

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APUTURE IMAGING INDUSTRIES CO., LTD.,

Petitioner,

v.

ROTOLIGHT LIMITED,

Patent Owner.

Case No.: IPR2024-01422
U.S. Patent No. 10,845,044

PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT NO. 10,845,044

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PETITIONER’S EXHIBIT LIST

EX1001	U.S. Patent No. 10,845,044 to Gammons et al. (the “’044 Patent”)
EX1002	Prosecution History of the ’044 Patent
EX1003	Declaration of P. Morgan Pattison, PhD, dated September 10, 2024 (“Pattison Decl.”)
EX1004	U.S. Patent Application Publication No. 2005/0275626 to Mueller et al. (“Mueller”)
EX1005	Complaint for Patent Infringement, <i>Rotolight Limited v. Aputure Imaging Indust. Co., Ltd.</i> , No. 4:23-cv-00508-ALM (E.D. Tex.) (Dkt. 1, filed June 5, 2023)
EX1006	First Amended Complaint for Patent Infringement, <i>Rotolight Limited v. Aputure Imaging Indust. Co., Ltd.</i> , No. 4:23-cv-00508-ALM (E.D. Tex.) (Dkt. 25, filed April 29, 2024)
EX1007	Docket Report for <i>Rotolight Limited v. Aputure Imaging Indust. Co., Ltd.</i> , No. 4:23-cv-00508-ALM (E.D. Tex.), captured September 26, 2024
EX1008	Time to Trial Report for the Eastern District of Texas from docketnavigator.com, captured June 13, 2024.
EX1009	Time to Trial Report for the Central District of California from docketnavigator.com, captured June 13, 2024.
EX1010	User Manual for the Astera AX10 Spotmax (“Astera”)
EX1011	U.S. Patent No. 9,743,010 to Edwards (“Edwards”)
EX1012	Declaration of Mr. Simon Canins from <i>Arnold Richter Cine Technik GmbH & Co. Betriebs KG v. Rotolight Ltd.</i> , IPR2021-01498 (P.T.A.B.)

I. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Party-in-Interest

Aputure Imaging Industries Co., Ltd. is the Petitioner and a real party-in-interest.

B. Related Matters

U.S. Patent No. 10,845,044 (the “’044 Patent”) is one of multiple patents asserted in *Rotolight Limited v. Aputure Imaging Industries Co., Ltd.*, No. 4:23-00508-ALM (E.D. Tex.), filed June 5, 2023. The ’044 Patent has also been asserted or challenged in the following litigations and *inter partes* review proceedings:

- *Videndum Production Solutions, Inc. v. Rotolight Limited*, No. IPR2023-01218 (P.T.A.B.), filed July 17, 2023;
- *Rotolight Limited v. Chauvet & Sons, LLC f/k/a Chauvet & Sons, Inc.*, No. 1:23-cv-00364 (D. Del.), filed March 30, 2023;
- *Rotolight Limited v. ARRI Inc.*, No. 1:22-cv-00983 (D. Del.), filed July 27, 2022;
- *Rotolight Limited v. Videndum PLC*, No. 1:22-cv-00928 (D. Del.), filed July 12, 2022;
- *Arnold & Richter Cine Technik GmbH & Co. Betriebs KG v. Rotolight Limited*, No. IPR2022-00099 (P.T.A.B.), filed October 25, 2021.

C. Lead and Back-up Counsel and Service Information

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Please address correspondence to lead and back-up counsel at AputureIPRService@merchantgould.com. Petitioner consents to electronic service.

II. GROUNDS FOR STANDING

Petitioner certifies that the '044 Patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review challenging the patent claims on the grounds identified in this Petition.

III. REQUESTED RELIEF

Petitioner asks that the Board review the accompanying prior art and analysis, institute a trial for an *inter partes* review of claims 1-19 of the '044 Patent (the "Challenged Claims") and cancel those claims as unpatentable.

IV. REASONS FOR THE REQUESTED RELIEF

The Challenged Claims of the '044 Patent would have been obvious to a person of ordinary skill in the art ("POSITA") and are therefore unpatentable. The '044 Patent claims recite nothing more than an obvious combination of lighting systems, lighting system components, and processes for the use of such systems that had been used by POSITAs prior to the filing of the '044 Patent.

This Petition's showing that the cited art renders the Challenged Claims unpatentable is fully supported by the Declaration of P. Morgan Pattison, PhD. EX1003. Dr. Pattison is familiar with the state of the cinematic and videographic lighting arts before the '044 Patent was filed and fully agrees with and supports the showing herein that the claims at issue merely recite long-known aspects of such lighting systems.

Accordingly, the Board should institute trial and cancel the Challenged Claims.

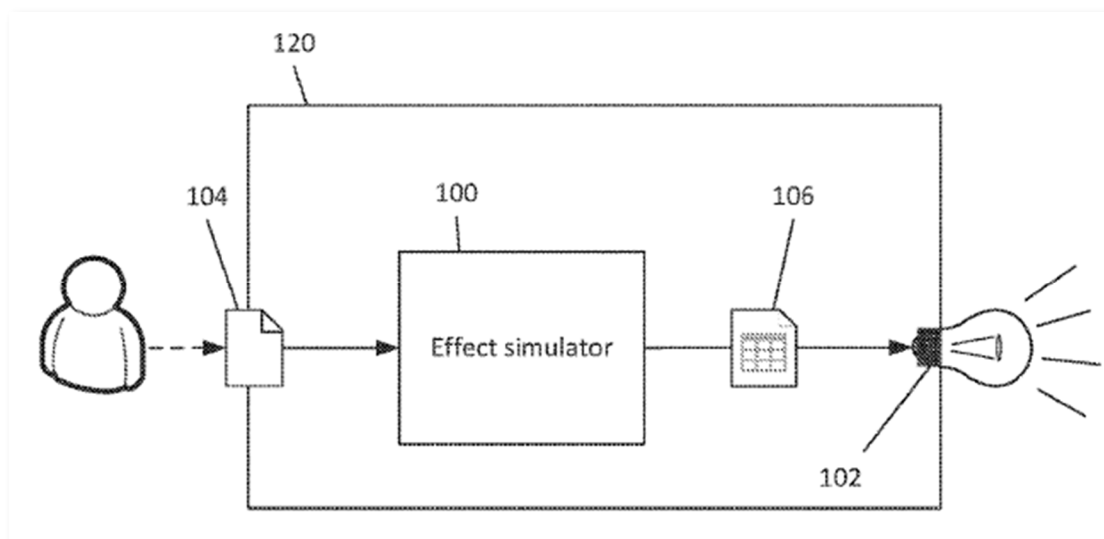
A. Summary of the '044 Patent

Independent Claims 1, 12, and 19 of the '044 Patent recite a method, system, and computer program, respectively, for "controlling a lighting device to produce a range of different user customisable lighting effects." These claims recite five elements:

1. receiving user input of at least one user input simulation parameter;

2. storing the user input simulation parameter into memory;
3. recalling the user input simulation parameter from the memory;
4. calculating, using an effect simulator, a time varying lighting value based on the simulation parameter; and
5. outputting to a lighting device the time varying lighting value so as to generate the user-selected lighting effect.

Figure 2 of the '044 Patent is a schematic diagram of a lighting system:



EX1001, Figure 2. Figure 2 depicts a single studio lamp device (120) with an effect simulator (100) and a light (102) integrated therein. *Id.*, 5:54-56. Figure 2 also depicts

- a control panel (104)¹

¹ Though the '044 patent does not explicitly identify item 104 of Figure 2, the specification makes clear that item 104 is a “control panel.” EX1001, 5:63-64.

- data (106) used to modulate light 102 such that the desired lighting effect is produced.

Id., 5:47-66. Though it is not depicted in Figure 2, the '044 Patent also discloses, “[a] microcontroller or other computing device [that] is integrated in the lamp device 120 for performing calculations.” *Id.*, 5:61-63.

Using Figure 2 as a reference, the '044 Patent describes how users can make selections of desired lighting effects on a control panel interface. *Id.*, 5:61-6:8, 8:5-18. Depending on the desired effect, users may select and adjust simulation parameters, such as brightness, duration, color, and frequency to customize the effect. *Id.*, 1:52-67, 6:37-7:6; 7:66-8:18, Figure 6. These simulation parameters are used by the effect simulator to calculate data, or “time varying lighting values,” that characterize the lighting effect, and which are used to produce signals sent to the light to generate the effect. *Id.*, 5:41-54, 7:19-36; 8:5-39. Effects and their parameters may be stored in memory and then recalled from that memory at a later time. *Id.*, 9:27-36.

The '044 Patent also describes a number of variants that correspond to dependent claims 2-11 and 13-18.

B. The Prosecution History of the '044 Patent.

The '044 Patent issued on November 24, 2020, from U.S. Patent Application No. 15/481,460, which claims priority to U.S. Provisional Patent Application No.

62/319,809, filed April 8, 2016. In an Office Action dated March 9, 2018, the Examiner rejected the original claims for claiming features not shown in the drawings and on non-statutory double patenting grounds in view of the application that matured into U.S. Patent No. 10,197,257. EX1002, 593. Applicant submitted a new claim set, along with amendments to the specification and figures. *Id.*, 439-457.

A subsequent Final Office Action dated December 31, 2018, objected to the amendments as introducing new matter and for failing to comply with the written description requirement. *Id.*, 393. Applicant withdrew the amendments and filed a terminal disclaimer. *Id.*, 361, 386. The '044 Patent was thereafter allowed. Applicant then proceeded to file IDSs on January 14, 2020, March 5, 2020, and June 30, 2020. No new Office Actions were issued, however, and nothing in the record indicates that any of the references were substantively considered.

