM 203.”) Thus, to the extent that Petitioner is relying on the presence of the LED array to satisfy claim limitations, which is the case in every argument presented, Beam expressly

has replaced the SLM in every such instance, and therefore any argument predicated on the presence of the SLM is not supported by Beam.

Petitioner seemingly advances this fictional narrative to recast Beam as a “directional light source with independently controlled angular positions” that can readily be combined with Thominet, by creating a Frankenstein embodiment expressly outside the teachings of Beam, and even outside positions Petitioner repeatedly espouses. (Petition at 10.)

**C. Grounds 1B-1C and 2B-2C: Even Combined, the Applied References Fail to Teach the Directional Light Clusters/Sources Limitations**

In Grounds 1B -1C and 2B-2C Petitioner conveniently hedges its arguments to add the teachings of Thominet, in case “Patent Owner argues, incorrectly, that Beam does not disclose [26.6]/[65.6]and [65.8].” (Petition at 10, 30, 40.) This theme is repeated in Ground 8 with respect to the teachings of Karlsson and Harbers. In reality, Petitioner knows that the primary references fail to disclose the Directional Light Clusters/Sources Limitations in [26.6] and [65.6]. The addition of Thominet in Grounds 1B-2B and 1C-2C is of little use; the combination still fails to disclose the Directional Light Clusters/Sources Limitations.

In a convoluted Ground 1B-2B argument, Petitioner seems to combine Beam with the “control technique (software implementation)” in Thominet: “using multiple beam regions (clusters) for different functions.” (Petition at 11, 12.) More

specifically, Petitioner proposes modifying Beam's software: "A POSA would have had a reasonable expectation of success combining Beam and Thominet, for example, by simply modifying software instructions in memory of Beam's controller/processor to organize Beam's array of microbeams into multiple directional beam regions for different functions." (Petition at 14.) However, because microbeams do not constitute a light source, per Petitioner's own admission, angularly positioned microbeams do not constitute *directionally controlled light sources*, as required by the Directional Light Clusters/Sources Limitations in all Challenged Claims. (Ex.2001, ¶113.)

Finally, for its third and also futile effort, Petitioner attempts a hardware combination— "Thominet's semiconductor light sources 10 on curved surface 12 (arranged in different beam regions 22, 24, 26, 28, *see* EX1006, ¶¶17-20, 23-26, FIGS. 1-2, 5-7) into Beam's system (with flat array of light sources 401)." (Petition at 14.) As Petitioner correctly points out, in Thominet "semiconductor light sources 10 arranged on curved surface 12 provide beam regions 22, 24, 26, 28 for different driving situations." (Petition at 15.) What Petitioner fails to mention however, is that each of the beam regions are predefined for specific functions and controlled as a unit—rendering Thominet fundamentally incompatible with Beam. (Ex.2001, ¶114.) As detailed further in section VI.(D.), *infra*, Petitioner also fails to present a plausible rationale to combine. Since, a "[d]etermination of

obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention,”

Ground 1C also fails. *See, ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998) (emphasis added.)

**D. Ground 8: Neither Karlsson Nor the Combination of Karlsson and Harbers Teach the Directional Light Clusters/Sources Limitations**

Petitioner can’t decide whether or how various limitations of the Challenged Claims are found in Karlsson or Harbers or some combination thereof left to the imagination of the reader. To satisfy the Directional Light Clusters/Sources Limitations [26.6]/[65.9], Petitioner asserts that Karlsson discloses every feature of claims 26-31, 65, and 68-69, but if not, then Harbers discloses [26.6]/[65.9] and a POSITA would have been motivated to extract them from Harbers and insert them into Karlsson (Petition at 78.)

Even though Petitioner again incorrectly suggests that beams of Karlsson can be light clusters or sources, Petitioner also contends that the sources can also constitute LEDs in an array. Problematically, however, the array is a flat array, never taught to have the directionality required in 26.6 or 65.9. Recognizing this, Petitioner disingenuously tries to manipulate the teachings of Karlsson related to the light modulator means 3 – stating that “*light modulator means 3 advantageously can be switched to . . . given directions.*” (Petition at 78, 116-117.)

This is an intentional omission and obscurement of essential context of the sentence through use of ellipses. Petitioner tries to change the meaning of the entire teaching to relate to using the modulator to control emission instead of detection.

Contrary to this misrepresentation of Karlsson as teaching a “directional light source”, this quote is related to detecting incoming light when the light sensor is positioned behind the light modulator means 3: **“If the light modulator means 3 are arranged to receive incident light in front of the sensor 23, the light modulator means 3 advantageously can be switched to detect light by the sensor 23 from a given direction or given directions.”** (Ex.1010, 11:25-28.)

The Petition is also unclear as to how **“the combination of Karlsson’s spotlight beams form *at least one directional light cluster/source* to provide illumination in desired subsections”** to satisfy either explicitly or implicitly [26.6]/[65.9]. (Petition at 78.)

Perhaps recognizing the untenable contortions of Karlsson to meet [26.6]/[65.9], Petitioner punts and provides a conclusory assertion that if Karlsson doesn’t disclose these limitations “to avoid doubt, Karlsson is combined with Harbers, for [26.6] and [65.9] rendering the claims obvious” relying solely on Dr. Jiao’s declaration ¶433 that parrots the same. (Petition at 78.) Dr. Jiao then states that the “array of opto-electronic elements 11; 12;13; 14|. . .” disclosed by Harbers

is now the directional light sources that satisfy [26.6] and [65.9], rather than some combination of beams emitted by the opto-electronic elements as required for Petitioner's interpretation of Karlsson. However, neither Petitioner nor Dr. Jiao describe how Harbers' "array of opto-electronic elements" a.k.a. "directional light sources" of Fig. 2 that may alternatively be provided on a curved substrate are combined or substituted into the planar LED array of Karlsson's Fig. 14 that includes interspersed light-sensitive sensors. Expert declarations that merely repeat, "verbatim, the conclusory assertion for which it is offered to support" are entitled to little weight. *See, Xerox Corp v. Bytemark, Inc.*, IPR2022-00624, Paper 9, at 15 (PTAB August 24, 2022).

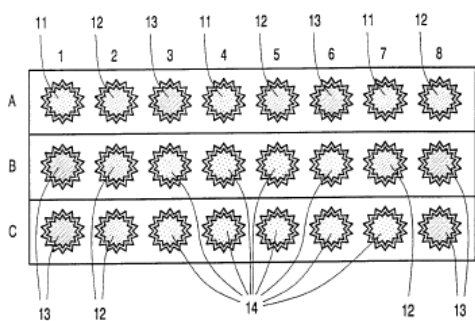


FIG. 2

Harbers Array/Light Pattern

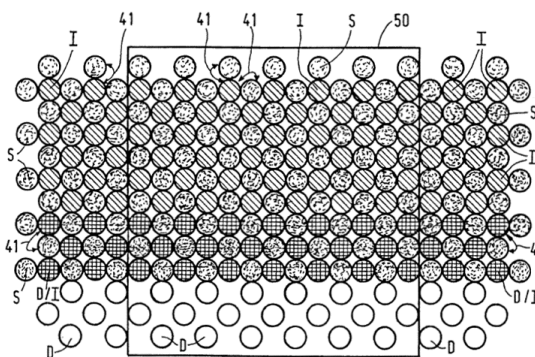


FIG. 14

Karlsson Array/Light Pattern

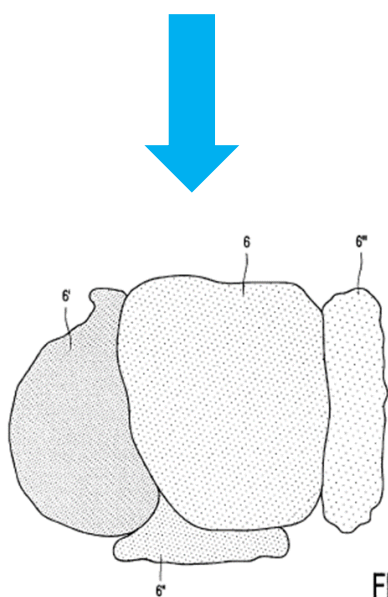


FIG. 3B

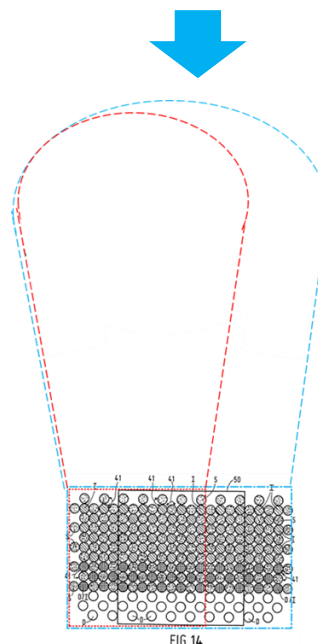


FIG. 14

(Ex.1011, Figs 2, 3B, Annotated)

(Ex.1010, Fig. 14, Annotated)

Furthermore, Petitioner does not explain how the combined Karlsson/Harbers system having a curved substrate to satisfy [26.6]/[65.9] controls intensity of the individual spotlight beams in response to light detected by the interspersed light-sensitive sensors of Karlsson, or how parameters such as vehicle velocity, steering wheel position, or weather as disclosed by Harbers are provided

by the dipped/main beam groupings of LEDs disclosed by Karlsson. (Ex.2001, ¶119.) Petitioner further fails to describe how the four beam segments and resulting light pattern of Harbers is provided by the groupings of D, I, and D/I LEDs in Karlsson that correspond to the dipped beam and main beam functions. (Ex.2001, ¶119.) In short, Petitioner simply selectively combines the two teachings out of convenience and completely omits any and all addressing of the myriad of additional issues this would create.

**E. All Grounds: A Person of Ordinary Skill in the Art Would Not Have Been Motivated to Combine Beam and Thominet or Karlsson and Harbers**

“[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int’l v. Teleflex Inc.*, 550 U.S. at 418, 82 USPQ2d at 1396 (2007), *quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Petitioner combines incompatible systems directed to different problems within the vehicle lighting field asserting the overly broad goal of “improving driver safety” without identifying any rational underpinning as to why a POSITA would have selected and combined such features “to improve driver safety.” (Petition at 82.) This catch-all justification allows Petitioner to randomly select and combine “hardware or software” or “light sources, sensors, controllers” in direct violation of the Supreme Court mandated obviousness analysis.