C. Priority Date.

The '044 Patent claims priority to a provisional patent application filed on April 8, 2016. EX1001, Cover. That date is the assumed priority date for purposes of this Petition. The reference cited in the instant Petition qualifies as prior art based on that priority date.

D. Discretionary Denial under § 325(d) or § 314(a) Is Not Warranted.

Aputure has not been involved in any previous review of the '044 Patent. Additionally, the Office has not considered the reference forming the grounds for

this Petition, and reference is not redundant to any combination of references considered during prosecution. Additionally, the instant Petition provides the analysis of Dr. Pattison, which has likewise not been presented to the Office before. As the same or similar arguments have not been previously considered by the Office, discretionary denial under § 325(d) is not warranted here.

1. Institution should not be denied under the *General Plastic* Factors

The factors articulated by the Board in *General Plastic Industrial Co., Ltd v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (P.T.A.B Sept. 6, 2017), do not support denial of institution. Though prior Petitions for IPR challenging the '044 have been filed by third parties, Petitioner has not previously filed a petition directed to the '044 Patent, nor does Petitioner have a significant relationship with any prior petitioner. “[W]here, as here, the first and second petitioners are neither the same party, nor possess a significant relationship under *Valve [Corp. v. Electronic Scripting Products, Inc.]*, IPR2019-0062, Paper 11 (P.T.A.B. Apr. 2, 2019)], *General Plastic* factor one necessarily outweighs the other *General Plastic* factors.” *Videndum Production Solutions, Inc. v. Rotolight Ltd.*, IPR2023-01218, Paper 12 at 6 (P.T.A.B. Apr. 19, 2024) (Director Vidal vacating Board decision denying institution). The fact that Petitioner has not previously sought IPR of the '044 Patent and does not have a significant relationship with any previous petitioner is thus

dispositive on the issue of whether the Board should exercise its discretion to deny institution under 35 U.S.C. § 314(a).

Even if the Board considers the additional *General Plastic* factors, however, such consideration would not warrant denying institution. For instance, there has been no time between the filing of a prior Petition from Petitioner and the present Petition (Factor 5). Moreover, Petitioner was not aware of the prior art asserted in this Petition prior to the filing third party ARRI's 2021 petition filed against the '044 Patent (Factor 2). Each of these factors weighs against denying institution based on *General Plastic*.

The remaining factors are, at most, either neutral or, in view of the fact that Petitioner has not previously challenged any claims of the '044 Patent, not applicable to the present Petition. Though Petitioner learned of the prior art asserted in the ARRI petition shortly after it was sued by Patent Owner in the district court on June 5, 2023 (EX1007) (Factor 4), there is no evidence on which Patent Owner could rely that Petitioner has improperly delayed in filing the present Petition, the district court litigation remains in its early stages, and this Petition is brought well within the one-year time limit set forth in 35 U.S.C. § 315(b).² And because Patent Owner waived its Patent Owner's Preliminary Response to ARRI's petition, no time has elapsed

² Patent Owner did not serve the Complaint until October 17, 2023. EX1007.

since Petitioner's receipt of such a response (Factor 3). And there is no evidence that the Board's finite resources (Factor 6) will prevent the Board from issuing a final determination within the timing requirements of 35 U.S.C. § 316(a)(11) (Factor 7). Institution should not be denied based on *General Plastic*.

2. Institution should not be denied under the *Finitiv* Factors.

The Petition should not be denied under the discretionary factors set out in *Apple v. Finitiv, Inc.*, IPR2020-00019, Paper 11, at 6 (PTAB Mar. 20, 2020 ("*Finitiv I*").

Regarding Factor 1, no stay of the district court litigation has been requested, though a stay would be appropriate under the applicable standard. *See, e.g., Vill. Green Techs., LLC v. Samsung Elecs. Co.*, No. 2:22-CV-00099-JRG, 2023 US. Dist. LEXIS 12794, at *9-10 (E.D. Tex. Jan 25, 2023). Patent Owner waited years after the '044 Patent issued before filing its Complaint on June 5, 2023, EX1005, and the litigation is in its early stages, and a stay pending IPR would be appropriate. Given that a motion to stay has not yet been filed, however, the Board should not infer the outcome of that motion. *Intel Corp. v. VLSI Tech. LLC*, IPR2020-00158, Paper 16, at 7 (PTAB May 20, 2020). This factor is neutral.

Regarding Factor 2, trial in the litigation is not scheduled. EX1007. In the Eastern District of Texas, average time to trial is 24-27 months. EX1008. In the Central District of California, to which Petitioner seeks transfer, average time to trial

is 29-32 months. EX1009. That the case remains in its early stages means it is unlikely the litigation will be ready for trial before the Board enters a final written decision. This factor weighs against discretionary denial.

Regarding Factor 3, Investment in the litigation has been minimal. Patent Owner has filed its Complaint, which it has amended. This Factor weighs against discretionary denial.

Regarding Factor 4, no deadline requiring Petitioner to articulate its invalidity positions in the litigation is imminent. Instituting a proceeding will allow the Board to address the art, and the issues will be narrowed in the litigation due to the estoppel provisions of 35 U.S.C. § 315(e)(2). To reduce potential overlap, if the Board institutes trial, Petitioner will decline to assert in the related litigation the prior art combinations on which trial is instituted while trial is instituted. The most efficient course is for the Board to address the issues before it. This factor weighs against discretionary denial.

Regarding Factor 5, Petitioner is a defendant in the litigation. EX1007. That is true of many Petitioners in IPR proceedings and is consistent with one purpose of IPRs as a process available to defendants. This factor is not a basis for denying institution.

Regarding Factor 6, the prior art discussed herein demonstrates that Claims 1-19 are unpatentable as anticipated or obvious. The merits of Petitioner's argument are strong, and this factor weighs against discretionary denial.

As such, this Petition should not be denied on discretionary factors.

V. CLAIM CONSTRUCTION

In *inter partes* review, claims are “construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b). Claims must be given their ordinary and customary meaning as understood by a POSITA at the time of the invention in light of the specification and the prosecution history pertaining to the patent. *Id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2015) (*en banc*).

Petitioner believes the '044 Patent's claim terms do not require construction for the purpose of evaluating the prior art in this Petition. Petitioner, however, may pursue constructions of additional claim terms, including that certain terms are indefinite in the related litigation concerning the '044 Patent to help the jury understand the relevant technical terms.

VI. STATUTORY GROUNDS FOR CHALLENGES AND REFERENCES USED

Ground #1: Claims 1-4 and 7-19 of the '044 Patent are obvious under 35 U.S.C. § 103 over Mueller.

Ground #1a: Claims 5 and 6 of the '044 Patent are obvious under 35 U.S.C.

§ 103 over Mueller in view of Edwards.

Ground #2: Claims 1-19 of the '044 Patent are anticipated under 35 U.S.C.

§ 102 over Astera and/or are obvious under 35 U.S.C. § 103 over Astera.

VII. LEVEL OF ORDINARY SKILL IN THE ART

A POSITA in the field of the '044 Patent, as of April 8, 2016, would have had a good working knowledge of electrical engineering and entertainment lighting systems, controls, and effects. EX1003, ¶34. He or she would have gained this through an undergraduate degree in electrical engineering or a comparable field as well as some experience in the field of entertainment lighting systems. *Id.* The more education one has, the less experience needed to attain an ordinary level of skill. *Id.* Similarly, more experience in the field may serve as a substitute for formal education. *Id.*

VIII. CLAIMS 1-19 ARE UNPATENTABLE

When the Examiner allowed the Challenged Claims to issue, the Examiner was not aware of Mueller. Mueller discloses or teaches every limitation of the Challenged Claims. Had the Examiner been aware of Mueller, the Examiner would have found the Challenged Claims unpatentable. EX1003, ¶¶37-447.

This petition's showing that Mueller renders the challenged claims unpatentable is fully supported by the Declaration of Dr. Pattison (EX1003), an

expert in the field of lighting systems. Dr. Pattison is familiar with the state of lighting methods and system art before the '044 Patent was filed, EX1003, ¶¶27-31, and fully supports the showing herein that the claims at issue merely recite methods and systems that have long been known. *Id.*

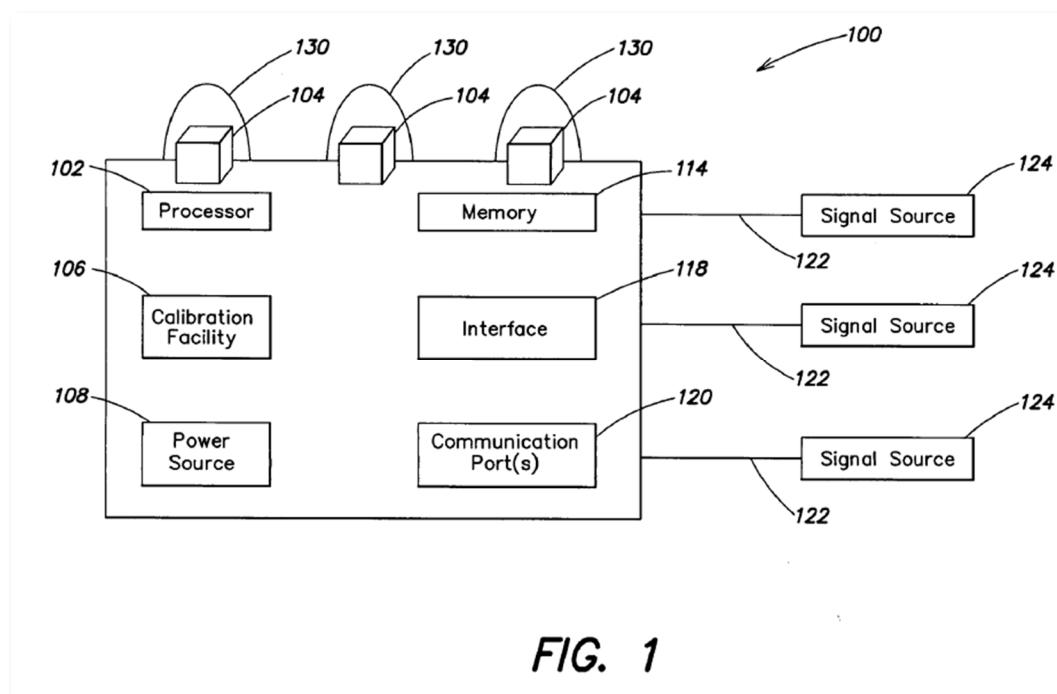
A. Ground 1 – Mueller renders Claims 1-4 and 6-19 obvious.