**1. Petitioner’s Rationale for Combining References  
Renders the Primary Reference Inoperable or  
Unsatisfactory for Its Intended Purpose**

In all Grounds, the secondary reference interferes with the intended purpose of the primary reference. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

**a. Grounds 1B-1C and 2B-2C: The Proposed  
Combination Renders Beam Inoperable and  
Defeats Beam’s High-Intensity Illumination “At  
All Times” Purpose**

In Grounds 1B-1C and 2B-2C, Petitioner’s proposed modification of Beam by adding “an additional control technique (software implementation) . . . -- Thominet’s *known technique* of using multiple directional beam regions for different functions”—would 1) render Beam’s AABH system inoperative or unsatisfactory for its stated purpose of providing “high-intensity illumination all the time” but for selective darkening associated with the location of incoming light, 2) interfere with Thominet’s stated purpose of providing partial predefined regions that are controllable as a unit to deliver multi-functional capability with an LED array and 3) as a result, would not accomplish Petitioner’s proffered purpose of “improving driver safety.” (Ex.2001, ¶121.) *See Gen. Plastic Indus., LTD. v.*

*Canon Inc.*, IPR2015-01954, Paper 9, at 25-26 (PTAB Mar. 9, 2016) (denying institution where “it appears that the proposed modification [] would render [the prior art] unsuitable for its intended purposes” (citing *In re Gordon*, 733 F.2d at 902)).

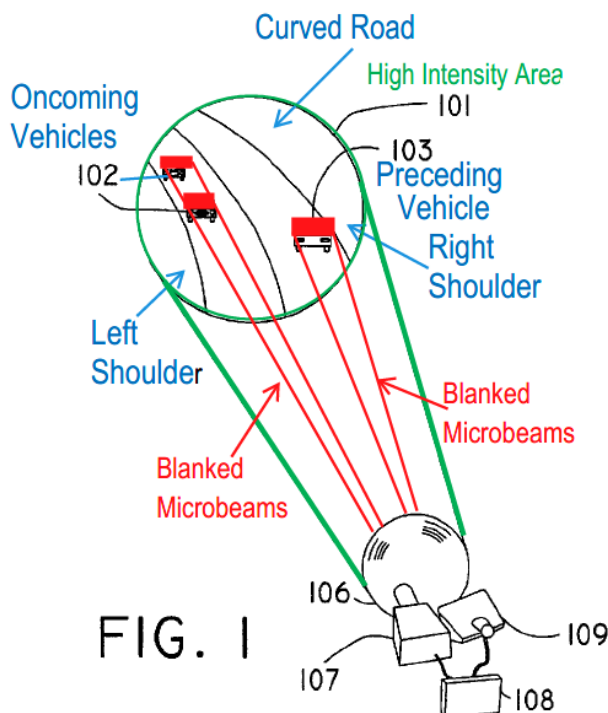
**b. Petitioner’s Contorted Rationale Undermines the Crux of Beam’s Maximum Intensity “At All Times” Strategy**

The specification details the central tenet of the Beam reference—to darken the area of the beam that would dazzle the driver, “**while maintaining [full] intensity elsewhere**”:

These AABH headlights will operate at maximum intensity at all times. An imaging sensor (such as a video camera) faces forward, boresighted with the headlight. The output of the sensor is connected to the controller. The controller module uses the sensor spatial data (video) to determine whether there are illumination sources (headlights or tail lights) present in the headlight’s field-of-view, determines their location relative to the Adaptive Anti-Blinding Headlights beam, and uses these data to control the Illuminator. When an oncoming vehicle’s headlights are detected (whether or not it is equipped with the AABH system), an area slightly wider than the headlight spacing and approximately six feet high, and whose bottom edge is centered on the oncoming headlights, is dimmed in the beam-bundle of the vehicle equipped with the AABH system.

(Ex.1005, 6:11-19, emphasis added; Ex.2001, ¶121.)

Beam specifically recognizes and disparages prior art attempts to control the direction of the headlight beams. (Ex.1005, 1:60-2:6.) According to Beam, prior art systems that had to choose where to put light and that changed the direction of the headlamp beam, were prone to errors and/or subject to misalignment. (Ex.1005, 2:15-26.) In response to these prior art problems, Beam's solution is to provide "the equivalent of high beam headlights or brighter on at all times, greatly enhancing the ability to see at night" (*Id.*, 6:53-56.) except for areas where incoming light is detected. Since Beam is already putting maximum intensity light everywhere it could be needed, there would be no reason to provide the ability to change the direction of microbeams in the AABH system or on point or direct light in any particular direction. (Ex.2001, ¶122.)



( Ex.1005, FIG 1, Annotated)

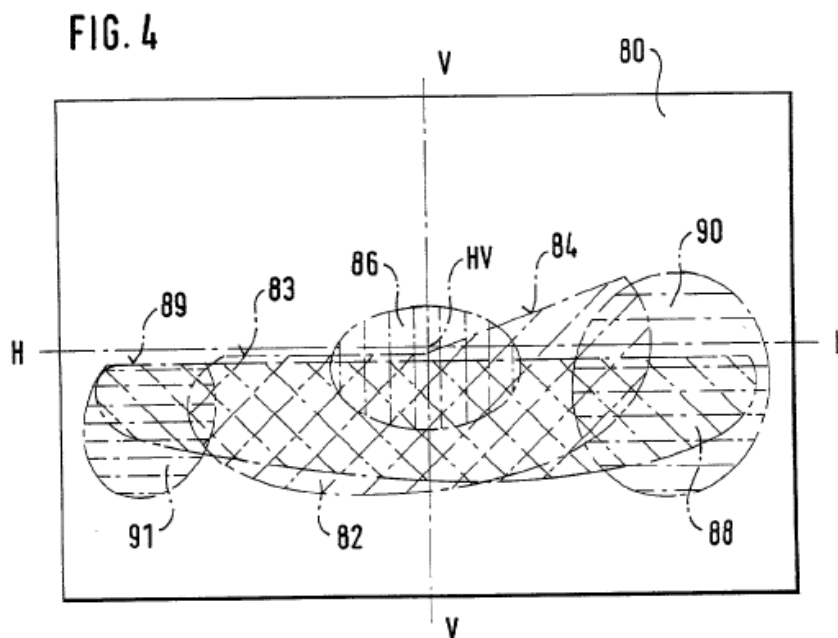
Even if changing the direction of microbeams in Thominet's software was possible, it would reduce the maximum intensity of illumination of regions within the road ahead, contrary to Beam's stated purpose. For example, changing direction of microbeams in the direction of an upcoming left-hand curve in response to map data would reduce illumination below the maximum possible in regions to the right of oncoming vehicles 102 and would defeat anti-blinding operability for any vehicles outside of the intersection of the illumination and sensor fields of view. (Ex.2001, ¶123.)

**2. Grounds 1B-1C and 2B-2C: Beam’s Maximum Intensity Field-Of-View Teaches Away from Thominet’s Illumination Functions Undermining Petitioner’s Rationale for Combining**

“An inference of nonobviousness is especially strong where the prior art’s teachings undermine the very reason being proffered as to why a person of ordinary skill would have combined the known elements.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009). Petitioner had, and failed to meet the burden, of at least addressing these teaching away statements. *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1363 (Fed. Cir. 2017). (“Evidence suggesting reasons to combine cannot be viewed in a vacuum apart from evidence suggesting reasons not to combine”).

Petitioner’s rationale for combining Thominet with Beam is the generalized goal of improving/increasing safety through improved visibility. (Petition at 26-32.) However, Beam disparages and teaches away from “devices which shape the beam(s) in a predetermined profile that is expected to cause the fewest problems to the oncoming drivers under a variety of circumstances” noting that “This is a compromise, at best, between reducing glare and providing enough light to the driver for adequate visibility.” (Ex.1005, 2:16-21; Ex.2001, ¶124.) As described above, Beam’s microbeams “operate at maximum intensity at all times” allowing “the driver to have the equivalent of high beam headlights or brighter on at all

times, greatly enhancing the ability to see at night.” (Ex.2001, ¶124.) In contrast, Thominet assigns different partial regions of semiconductor sources, “which shape the beam(s) in a predetermined profile” to provide “different illumination functions (low beam, high, beam, low sight, large width)” as shown in Fig. 4, each necessarily providing less than the maximum intensity illumination to the field-of-view directly contrary to the teachings of Beam. (Ex.2001, ¶124.)



**(Ex.1006, Fig. 4)**

As such, the proposed combination would not provide increased visibility and increased/improved safety as alleged and there would therefore be no motivation for a POSITA to combine Thominet’s predefined beam profiles with Beam’s AABH system. (Ex.2001, ¶125.)

**3. Petitioner Does Not Explain How the Combination Would Operate for its Intended Purpose**

Petitioner must explain how and why a POSITA would have modified or combined the prior art. *KSR 'Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2006) (requiring articulated reasoning with rationale underpinning as to how or why a person of ordinary skill in the art would have combined or modified the teachings of the prior art); *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017) (holding obviousness determination to be improper where the record lacked a “clear, evidence-supported account” of “how the combination” would work). *Adidas AG v. Nike, Inc.*, IPR2016-00922, Paper 21, 36 (October 19, 2017) (holding that challenged claims are patentable when the “Petitioner fails to explain why and how a person of ordinary skill in the art would combine” two references.)

**a. Grounds 1B-1C and 2B-2C: Petitioner Does Not Explain How a POSITA Would Use Thominet’s Software or Hardware to Control Direction of Beam’s Maximum Intensity Microbeams**

Petitioner’s obviousness arguments gloss over how a POSITA would combine the disparate teachings in Beam and Thominet. The Petition asserts that because the references include the same building block components and share a common goal, the software/hardware functionality is effectively interchangeable. (Petition at 25-26.) By taking such a superficial approach to addressing how the references would be combined, the Petition does not: 1) explain how the combined

Beam-Thominet system would determine which LEDs to blank in view of the predefined functionality of the LED regions; 2) how the Beam-Thominet combined hardware or software system would provide spatially differentiated illumination to different subsections based on the detection or identification of a vehicle in a given subsection; or 3) provide Beam's anti-blinding feature for microbeams that change direction based on Thominet's curved hardware. (Ex.2001, ¶126.)

By way of example, Thominet identifies that low beams are advantageous when you go around a curve but doesn't explain whether the operation of the low beam is achieved by the driver manually doing something or some form of automatic control; similarly, it identifies different functions without explaining how those regions can be used at different times and provides no details on how the "different functions" would be controlled. (Ex.2001, ¶127.) Because Thominet discloses high-level concepts, it was incumbent on the Petitioner to explain how a POSITA would integrate the teachings of Thominet and Beam. But apart from general platitudes, Petitioner offers no details on how the references would be combined.