1. Overview of Mueller

U.S. Patent Application Publication 2005/0275626 to Mueller *et al.*, titled “Entertainment Lighting System” was filed on March 2, 2005, and published on December 15, 2005. Mueller is therefore prior art to the '044 Patent at least under 35 U.S.C. § 102(a).

Mueller describes the creation and modification of coordinated lighting effects in real time. In doing so, Mueller describes a processor 102 that is configured to output one or more control signals to drive light sources 104 so as to generate various intensities of light from light sources 104. EX1004, [0168]. The processor 102 may be particularly configured (*e.g.*, programmed) to provide control signals to one or more of the light sources 104 to generate a variety of static or time-varying (dynamic) multi-color (or multi-color temperature) lighting effects. *Id.*, [0170]. Mueller further describes that the processor's control of one or more of the light sources 104 could be based, at least in part, on user signals provided through an interface 118. *Id.*, [0183]. Such user signals could be user-selectable settings or

functions, including, but not limited to, generally controlling the light output of the lighting unit 100, changing and/or selecting various pre-programmed lighting effects to be generated by the lighting unit, changing and/or selecting various parameters of selected lighting effects, and setting particular identifiers such as addresses or serial numbers for the lighting unit. *Id.*, [0182].



Id., Figure 1.

Mueller discloses alternative embodiments utilizing the general concepts disclosed therein in a variety of specific devices and settings. EX1003, ¶39. A POSITA would understand that the concepts discussed in the context of each of these embodiments are applicable to Mueller's other embodiments. *Id.* Generally, employing these concepts across Mueller's embodiments would require only the

alteration or addition of software code, a concept with which a POSITA would be familiar. *Id.* A POSITA would thus be motivated, where required, to combine the teachings of Mueller’s various embodiments with those of other embodiments. *Id.*

2. Claim 1

Mueller renders Claim 1 obvious. EX1003, ¶¶40-84.

a. Claim Element 1p

A method for controlling a lighting device to produce a range of different user customisable lighting effects, the method comprising:

It is Petitioner’s position that the preamble to Claim 1 is not limiting and need not be analyzed for purposes of determining Claim 1’s validity. Should the Board determine the preamble is limiting, Mueller teaches Claim Element 1p. EX1003, ¶¶41-47.

Mueller describes a method for controlling a lighting device. Mueller describes “methods and systems for managing control instructions for a plurality of light systems.” EX1004, [0025]. Mueller also describes a “**lighting unit 100** that may serve as a device in a lightning environment.” *Id.*, [0164] (emphasis added). Lightning unit 100 is controlled by a processor 102 that “may be particularly configured (e.g., programmed) to provide control signals to one or more of the light sources [within the lighting unit 100] so as to generate a variety of static or time-varying (dynamic) multi-color (or multi-color temperature) lighting effects.” *Id.*,

[0170].

Mueller further explains that control of the lightning unit 100 includes producing user customizable lightning effects. Specifically, Mueller describes “controlling the light output of lighting unit 100, changing and/or selecting various pre-programmed lighting effects to be generated by the lighting unit, changing and/or selecting various parameters of selected lighting effects, [and] setting particular identifiers such as addresses or serial numbers for the lighting unit” *Id.*, [0182]; *see also id.*, [0202] (“a lighting system user may want to generate a color changing effect that varies colors from one lighting unit 100 to another lighting unit 100, or across a number of the lighting units 100 in such a way as to generate the appearance of a propagating rainbow of colors (‘rainbow chase’), given a particular placement of lighting units 100 with respect to one another. In this example, the user may provide a simple instruction to the central controller 204 to accomplish this”), [214] (“An explosion icon can be selected with a mouse-controlled cursor or other interface technique, which may prompt the user to click on a starting and ending point for the explosion in the coordinate system. By locating a vector in the representation, the user can cause an explosion to be initiated”).

b. Claim Element 1a

receiving user input of at least one user input simulation parameter to customize a lighting effect;

Mueller teaches Claim Element 1a. EX1003, ¶¶48-56.

Mueller states that the interface 118 can present a user interface to a user for controlling the lighting unit 100. EX1004, [0182]. Mueller thus discloses user input through the interface 118.

Mueller further explains that the interface 118 can enable a user to both “chang[e] and/or select[] various pre-programmed lighting effects to be generated by the lighting unit” and “chang[e] and/or select[] various parameters of selected lighting effects.” *Id.* These parameters, selected and/or changed based on user input, customize the selected lighting effect. EX1003, ¶51.

Mueller also discloses that the interface 118 “may be coupled . . . to a computer that provides a graphical user interface to a user for controlling the lighting unit 100.” *Id.*

c. Claim Element 1b

storing in memory said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated;

Mueller teaches Claim Element 1b. EX1003, ¶¶57-64.

Mueller describes, associated with the processor disclosed therein, “one or more storage media generically referred to . . . as ‘memory[.]’” EX1004, [0064]. “[T]he storage media may be encoded with one or more programs that, when

executed on one or more processors, perform at least some of the functions discussed herein.” *Id.* Mueller describes such functions as including, “generally controlling the light output of the lighting unit 100, changing and/or selecting various pre-programmed lighting effects to be generated by the lighting unit, changing and/or selecting *various parameters of selected lighting effects*, setting particular identifiers such as addresses or serial numbers for the lighting unit. *Id.*, [0182] (emphasis added).

Mueller further provides that

[t]he lighting unit 100 also may include a *memory* 114 to *store* various information. For example, the memory 114 may be employed to *store one or more lighting programs* for execution by the processor 102 (e.g., to generate one or more control signals for the lights sources, as well as various types of data useful for generating variable color radiation

Id. (emphasis added).

A POSITA would understand that a lighting program stored in memory 114 could include a user input simulation parameter depending on a selected lighting effect to be simulated. EX1003, ¶62. This is particularly true because, in connection with another embodiment, Mueller describes storing at least one simulation parameter in memory: “the lighting control interface allows for the storage and downloading of new functions and new parameter settings.” EX1004, [0380]; *see also* EX1003, ¶62.

In view of the disclosure by Mueller that the storage of lighting effects and the user-selected parameters associated therewith is carried out by memory, EX1004, [0064], a POSITA would understand that such storage of user input simulation parameters must be in memory for fast execution by processor 102. EX1003, ¶63.

d. Claim Element 1c

recalling from said memory said at least one stored user input simulation parameter;

Mueller teaches Claim Element 1c. EX1003, ¶¶65-70.

As discussed in the context of Claim Element 1b, Mueller discloses storing at least one user input simulation parameter depending on the lighting effect being simulated. Mueller also discloses recalling the stored simulation parameter being recalled for execution: “[t]he memory 114 may be employed to store one or more lighting programs for execution by the processor 102 (e.g., to generate one or more control signals for the light sources.” EX1004, [0172].

A POSITA would understand that the purpose for storing in memory a lighting program, comprising lighting effects and their parameters, was to later recall the lighting program and run it. EX1003, ¶68. This is particularly true given that Mueller, in the context of a separate embodiment describes that lighting functions and parameters can be stored for “user modification and implementation” of lighting

effects. EX1004, [0380]; EX1003, ¶68.

e. Claim Element 1d

calculating, using an effect simulator, a time varying lighting value based on said recalled simulation parameter;

Mueller teaches Claim Element 1d. EX1003, ¶¶71-79.

Mueller describes an effect simulator which performs calculations, namely processor 102. Specifically, Mueller describes that processor 102 within lighting device 100 is configured to output at least one control signal for each light source 104 so as to independently control the intensity of light generated by each light source 104. EX1004, [0168].

Mueller further explains that the processor 102 calculates a time varying lighting value: “the processor 102 may be particularly configured (e.g., programmed) to provide control signals to one or more of the light sources so as to generate a variety of static or time-varying (dynamic) multi-color (or multi-color temperature) lighting effects.” *Id.*, [0170]; *see also id.*, [0182] (“changing and/or selecting various parameters of selected lighting effects”).

In connection with a number of additional embodiments, Mueller further discloses the use of a processor as an effect simulator to calculate a time varying lighting value:

- “[A] simulation window 4970 can be generated for any effect, which

simulates the appearance of an effect on the selected group of lights. . . The simulation window 4970 is an animation window, so that the effect runs through time, representing the time parameters selected by the user.” *Id.*, [0304]; *see also id.*, [303];

- “The program may be configured, for example to generate an array of lighting effects such as color-changing effects, stroboscopic effects, flashing effects, coordinated lighting effects, lighting effects coordinated with other media such as video or audio, color wash where ***the color changes in hue, saturation or intensity over a period of time***, ambient color generation, color fades, effects that simulate movement such as a color chasing rainbow, a flare streaking across a room, a sun rising, a plume from an explosion, other moving effects, and any other lighting effect consistent with the environment 602 and the lighting system 200.” *Id.*, [0215] (emphasis added);
- “By changing the coordinates in the configuration file, the real world lights can be mapped to the virtual world represented on the screen in a way that allows them to reflect what is happening in the virtual environment. The developer can thus create time-based effects, such as an explosion.” *Id.*, [0242].