**b. Ground 8: Petitioner Does Not Explain How a POSITA Would Use Harber's Curved LEDs with Karlsson's Spotlight Beams and Spotlight Sensors**

Petitioner does not explain how the combined Karlsson/Harbers system,

which “implements Harber’s multiple directional beam segments, through either hardware or software,” controls intensity of the individual spotlight beams of Karlsson in response to light detected by the interspersed light-sensitive sensors of Karlsson, or how parameters such as vehicle velocity, steering wheel position, or weather as disclosed by Harbers are provided by the dipped/main beam groupings of LEDs disclosed by Karlsson. (Petition at 96; Ex.2001, ¶128.) Petitioner further fails to describe how the four beam segments and resulting light pattern of Harbers is provided by the groupings of D, I, and D/I LEDs in Karlsson that correspond to the dipped beam and main beam functions. (Ex.2001, ¶128.)

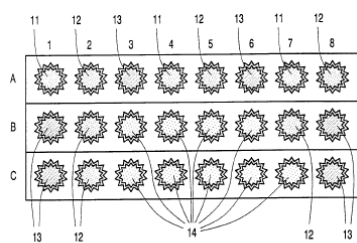


FIG. 2

Harbers Array/Light Pattern

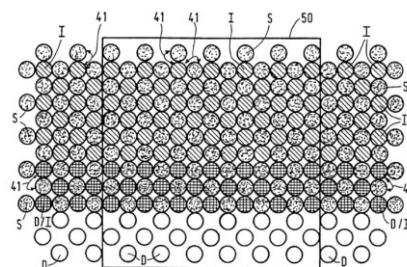


FIG. 14

Karlsson Array/Light Pattern

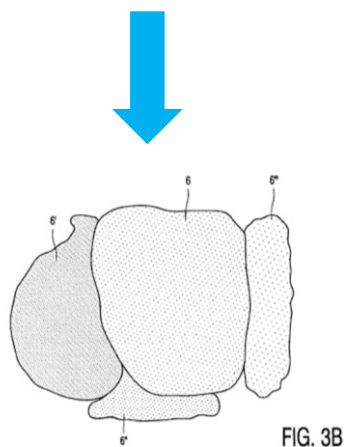


FIG. 3B

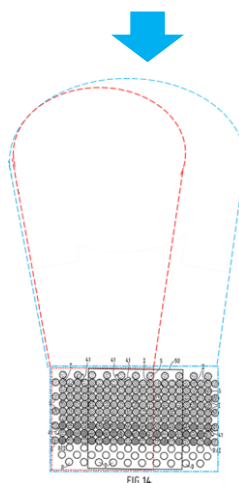


FIG. 14

(Ex.1011, Figs 2, 3B, Annotated)

(Ex.1010, Fig. 14, Annotated)

Petitioner has thus failed to meet its burden to identify *how* the proposed combination would function to establish Petitioner's stated rationale.

**4. Petitioner Fails to Explain Why the References Would Have Been Combined; the Rationale to Combine Suffers from Hindsight Bias**

Petitioner's impermissible reliance on hindsight rather than any teachings from the references undermines the alleged combination of references as proposed. A "[d]etermination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the

patented invention.” *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998) (emphasis added). Instead, “[t]here must be a teaching or suggestion within the prior art, or within the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in the way they are combined by the inventor.” (*Id.*)

Petitioner fails to identify a rational underpinning in the references to explain why a POSITA would add features from the secondary references to modify the primary references when, according to their own argument, the primary reference already “emphasize[s] safety of all drivers” and enables “the driver to see more clearly at night, while protecting others from glare.” (Petition at 11.) In both Grounds, the reason for combining the references is not to achieve the overly broad and amorphous goal of “improving driver safety” as stated by Petitioner. (Petition at 11-13.) Rather, the only plausible, but impermissible reason for combining the references as proposed is to meet the ‘503 Patent claims. *TRW Automotive U.S. LLC v. Magna Electronics, Inc.*, IPR2015-00972, Paper 9, slip op. at 15, 17 (September 16, 2015). *See also Stryker Corp. v. Karl Storz Endoscopy America, Inc.*, IPR2015-00764, Paper 13, slip op. at 13 (September 2, 2015).

**a. Grounds 1B-1C and 2B-2C: The Addition of Features Already Present in Beam Constitutes Impermissible Hindsight**

The Petition is riddled with inconsistencies regarding Beam’s teachings and

provides nothing more than unsupported attorney argument to explain why a POSITA would have been motivated to make the proposed modifications.

Having drawn a false equivalency between Beam and Thominet—that both references teach independently controlled angular microbeam clusters/sources—and a common “driver visibility” goal, Petitioner posits that “Thominet’s express control of having multiple directional beam regions (clusters), implemented with Beam’s controller 108/illuminator 109 (including SLM 203), would have provided Beam’s system with different spatial distributions for different driving situations beyond reducing glare for drivers, thereby improving safety.” (Petition at 13.) But Petitioner fails to explain why the prior art would have prompted a POSITA to improve Beam’s LED array solution with Thominet’s software or hardware techniques to have “multiple directional beam regions for different functions,” when Petitioner repeatedly argues that Beam discloses “directional light cluster/sources.” (Petition at 10, 28-29, 37.)

Because Petitioner has not provided any findings that Thominet recognized a problem with Beam’s ability to provide spatial distributions to improve driver safety, Petitioner’s statement of the desire for “different functions” appears rooted in impermissible hindsight reconstruction. *See Ex parte Tessier*, Appeal 2012-006616 (PTAB October 2, 2014) (Because the Kolk system already remotely controlled, and without any “findings that either Kolk or Petite recognized a

problem with the remote technique used in Kolk”, the PTAB concluded that the stated reasoning is based on the “use of impermissible hindsight reconstruction.”).