In connection with several embodiments, Mueller discusses the use of

software, algorithms, and the like to calculate time varying lighting values. *See, e.g., id.*, [0063], [0064], [0170], [0172], [0178], [0205]-[0207], [0211], [0220], [0302], [0303]. A POSITA would have understood that such software or algorithms would provide processor 102 with the ability to calculate these dynamic lighting values. EX1003, ¶76.

A POSITA would have understood that Mueller disclosed an effect simulator (processor 102) that could be programmed in a multitude of different ways, including to calculate a time-varying lighting value based on a simulation parameter in the manner disclosed in multiple these multiple embodiments of Mueller. EX1003, ¶77.

f. Claim Element 1e

outputting to said lighting device said time varying lighting value thereby to simulate the lighting effect.

Mueller teaches Claim Element 1e. EX1003, ¶¶80-84

Mueller describes the outputting a time varying lighting value to simulate a selected lighting effect, as it explains that “processor 102 . . . is configured to output one or more control signals to drive the light sources 104 so as to generate various intensities of light from the light sources 104. EX1004, [0168]. Mueller further discloses that “the processor 102 may be particularly configured (e.g., programmed) to provide controls signals to one or more of the light sources so as to generate a

variety of static or *time-varying (dynamic) multi-color (or multi-color temperature) lighting effects.*” *Id.*, [0170] (emphasis added).

Again, Mueller offers multiple disclosures of outputting a time varying lighting value to a lighting device, as it describes, for instance, a “simulation window 4970 [that] can be used to *display a simulation of any effect selected by the user.*” *Id.*, [0304] (emphasis added).

3. Claims 12 and 19

For purposes of this Petition, there are no substantive differences between Claim 1 and Claims 12 and 19, and Mueller renders claims 12 and 19 obvious for the same reasons as Claim 1. *See supra* Claim 1; *see also* EX1003, ¶¶40-84, 123-167, 193-236.

A matching of each limitation in Claim 1 to the corresponding limitation in Claims 12 and 19 is as follows, with differences shown in red and underlined:

Claim 1	Claim 12	Claim 19
<u>A method for</u> controlling a lighting device to produce a range of different user customisable lighting effects, <u>the method comprising:</u>	<u>A system adapted to</u> control <u>at least one</u> lighting device to produce a range of different user customisable lighting effects, <u>the system comprising:</u>	<u>A computer program product comprising software code for</u> controlling a lighting device to produce a range of different user customisable lighting effects <u>the computer program product is adapted to perform, when executed, the steps of:</u>

Claim 1	Claim 12	Claim 19
receiving user input of at least one user input simulation parameter to customise a lighting effect;	<u>an input interface adapted to</u> receive user input of at least one user input simulation parameter to customise a lighting effect;	receiving user input of at least one user input simulation parameter to customise a lighting effect;
<u>storing in memory</u> said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated;	<u>a memory adapted to store</u> said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated; and	<u>storing in memory</u> said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated;
recalling from said memory said at least one stored user input simulation parameter;	<u>an effect simulator adapted to:</u> recall from said memory said at least one stored user input simulation parameter; and	recalling from said memory said at least one stored user input simulation parameter;
calculating, <u>using an effect simulator</u> , a time varying lighting value based on said recalled simulation parameter; and	calculate a time varying lighting value based on said recalled simulation parameter;	calculating, <u>using an effect simulator</u> , a time varying lighting value based on said recalled simulation parameter; and
<u>outputting to said lighting device said</u> time varying lighting value thereby to simulate the lighting effect.	<u>wherein the effect simulator is adapted to output said calculated</u> time varying lighting value <u>to the at least one lighting device thereby</u> to simulate a lighting	<u>outputting to said lighting device said</u> time varying lighting value thereby to simulate a lighting effect.

Claim 1	Claim 12	Claim 19
	effect.	

The only differences are that while Claim 1 is directed to a “method” for controlling a lighting device, Claim 12 is directed to a “system” implementing this same method, and Claim 19 is directed to a “computer program” performing the same method. Thus, Mueller discloses each limitation in Claims 12 and 19 for the same reasons discussed above with respect to the corresponding limitation in Claim 1.

With respect to Claim 12, Mueller discloses that the method of claim 1 is implemented with a system that includes the lighting device 100 as controlled by processor 102. *See supra* Claim 1.

Moreover, as discussed in Claim 1, Mueller discloses the method can be performed by a “software program” as in claim 19. Mueller discloses that, “[i]n some implementations [of the methods and systems described therein], the storage media may be encoded with one or more programs that, when executed on one or more processors, perform at least some of the functions discussed herein.” EX1004, [0064]. Mueller further provides that “[t]he terms ‘program’ and ‘computer program’ are used herein in a generic sense to refer to any type of computer code (e.g., high or low level software, microcode, and so on) that can be employed to control operation of a processor.” (*Id.*) A POSITA would thus understand that the

control of lighting systems and methods disclosed in Mueller is via a processor's execution of software code. EX1003, ¶193.

4. Claim 2

The method according to claim 1, wherein said user customisable simulation parameter is stored locally.

Mueller renders Claim 2 obvious. EX1003, ¶¶85-90.

The memory discussed above in connection with Claim Elements 1b and 1c is located within lighting unit 100 disclosed by Mueller. *See supra* Claim Elements 1b and 1c. Specifically, Mueller discloses that the lighting unit 100 described therein can include a memory 114 to store various information, such as “one or more lighting programs for execution by the processor 102 (e.g., to generate one or more control signals for the light sources), as well as various types of data useful for generating variable color radiation” EX1004, [0172].

A POSITA would understand that a lighting program stored in memory 114 could include a user input simulation parameter depending on a selected lighting effect to be simulated. EX1003, ¶88. This is particularly true given Mueller's disclosure that a user of lighting unit 100, via interface 118, can “facilitate any of a number of user-selectable settings or functions (e.g., generally controlling the light output of the lighting unit 100, changing and/or selecting various pre-programmed lighting effects to be generated by the lighting unit, changing and/or selecting

various parameters of selected lighting effects, . . . etc.).” EX1004, [0182]; EX1003, ¶88.

Mueller also describes storing at least one simulation parameters locally in another embodiment, as it describes “the lighting control interface allows for the *storage* and downloading of *new functions and new parameter* settings.” EX1004, [0380] (emphasis added). A POSITA would understand that such downloaded functions and parameter settings are stored locally. EX1003, ¶90.

5. Claim 3

The method according to claim 1, wherein the simulation parameter comprises a colour or colour temperature.

Mueller renders Claim 3 obvious. EX1003, ¶¶91-96.

Mueller explains that a simulation parameter to be used with lighting unit 100 can comprises a color. Specifically, Mueller discloses that the processor 102 of lighting unit 100 “may be particularly configured (e.g., programmed) to provide control signals to one or more of the light sources so as to generate a variety of static or time-varying (dynamic) multi-color (or multi-color temperature) lighting effects.” EX1004, [0170].

In connection with an embodiment in which multiple lighting units 100 are used together, Mueller describes the manner in which a user can “generate a color changing effect that various colors from one lighting unit 100 to another lighting

unit 100 and across a number of lighting units 100 in such a way as to generate the appearance of a propagating rainbow of colors (“rainbow chase”)” *Id.*, [0202]. Within discussion of that same embodiment, Mueller explains that commands may be sent to each lighting unit 100 that “contain timing, intensity, hue, saturation or other relevant information, for example.” *Id.*

In yet another embodiment, Mueller describes a “parameters pane 4074 [that] presents parameters for a random color effect [U]sing the button 4462, the user can select the initial color, such as by selecting it from the palette 4750 of FIG. 47.” *Id.*, [0303].

6. Claim 4

The method according to claim 1, wherein the simulation parameter is related to at least one of: an effect frequency; an effect speed; a colour; a colour temperature; a trigger; a rate of increase of brightness; a rate of decrease of brightness; a rate of change of colour; a brightness; a local maximal (peak) brightness; a local minimal brightness; a brightness fluctuation period; and a colour fluctuation time period.

Mueller renders Claim 4 obvious. EX1003, ¶¶97-102.

As explained above in the context of Claim 3, Mueller discloses or teaches the method of Claim 1 wherein the simulation parameter is related to a color or a color temperature. *See supra* Claim 3.

Mueller also teaches simulation parameters related to brightness, EX1004, [0168] (processor 102 can be “configured to output one or more control signals to drive the light sources 104 so as to generate various intensities of light from the light sources 104.”), and rates of change of color, *id.*, [0170] (“the processor 102 may be particularly configured . . . to provide control signals . . . so as to generate a variety of static or time-varying (dynamic) multi-color (or multi-color temperature lighting effects.”)).

7. Claim 7

The method according to claim 1, wherein the lighting effect is designed to mimic at least one of: fire; lightning; police car light; television; a neon flickering sign; a candle; muzzle (gunshot); welding; spark/short circuit; a scan (e.g. fingerprint scanner); paparazzi flashes; fireworks; flashes (strobe); a propeller; a (nuclear) explosion; and a wormhole.

Mueller renders Claim 7 obvious. EX1003, ¶¶103-106.

In connection with an embodiment in which multiple lighting devices 100 are employed together, Mueller discloses a number of user customizable lighting effects included in the list comprising Claim 7, including a fire, EX1004, [0221], an explosion, *id.*; *see also id.*, [0215], flashes, *id.*, [0215], “and many others,” *id.*, [0221]. A POSITA would understand that these types of effects could be generated

with a single lighting unit comprising multiple light sources as taught by Mueller as well as an embodiment employing multiple lighting units. EX1003, ¶105.

8. Claim 8

The method according to claim 1, wherein the lighting value comprises brightness and/or colour data.

Mueller renders Claim 8 obvious. EX1003, ¶¶107-110.

Mueller includes multiple disclosures of an effect simulator (*i.e.*, processor 102), calculating a time-varying lighting value which comprises brightness and/or color data. For instance, Mueller states that “the processor 102 may be particularly configured (e.g., programmed) to provide control signals to one or more of the light sources so as to **generate** a variety of static or ***time-varying (dynamic) multi-color*** (or multi-color temperature) lighting effects.” EX1004, [0170] (emphasis added). Mueller also states that processor 102 can be “configured to output one or more control signals to drive the light sources 104 so as to generate various intensities of light from the light sources 104.” *Id.*, [0168].

9. Claim 9

The method according to claim 1, further comprising converting at least one of brightness and colour data into a lighting signal and outputting the lighting signal to the lighting device.

Mueller renders Claim 9 obvious. EX1003, ¶¶111-114.

Mueller discloses converting at least one of brightness and color data into a lighting signal and outputting that lighting signal to the light source(s) of lighting unit 100. Specifically, Mueller discloses that a user may interact with one or more interfaces 118, which are provided “to facilitate any of a number of user-selectable settings or functions (e.g., . . . changing and/or selecting various parameters of selected lighting effects)” EX1004, [0182]. Mueller further explains that the processor 102 “controls one or more light sources 104” based at least in part on user signals provided through interface 118. *Id.*, [0183]. Such control is the result of the processor being configured “to respond to operation of the interface 118 by originating one or more control signals for controlling one or more of the light sources 104.” *Id.* Processor 102 thus converts input data from interface 118 into lighting signals.

As explained above in connection with Claim 8, these lighting signals vary lighting parameters including color and brightness. *See supra* Claim 8; *see also* EX1004, [0168], [0170].

10. Claims 10, 16, and 18

10. The method according to claim 1, wherein the controlling is for a lighting system for videography, broadcast, cinematography, studio filming and/or location filming.

16. The system according to claim 12, wherein the at least one lighting device comprises a lighting device for videography, broadcast, cinematography, studio filming and/or location filming.

18. A lighting device according to claim 17, wherein the at least one lighting device is used for videography, broadcast, cinematography, studio filming and/or location filming.

Mueller renders claims 10, 16, and 18 obvious. EX1003, ¶¶115-118, 182-185, 189-192.

Mueller explains that the systems described therein can be used in a variety of contexts and locations, including “a film studio, [and] a video studio.” EX1004, [0034]. A POSITA would understand that the lighting systems and methods described in Mueller could be used in any of a number of entertainment settings, including videography, broadcast, cinematography, studio filming, and/or location filming. EX1003, ¶¶117, 184, 191.

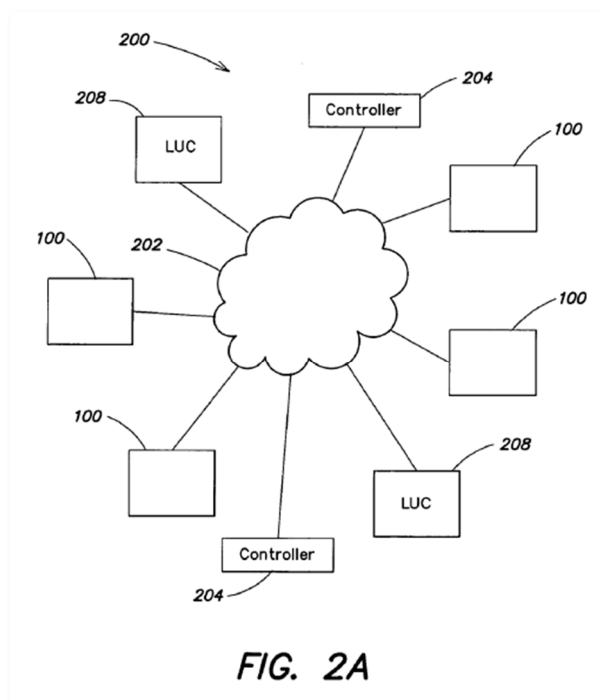
11. Claims 11 and 13

11. The method according to claim 1, further comprising controlling at least one further lighting device.

13. The system according to claim 12, wherein the system is adapted to control at least one further lighting device.

Mueller renders Claims 11 and 13 obvious. EX1003, ¶¶119-122, 168-171.

Mueller explains that “a number of lighting units 100, such as those described above with reference to FIG. 1, may be interconnected in a communicating relationship through a network to form a networked lighting system.” EX1004, [0197]. This networked lighting system is illustrated in Figure 2 of Mueller.



Id., Figure 2A; *see also id.*, [0197]. When arranged with multiple lighting units 100, this networked lighting system controls one or more additional lighting devices.

12. Claim 14

The system according to claim 12, further comprising an input interface and wherein the input interface comprises at least one of: a wireless communication interface; a dial; a slider; a display and buttons.

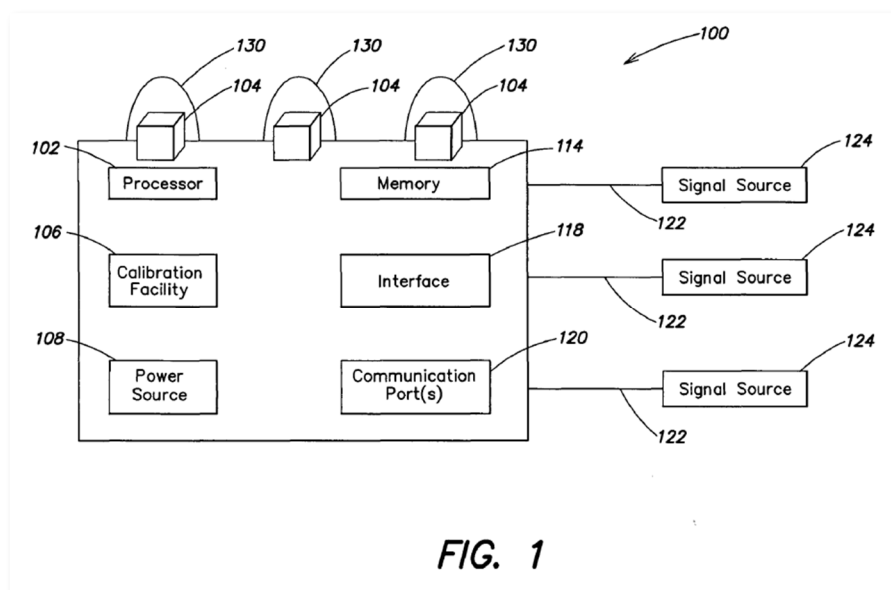
Mueller renders Claim 14 obvious. EX1003, ¶¶172-177.

As explained above in connection with Claim Element 12a, Mueller discloses an input interface in the form of interface 118. *See supra* Claim Element 1a; *see also* EX1004, [0182]. Mueller further provides that “[t]he interface 118 may present external controls that are, for example, physical controls such as switches, dials, buttons, or the like, programmatic controls, such as an application programming interface, or a user interface such as a graphical user interface on a computer.” EX1004, [0182].

Mueller also explains that “the interface 118 may simply present a network interface that may be accessed through any corresponding network facility and may be coupled in turn to a computer that provides a graphical user interface to a user for controlling the lighting unit 100.” *Id.*

Mueller further discloses the manner in which lighting unit 100 can be wirelessly networked with other devices through “communication ports 120” which

are interfaces for communication with other lighting devices. *Id.*, [0190] (“the lighting unit 100 may include one or more communication ports 120 to facilitate coupling of the lighting unit 100 to any of a variety of other devices . . . the communication port 120 may include an interface for any suitable wireless communications”), Figure 1.



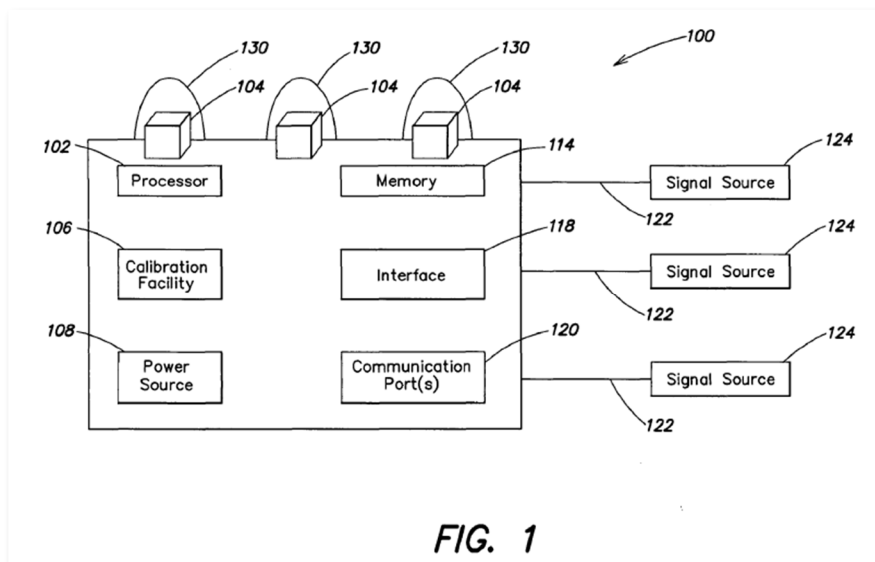
Id., Figure 1.

13. Claim 15

The system according to claim 12, wherein said at least one lighting device is integrated in a combined unit.

Mueller renders Claim 15 obvious. EX1003, ¶¶178-181.

Mueller describes that processor 102, input interface 118, memory 114, and light sources 104 are integrated in a combined unit: lighting unit 100. EX1004, [0168], Figure 1.



Id., Figure 1.

14. Claim 17

The system according to claim 12, wherein the at least one lighting device comprises at least one light emitting diode.

Mueller renders Claim 17 obvious. EX1003, ¶¶186-188.