Moreover, Petitioner fails to explain why a POSITA would be motivated to combine Beam and Thominet, when the combination results in a worse, materially deficient form of anti-glare illumination—one with conflicting control strategies and reduced intensity—than Beam provides alone. (Ex.2001, ¶132.) Petitioner states that the problem to solve is “improving driver safety”, however Petitioner may not “simply retrace[] the path of the inventor with hindsight, discount[] the number and complexity of the alternatives, and conclude[] that the invention . . . was obvious.” *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008).

Beam and Thominet are directed to different purposes, Beam teaches a simple, general approach to delivering anti-glaring illumination, whereas Thominet provides an LED array with multi-functional capability. (Ex.2001, ¶133.) Save attorney argument that tracks the improvements identified in the ‘503 Patent, Petitioner fails to provide supportive evidence to explain why a POSITA would have chosen to add the system complexity of Thominet, especially where, by Petitioner’s own admission, it offers no teachings to enhance anti-glaring illumination. On the contrary, Thominet introduces significant operational complexity by predefining groups of LEDs in different defined partial regions that

work in concert for different functions--contrary to Beam's overarching purpose of providing maximum intensity at all times. (Ex.1006, [0004-0009]; Ex.2001, ¶133.)

Ultimately, Petitioner had the burden to establish a reason why a POSITA would have been motivated to first select the applied references and then make the set of system modifications required by Petitioner's theory. Petitioner's conclusory assertions fail to meet the requisite burden.

**b. Ground 8: The Addition of Features Already Present in Karlsson Constitutes Impermissible Hindsight**

Petitioner has not only failed to identify *how* Harbers would be combined with Karlsson to achieve the proffered purpose but has also failed to provide articulated reasoning *why* a POSITA would look to Harbers to implement Harber's multiple directional beam segments to either replace Karlsson's LED array or integrate with Karlsson's LED array – as the petition leaves it to the reader to decide – other than solely to meet the Challenged Claim limitations using impermissible hindsight. Petitioner's rationale for combining is based on the flawed premise that “Karlsson discloses ‘directional light [clusters/sources]’ independently controllable directional spotlight beam clusters/sources—that ‘create an output headlight meeting the determined illumination requirements’/‘achieve the determined illumination levels’ as in [26.6]/[65.9].” (Ex.1003, ¶435; Petition at 79; Ex.2001, ¶134.) As noted in Section V.(E.), *supra*,

this premise is based on a gross misrepresentation of Karlsson with omitted language from a citation directed to detecting incoming light, rather than operation of Karlsson's LEDs. (Ex.2001, ¶134.)

Notably, Karlsson discloses a headlight having spotlight beams and sensors to automatically control a lighting pattern to reduce blinding of oncoming traffic and different illumination patterns/functions produced by spotlight sources D (dipped light), I (main-beam light), and D/I (dipped and main-beam lights). (Ex.1010, 19:22-30.) Karlsson also discloses "further sensor means, such as inclination sensors, and direction sensors for controlling the light beams . . . dependent on the inclination of a vehicle and/or its change of direction." (Ex.1010, 15:7-10.) As such, Karlsson already provides "different spatial distributions for improved visibility in different driving situations" such that there would be no increased/improved driver safety or visibility, and therefore no motivation for a POSITA to look to Harbers to provide these features as advanced by Petitioner. (Petition at 81; Ex.2001, ¶135.)

Rather than providing articulated reasoning with rational underpinnings for culling "building blocks" from Harbers and combining them with Karlsson, Petitioner relies on the catch-all goals of "improved visibility" and "increasing safety." The Petition fails to articulate why the inclusion of the multiple directional beam segments "software or hardware" from Harbers provides "different

functions” when combined with Karlsson, resulting in “increased safety.” (Petition at 81 and 82.) A POSITA would understand that Karlsson and Harbers disclose fundamentally different approaches that do not benefit from the combinations Petitioner proffers. (Ex.2001, ¶136.)

## **VII. The Board Should Deny Institution on Procedural Grounds**

The Board has discretion to deny institution. 35 U.S.C. § 314(a); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S.Ct. 2131, 2140 (2016). The Board’s discretion is informed by 35 U.S.C. § 316(b), which requires the Board to consider “the efficient administration of the Office, and the ability of the Office to timely complete proceedings.” *See also* Consolidated Trial Practice Guide (“CTPG”) at 5.

In this case, the Board should exercise its discretion, and deny institution because, as explained below: A) the Petition lacks particularity; and B) Petitioner does not justify filing three petitions challenging the ‘503 Patent, which requires an inefficient use of the Board’s resources. Therefore, the Board should exercise its § 314 discretion and deny institution. 35 U.S.C. § 316(b); 2018 CTPG at 56.

### **A. The Petition Lacks Particularity under § 312(a)(3)**

Under 35 U.S.C. § 312(a)(3), it is Petitioner’s burden to adequately explain its challenge and the references it uses. The Petition adopts an extreme word count optimization strategy of hiding the claim limitations in a claim appendix, resulting in a lack of particularity regarding the challenged claims. The Petition also

mischaracterizes teachings in the applied references and combines them in a vague manner to create an LED headlight system that does not and cannot function as alleged.

Petitioner's vague, and often factually incorrect application of the applied references, leaves Patent Owner and the Board in a position where they must venture a guess at how the Petition is interpreting and applying the references. It is not the Board's job nor Patent Owner's to try to make sense of the Petition and Petitioner's ambiguous presentation of the applied references; it was Petitioner's burden from the onset to adequately explain its challenge. As such, the Petition should be denied institution for failing to comply with the statutory requirement.