Mueller discloses that the lighting device (lighting unit 100) comprises one or more light sources 104, and that those light sources 104 may be light emitting diodes (LEDs). EX1004, [0167] (“The lighting unit 100 may include one or more light sources 104, wherein one or more of the light sources may be an LED-based light source that includes one or more light emitting diodes (LEDs).”).

B. Ground 1a – Mueller in view of Edwards renders Claims 5 and 6 obvious.

1. Overview of Edwards

Edwards was filed as U.S. Patent Application No. 15/061,893 on March 4, 2016, and issued as U.S. Patent No. 9,743,010 on August 22, 2017. Edwards Claims priority to Provisional Application No. 62/128,392, filed March 4, 2015, and Provisional Application No. 62/264,673, filed December 8, 2015. Edwards is prior art under at least 35 U.S.C. § 102(a)(2).

Edwards discloses a system and method for synchronizing LED light fixtures to digital camera shutters. EX1011, Abstract. The system controls the LEDs so that “changing of lighting can be synchronized with the times when the shutter is closed so that all frames are complete and are without the visual artifact of the light changing mid frame.” *Id.*

Edwards discloses that its lighting system can produce lighting effects, such as lightning, a camera flash, strobing, street light flicker, fire, and a candle, while compensating for rolling shutter artefacts. *Id.*, 3:18-28, 11:38-12:1. The lighting system includes “LED light fixtures” and a “lighting controller.” *Id.*, 5:18-51, 6:49-62. The lighting controller “can be included inside each individual LED light fixture” or in “an external third system which links all the lights together and coordinates the commands.” *Id.*, 6:57-62; *see also id.*, 7:20-8:1. A user can input a camera synchronization signal to the lighting controller, along with the “commands

that control the lights” and produce the effect. *Id.*, 5:18-24, 6:57-62, 7:20-8:1. The lighting controller compensates for the rolling shutter artefacts by holding commands to control the lights “until the next vertical frame synch pulse,” and then times any lighting transitions for each frame to “occur during the closed shutter period prior to the frame being captured by the camera.” *Id.*, 5:24-29.

In Edwards, the LEDs are synchronized to the camera shutter frequency, such that they are “on” while the camera shutter is open, and changes to the LED lighting, which would otherwise introduce undesired visual artifacts, occur only when the shutter is closed. *Id.*; *see also id.*, 1:25-30 (“The present invention is related to synchronization of changes in lighting to the camera shutter for videos and motion pictures. This enables all lighting transitions to be done between frames making the resulting frame image capture clean and free from artifacts that occur when lighting changes occur in the middle of a frame.”); *see also* EX1003, ¶240.

2. Motivation to Combine

Mueller and Edwards are in the same field of art, namely entertainment lighting methods and systems. Mueller provides abundant disclosures regarding the control of lighting devices to produce a wide range of entertainment lighting effects, including light effects to be used in film and video recording. EX1003, ¶241. Mueller does not specifically provide specific disclosure relating to use of lighting controls to compensate for camera shutter speeds and frame rates to prevent the creation of

flicker or rolling shutter artifacts. *Id.*, ¶242. As demonstrated by Edwards, however, the need for such controls, and the methods to carry them out, were well known as of the priority date of the '101 Patent. *Id.* Knowing the necessity of such controls, a POSITA would have been motivated to supplement the disclosures of Mueller with known methods for preventing flicker and rolling shutter artifacts, such as those taught by Edwards. *Id.*

3. Claim 5

The method according to claim 1, wherein the lighting effect comprises a short time-period (e.g. stroboscopic) lighting effect with a user adjustable minimum pulse width.

Mueller in view of Edwards renders Claim 5 obvious. EX1003, ¶¶243-247.

In connection with an embodiment in which multiple lighting devices 100 are employed together, Mueller describes a stroboscopic lighting effect. *See, e.g.*, EX1004, [0215] (“The program may be configured, for example to generate an array of *lighting effects* such as color-changing effects, *stroboscopic effects*” (emphasis added)). Such stroboscopic effects are short time-period lighting effects. EX1003, ¶245. A POSITA would understand that this type of effect could be generated with a single lighting unit of Mueller as well as an embodiment employing multiple lighting units. *Id.*

Edwards discloses that its lighting system can produce lighting effects, such as lightning, a camera flash, strobing, street light flicker, fire, and a candle, while compensating for rolling shutter artefacts. EX1011, 3:18-28, 11:38-12:1. The lighting system includes “LED light fixtures” and a “lighting controller.” *Id.*, 5:18-51, 6:49-62. The lighting controller “can be included inside each individual LED light fixture” or in “an external third system which links all the lights together and coordinates the commands.” *Id.*, 6:57-62; *see also id.*, 7:20-8:1. A user can input a camera synchronization signal to the lighting controller, along with the “commands that control the lights” and produce the effect. *Id.*, 5:18-24, 6:57-62, 7:20-8:1.

A POSITA would have understood that Mueller and Edwards teach that a user could adjust pulse width, i.e., a short time-period (e.g. stroboscopic) lighting effect with a user adjustable minimum pulse width. EX1003, ¶247.

4. Claim 6

The method according to claim 1, wherein the user customisable simulation parameter comprises a parameter indicative of a group consisting of: a camera recording frequency; a camera shutter speed; and a camera frame rate.

Mueller in view of Edwards renders Claim 6 obvious. EX1003, ¶¶248-252.

Mueller describes a method for controlling a lighting device. In particular, Mueller describes “methods and systems for managing control instructions for a plurality of light systems.” EX1004, [0025]. Mueller specifically describes a

“lighting unit 100 that may serve as a device in a lightning environment.” *Id.*, [0164] (emphasis added). Lightning unit 100 is controlled by a processor 102 that “may be particularly configured (e.g., programmed) to provide control signals to one or more of the light sources [within the lighting unit 100] so as to generate a variety of static or time-varying (dynamic) multi-color (or multi-color temperature) lighting effects.” *Id.*, [0170]; *see also id.* at [0182] (referring to user-selectable settings or functions that “generally controlling the light output of the lightning unit 100 . . .”).

Mueller further discloses that control of the lightning unit 100 includes producing user-customizable lightning effects. Specifically, Mueller describes “controlling the light output of lighting unit 100, ***changing and/or selecting various pre-programmed lighting effects to be generated by the lighting unit, changing and/or selecting various parameters of selected lighting effects***, [and] setting particular identifiers such as addresses or serial numbers for the lighting unit” *Id.*, [0182] (emphasis added); *see also id.*, [0202] (“a lighting system user may want to generate a color changing effect that varies colors from one lighting unit 100 to another lighting unit 100, or across a number of the lighting units 100 in such a way as to generate the appearance of a propagating rainbow of colors (‘rainbow chase’), given a particular placement of lighting units 100 with respect to one another. In this example, the user may provide a simple instruction to the central controller 204 to accomplish this”), [214] (“An explosion icon can be selected with a mouse-

controlled cursor or other interface technique, which may prompt the user to click on a starting and ending point for the explosion in the coordinate system. By locating a vector in the representation, the user can cause an explosion to be initiated”).

It would have been obvious to a POSITA to apply Edwards’s additional teachings of compensating for rolling shutter artifacts produced by a camera to Mueller. EX1003, ¶252. Mueller and Edwards are analogous art—both disclose systems for producing lighting effect. *Id.* Both include controllers allowing a user to select and customize lighting effects such that a POSITA would have understood that adding the feature of compensating for rolling shutter artifacts produced by a camera as described in Edwards, would simply be the addition of a known method to a compatible system. *Id.*

C. Ground 2: Astera anticipates or renders obvious Claims 1-19.

1. Astera overview

Astera (EX1010) discloses how the AX10 can, through an interface on the light, a remote, or an app, receive user selections for customizable lighting effects, store those inputs, and then produce the customizable lighting effects at a later time.

Astera is a user manual for the AX10, a controllable lighting device used in studio filming and entertainment lighting. EX1003, ¶254. Astera is prior art under at least 35 U.S.C. § 102(a)(1).

The AX10 was sold to customers beginning in 2014 in Germany, and the first orders from customers in the United States were in March 2015. EX1012, ¶¶4-8 Astera bears a date of May 7, 2015, and was made publicly available, including to distributors and purchasers of the AX10, beginning at least in June of 2015 in the U.S., including via a Quick Start guide in product packaging and via Astera’s website. *Id.*

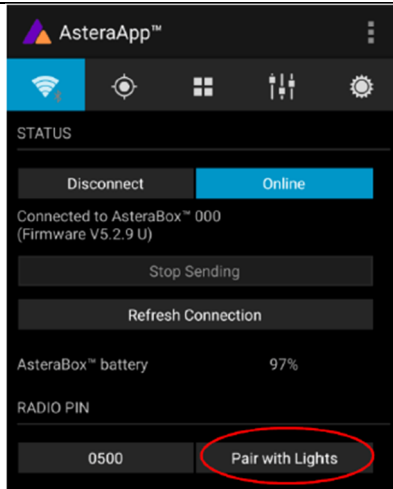
Astera describes operation and use of the AX10, a controllable lighting fixture with an array of nine “RGBAW” (*i.e.*, red, green, blue, amber, and white) LEDs:



EX1010, cover (annotated).

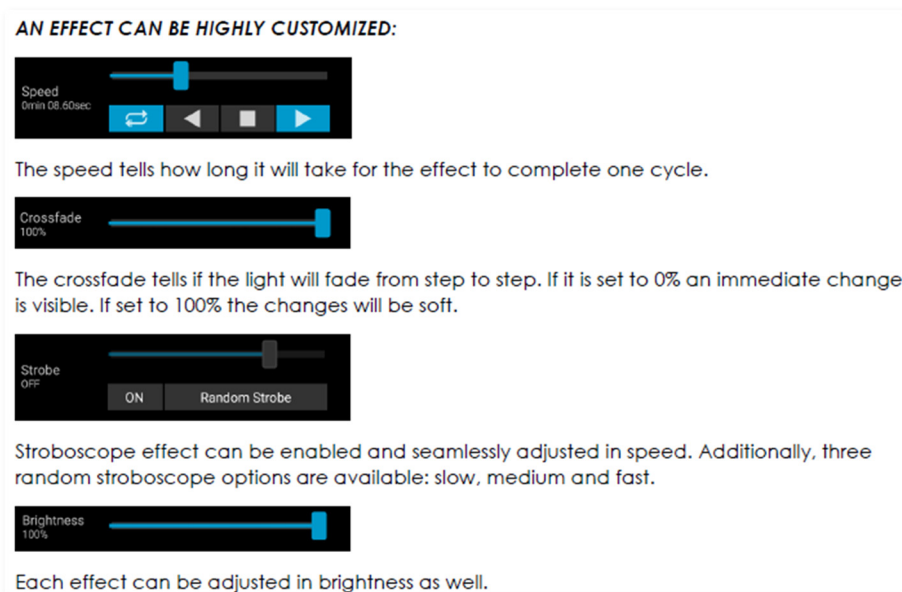
The AX10 can be controlled by various controllers, including (a) LCD Control Panel (with a “standalone engine”) on the AX10 (“**Control Panel**”), (b)

remote control, (c) “AsteraApp” (an app for mobile devices), and (d) CRMX wireless DMX. *Id.*, 9.

Control Panel on AX10 Light	Remote Control	App																				
LEGEND <table><tr><td> MENU COLOR BACK TO PREVIOUS MENU </td><td> - SPEED SCROLL DOWN </td><td> + BRIGHT SCROLL UP </td><td> ENTER PROG CHOOSE/ CONFIRM </td></tr><tr><td colspan="4">FROM THE STATUS SCREEN, PRESS THE ABOVE BUTTONS TO:</td></tr><tr><td> ENTER THE MAIN MENU </td><td> FACTORY RESET </td><td> ENTER THE MAIN MENU </td><td> ENTER THE DMX MENU </td></tr><tr><td colspan="4">HOLD THE ABOVE BUTTON FOR 2SECS TO:</td></tr><tr><td> STANDALONE MENU </td><td> ADJUST SPEED </td><td> ADJUST BRIGHTNESS </td><td> CHANGE PROGRAM </td></tr></table>	MENU COLOR BACK TO PREVIOUS MENU	- SPEED SCROLL DOWN	+ BRIGHT SCROLL UP	ENTER PROG CHOOSE/ CONFIRM	FROM THE STATUS SCREEN, PRESS THE ABOVE BUTTONS TO:				ENTER THE MAIN MENU	FACTORY RESET	ENTER THE MAIN MENU	ENTER THE DMX MENU	HOLD THE ABOVE BUTTON FOR 2SECS TO:				STANDALONE MENU	ADJUST SPEED	ADJUST BRIGHTNESS	CHANGE PROGRAM		
MENU COLOR BACK TO PREVIOUS MENU	- SPEED SCROLL DOWN	+ BRIGHT SCROLL UP	ENTER PROG CHOOSE/ CONFIRM																			
FROM THE STATUS SCREEN, PRESS THE ABOVE BUTTONS TO:																						
ENTER THE MAIN MENU	FACTORY RESET	ENTER THE MAIN MENU	ENTER THE DMX MENU																			
HOLD THE ABOVE BUTTON FOR 2SECS TO:																						
STANDALONE MENU	ADJUST SPEED	ADJUST BRIGHTNESS	CHANGE PROGRAM																			

Id., 9, 11, 23.

The AX10 produces customized lighting effects, *id.*, 23-24, 27-28, 32, run through the Control Panel, infrared remote, AsteraApp, and DMX control. *Id.*, 21, 28; *see also id.*, 17. The effects include fire, fast, medium, and slow strobes, color chaser effects, color fades, spiral colors, and rainbow. *Id.*, 17, 21. Users can customize these effects by adjusting parameters including speed, crossfade, stroboscope, and brightness:



Id., 27; see also *id.* 20, 24-29.

2. Claim 1

Astera anticipates or renders obvious Claim 1. EX1003, ¶¶259-297.

a. Claim Element 1p

A method for controlling a lighting device to produce a range of different user customisable lighting effects, the method comprising:

Astera disclose Claim Element 1p. EX1003, ¶¶260-267.

Astera discloses features and functionality of the AX10, a controllable lighting fixture with an array of nine “RGBAW” (*i.e.*, red, green, blue, amber, and white) LEDs. EX1010, 7.



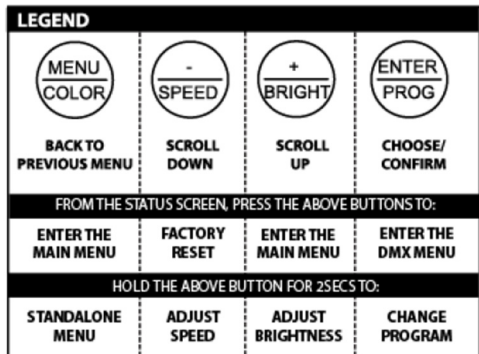
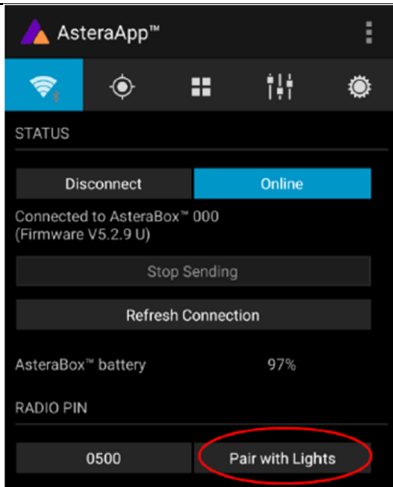
Id., cover (annotated),

4 SPECIFICATION

LED power:	135W
Illuminants:	9 x 15W RGBAW Philips LEDs
Luminous Flux*:	3,350lm (at White 4000K)
Emittance*:	10,350lx (at 2m; White 4000K)
CRI*:	up to 92

Id., 7 (annotated).

The AX10 can be controlled via various controllers, including the Control Panel and AsteraApp. *Id.*, 9.

Control Panel on AX10 Light	Remote Control	App
		

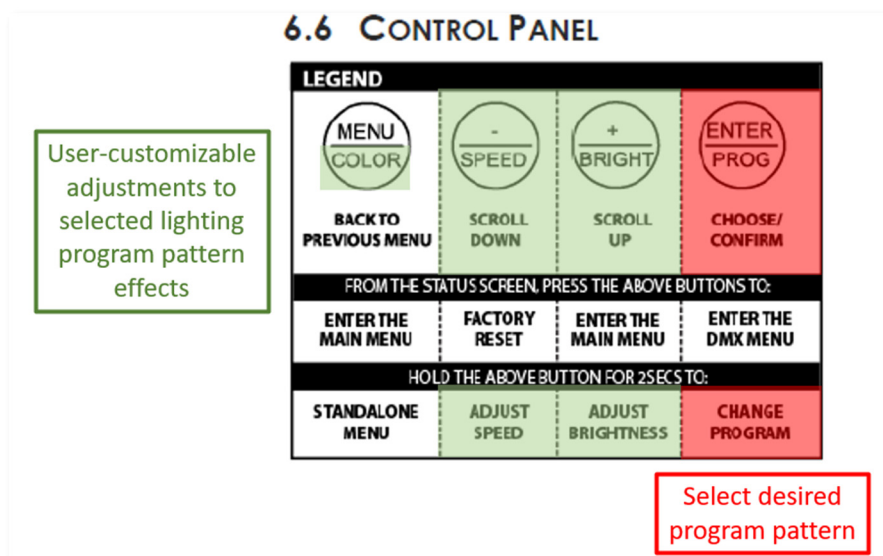
Id., 9, 11, 23.

The AX10 can produce different “user customizable lighting effects.” EX1003, ¶265. “Effect modes” offer “a comprehensive control of the built in standalone engine,” to implement “predefined programs” for effects including fire, strobe, static colors, color fades, rainbow, spiral colors. EX1010, 17, 21.