An IPR petition must identify “with particularity, each *claim* challenged, the *grounds* on which the challenge to each claim is based, and the *evidence* that supports the grounds for the challenge to each claim.” 35 U.S.C. § 312(a)(3). “In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) citing 35 U.S.C. § 312(a)(3). The PTAB Trial Practice Guide advises that “parties should avoid submitting a repository of all the information that a judge could possibly consider, and instead focus on concise, well-organized, easy-to-follow arguments supported by readily identifiable evidence of record.” (CTPG at 39.) Further, “[t]he petition must specify where

each element of the claim is found in the prior art patents or printed publications relied upon.” 37 C.F.R. § 42.104(b)(4).

“The statutory requirement of particularity in a petition for IPR takes on heightened importance when considered in conjunction with SAS’s ‘all-or-nothing’ approach,” and “the Board may consider whether a lack of particularity as to one or more of the asserted grounds justifies denial of an entire petition.” *Adaptics LTD. v. Perfect Co.*, IPR2018-01596, Paper 20 (PTAB March 6, 2019) (Informative). Further, “where a petition contains voluminous or excessive grounds, Office guidance indicates ‘[t]he panel will evaluate the challenges and determine whether, in the interests of efficient administration of the Office and integrity of the patent system (*see* 35 USC § 316(b)), the entire petition should be denied under 35 USC § 314(a).’” *Id.* at 18 citing SAS Q&As (June 5, 2018) (“SAS Q&As”), 11 at Part D, Effect of SAS on future challenges that could be denied for statutory reasons, Question D2.

**1. The Petition does not specify where each claim element is found in the prior art**

Under 37 C.F.R. § 42.104(b)(4), “The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.” Petitioner challenges 17 claims (claims 26-36 and 65-70) under at least 10 grounds, yet the language of the Challenged Claims is largely absent from

Petitioner's arguments. (Petition at 8-141.) Instead Petitioner's arguments include a claim identifier, e.g., "[26.6]", and often a simple paraphrase of complex claim limitations, without any justification or explanation, inviting the reader to embark on a scavenger hunt to find the actual claim limitation in the Claim Appendix. *Compare* Petition at 96 to Appendix A (Petition at 151.) Unsurprisingly, such an approach leads to confusion, and claim limitations that are not addressed, and arguments that do not address the actual claim limitations.

**2. The Petition does not identify grounds with particularity**

**a. Lumping Anticipation and Obviousness Grounds**

Although Grounds 1 and 8 are each presented as obviousness grounds, Petitioner argues that the primary reference of each ground discloses all limitations of the independent claim. For example, regarding Ground 1, Petitioner states that "Beam discloses 'directional light [clusters/sources]' —independently controllable angular microbeam clusters/sources—that 'create an output headlight beam meeting the determined illumination requirements'/'achieve the determined illumination levels' as recited in [26.6]/[65.9]" and that "[i]f Patent Owner argues, incorrectly, that Beam does not, Thominet does." (Petition at 10.) Similarly, regarding Ground 5, Petitioner states that "[i]f Patent Owner argues, incorrectly, that Karlsson does not disclose [26.6]/[65.9], Harbers does." (Petition at 79.)

The USPTO discourages such “if patent owner argues” disclaimer-type language: “**Do NOT ‘suggest’** other proposed rejections in footnotes or ‘disclaimer-type’ language.” (Ex.2003 at 3, Best Practices and FAQs for Filing Requests for Reexamination Compliant with 37 CFR 1.510 and 1.915, PTAB, May 2010, emphasis in original.) The USPTO also discourages such lumping of anticipation and obviousness challenges: “**Do NOT lump** together multiple proposed rejections based on different grounds. Separate rejections based on anticipation and rejections based on obviousness.” (*Id.*) The Petition does not identify with particularity “the *grounds* on which the challenge to each claim is based,” and therefore should be denied institution under 35 U.S.C. § 312(a)(3).

**b. Lumping Alternative Teachings**

Petitioner also uses disjunctive terminology to combine each primary reference with one or more teachings of a secondary reference. For example, regarding Ground 1, Petitioner proposes combining Beam with Thominet’s software and/or hardware: “First, including an additional control technique (software implementation) for Beam—Thominet’s *known technique* of using multiple directional beam regions for different functions.” (Petition at 11.) “Second, a POSA would have sought to incorporate *known components* (hardware implementation) of Thominet’s semiconductor light sources 10 on curved surface 12 . . . into Beam’s system.” (Petition at 14.)

Similarly, regarding Ground 8, Petitioner proposes combining Karlsson with Harber’s software and/or hardware: “First, including an additional control technique (software implementation) for Karlsson—Harbers’s *known technique* of using multiple directional beam segments for different functions.” (Petition at 82.) “Second, a POSA would have sought to incorporate *known components* (hardware implementation) of Harbers’s opto-electronic elements 11-14 on a “curved substrate” (with differently angled/aimed opto-electronic elements 11-14 . . .) into Karlsson’s system (with lighting means 2, 3).” (Petition at 84, 85.)

As shown in the following table, Grounds 1 and 8 expand into at least 3 grounds each:

| Grounds                |    |     | Challenged Claims | References                                 |
|------------------------|----|-----|-------------------|--------------------------------------------|
| Lumped<br>Ground<br>#1 | 1A | 102 | 26-27, 30-31      | Beam                                       |
|                        | 1B | 103 | 26-27, 30-31      | Beam + Thominet’s <i>Software</i>          |
|                        | 1C | 103 | 26-27, 30-31      | Beam + Thominet’s <b><i>Hardware</i></b>   |
| Lumped<br>Ground<br>#8 | 8A | 102 | 26-31, 65, 68-69  | Karlsson                                   |
|                        | 8B | 103 | 26-31, 65, 68-69  | Karlsson + Harber’s <i>Software</i>        |
|                        | 8C | 103 | 26-31, 65, 68-69  | Karlsson + Harber’s <b><i>Hardware</i></b> |

Additionally, limitation [26.10] requires “*controlling the light clusters via the electronic control circuitry to collectively emit the headlight beam meeting the*

*determined illumination requirements.*” For Lumped Ground 1, Petitioner relies solely on Beam for satisfying this limitation without addressing Thominet, which conflicts with its “Software Implementation” of Ground 1B. (Petition at 35.) For Lumped Ground 8, Petitioner relies solely on Karlsson for satisfying this limitation without addressing Harbers, which conflicts with its “Software Implementation” of Ground 8B. (Petition at 106.)

It is unclear which grounds the Patent Owner is expected to respond to, and which grounds the Board must undertake in its review of the petition. In *Adaptics*, the Board determined “that the lack of particularity [in the Petition] results in voluminous and excessive grounds,” and that “in the interests of efficient administration of the Office and integrity of the patent system and as a matter of procedural fairness to Patent Owner, the entire petition should be denied under 35 USC § 314(a).” *See* 35 U.S.C. § 316(b); *see also* SAS Q&As, question D2.” *Adaptics* at 24. The Petition does not identify with particularity, “the **grounds** on which the challenge to each claim is based,” and therefore should be denied institution under 35 U.S.C. § 312(a)(3).

**B. Petitioner’s Parallel Petitions Raise Fairness, Timing, and Efficiency concerns under § 316(b)**

The Board will consider whether multiple petitions challenging the same patent is fair and efficient, because “[b]ased on the Board’s experience, one

petition should be sufficient to challenge the claims of a patent in most situations." CTPG at 59. "Two or more petitions filed against the same patent . . . may place a substantial and unnecessary burden on the Board and the patent owner and could raise fairness, timing, and efficiency concerns. *See* 35 U.S.C. § 316(b)." CTPG at 59. Further, "the Board finds it unlikely that circumstances will arise where three or more petitions by a petitioner with respect to a particular patent will be appropriate." (*Id.*)

Petitioner filed three IPR petitions challenging the '503 Patent within one month: 1) the present petition ("The '328 IPR Petition"), 2) IPR2023-00197, Paper 2 (Ex.2004, "The '197 IPR Petition"), and 3) IPR2023-00335, Paper 2 (Ex.2005, "The '335 IPR Petition".) The '197 IPR Petition challenges 12 claims (claims 20-25 and 59-64) as obvious over: 1) Beam and Thominet, with Stam and/or Kobayshi; and 2) 6) Karlsson and Harbers, with or without Gotou. (Ex.2004 at 4.) The '328 IPR Petition challenges 17 claims (claims 26-36 and 65-70) as obvious over: 1) Beam and Thominet with or without Stam, Kobayshi, Braun, and/or Harbers; and 2) Karlsson and Harbers, with or without Gotou or Braun. (The '328 IPR Petition at 3.) The '335 IPR Petition challenges 41 claims (claims 1-19 and 37-58) as obvious over: 1) Beam and Thominet with or without Stam, Kobayashi, and/or Braun; and 2) Karlsson and Harbers with or without Gotou or Braun.

In each Petition, Petitioner challenges all claims with the Beam/Thominet

group of grounds and the Karlsson/Harbers group of grounds. Therefore, these grounds are clearly redundant within each Petition. The overlapping art among the three petitions indicates that Petitioner could have dropped one of the redundant groups of grounds and consolidated the petitions into 1 or 2 petitions and still challenged the same claims.

The PTAB requires a Petitioner to justify filing multiple parallel petitions. CTPG at 60, FN 4 (“[I]t will be expected that petitioners will justify multiple petitions in the first instance in their petitions or in a separate paper [of no more than 5 pages] with the petitions, and patent owners will respond in their preliminary responses or in a separate paper with their preliminary responses.”) However, Petitioner makes no attempt to justify filing three redundant parallel petitions challenging the ‘503 Patent, beyond stating that “the petitions address different claim groupings.” (Petition at 145; Ex.2005 at 177.) Petitioner’s redundant parallel petitions place a substantial and unnecessary burden on the Board and the patent owner and raise fairness, timing, and efficiency concerns, and therefore should be denied under 35 U.S.C. §§ 316(b), 314.

### **VIII. Conclusion**

In light of the remarks herein, Patent Owner respectfully requests that the Board deny the Petition for *inter partes* review of the ‘503 Patent.

Respectfully submitted,

Dated: April 19, 2023

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**Certificate of Service**

The undersigned hereby certifies that the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. § 42.107**, including any attachments and exhibits, was served in its entirety on **April 19, 2023**, upon the following parties by electronic mail:

|                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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**Certificate of Compliance Pursuant to 37 C.F.R. § 42.24**

This paper complies with the type-volume limitation of 37 C.F.R. § 42.24. The paper contains 13,817 words, excluding the parts of the paper exempted by § 42.24(a).

This paper also complies with the typeface requirements of 37 C.F.R. § 42.6(a)(ii) and the type style requirements of § 42.6(a)(iii)&(iv).

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