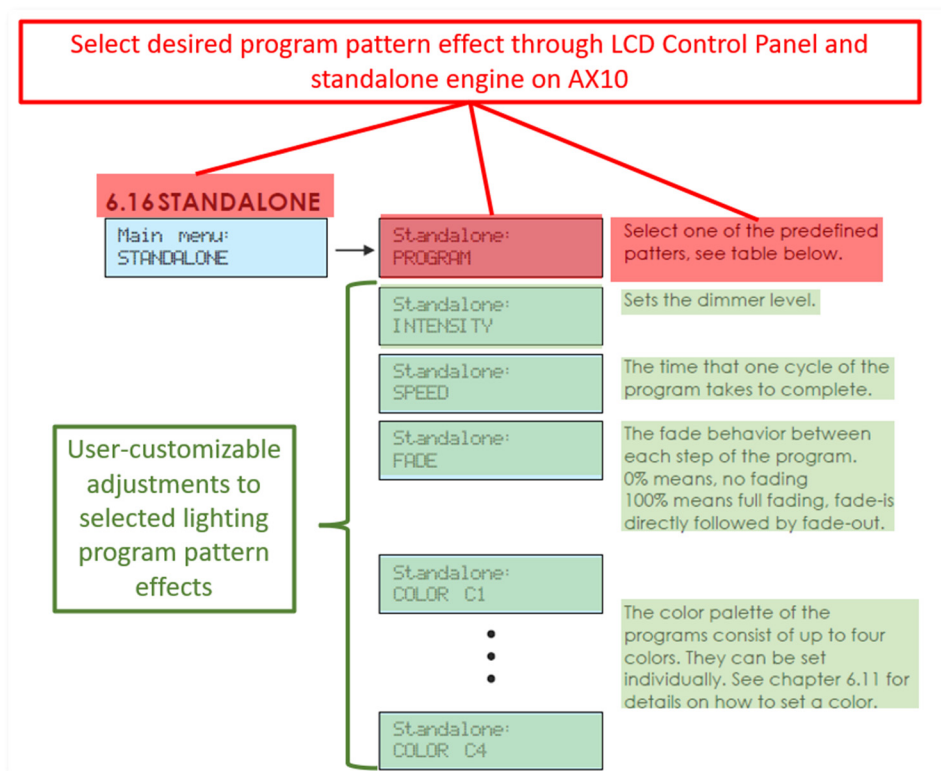
Name	Pattern
ONE COLOR STATIC	A static color is displayed on the whole virtual light.
TWO COLOR STATIC	The virtual light is split into two halves and two colors are displayed.
THREE COLOR STATIC	The virtual light is split into three parts and three colors are displayed.
FOUR COLOR STATIC	The virtual light is split into four parts and four colors are displayed.
ONE COLOR FADE	For all FADE programs, the whole color palette of four colors is used. Those colors are faded in and out one by one. Here, the whole virtual light shows the same color.
TWO COLOR FADE	The virtual light is split and shows two colors at a time.
THREE COLOR FADE	The virtual light is split and shows three colors at a time.
FOUR COLOR FADE	The virtual light is split and shows four colors at a time.
SIMPLE RUNNING	A running light; the background and the running pixels color can be set.
DOUBLE RUNNING	Two pixels are running in opposite direction.
TWO COL RUNNING	The two pixels are of different color even.
FLAG RUNNING	A three color flag is running over the background color.
DOUBLE FLAG RUNNING	Two flags are running over background in opposite direction.
SPIRAL 4 COLORS	The color is changed pixel by pixel. All four colors are used one after the other.
SPIRAL 2 COLORS	The color changes between color 1 and 2 from the outside to the inside, pixel by pixel.
RAINBOW	A rainbow effect is displayed.
FIRE	The fire effect is a random flicker between two colors, background and flickering color.

Id., 21.

Users can customize these effects. *Id.*, 8, 11, 13, 20, 24-29. The Control Panel allows users to “select” an effect and modify it by adjusting: (i) intensity to set a dimmer level; (ii) speed to change the time to complete one cycle; (iii) fade time between program steps; and (iv) color. *Id.*, 20.



Id., 11 (annotated).



Id., 20 (annotated).

Similarly, users can select and customize effects including “running lights,” “fire,” “rainbow,” “chaser effects” and “stroboscope” through AsteraApp. *Id.*, 27-28.

7.7 LIST OF EFFECTS

The effects' patterns are pre-defined and cannot be modified by the user. They are pre-programmed inside of each light. Still they can be parameterized. These effects are:

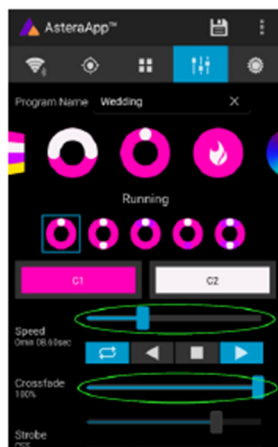
	Several variations of running lights are available.
	The Fire effect shows a random flickering effect. The background color and the color of the flickering effect can be adjusted.
	The rainbow effect shows a color change through all colors. Only its speed can be adjusted.
	Chaser effects provide an efficient means to create dancefloor lighting. The static chaser exchanges the color of the lights according to the tapped-in beat. The colors are randomly chosen. The effect can be adjusted to show up to 4 different colors at a time.
	The Moving Chasers overlay the static chaser by a second movement of the four displayed colors over the available positions of a Flow-Set. This gets mostly interesting of the Moving Strobe is chosen. Then, only some of the positions strobe and they are moving. So the strobe effect moves over the Flow-Set.

Id., 28 (annotated). Selected effects can then be customized by adjusting parameters including: (i) “speed” for “the effect to complete one cycle,” (ii) “crossfade” between steps, (iii) “speed” of a “stroboscope” effect, (iv) “brightness,” and (v) “color”:

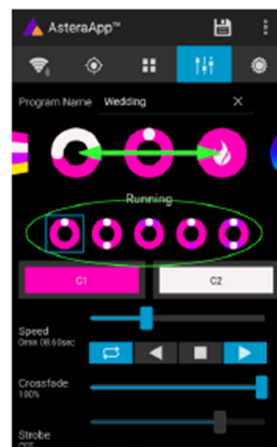
7.6 CHANGING THE EFFECT



On the AsteraApp™ main screen, press "Wedding" (1), then enter the editor (2).

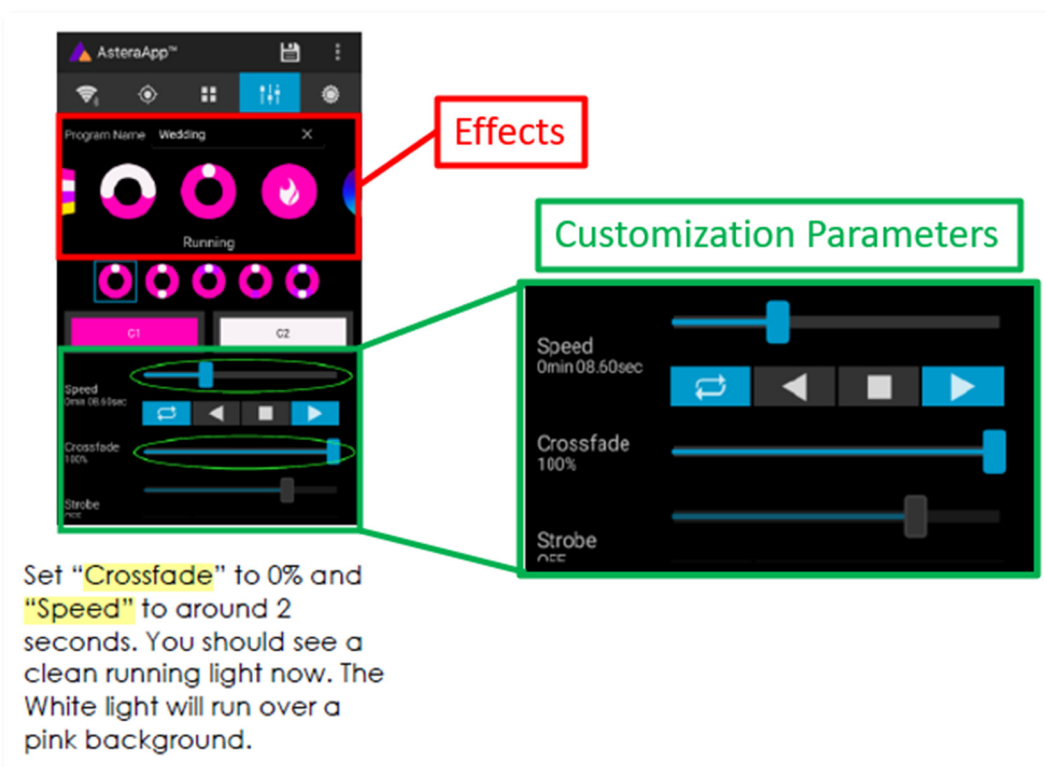


Set "Crossfade" to 0% and "Speed" to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.

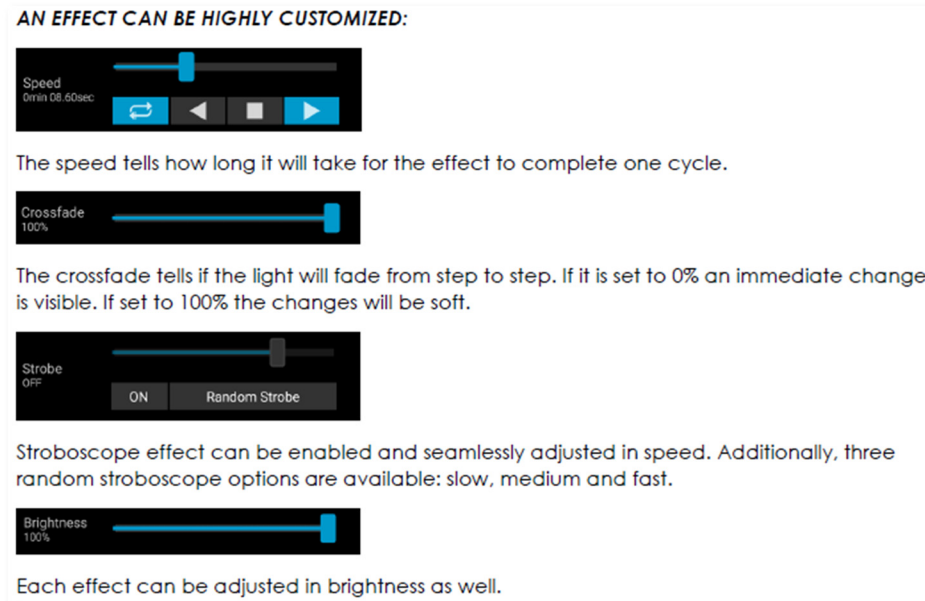


The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.

Id., 27.



Id. (annotated).



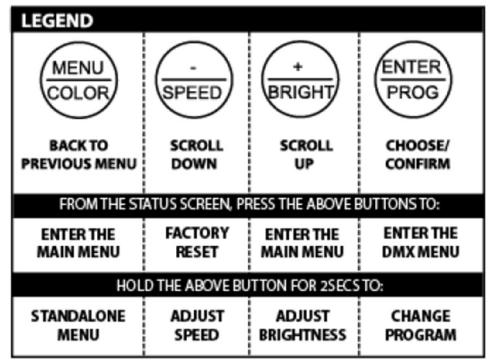
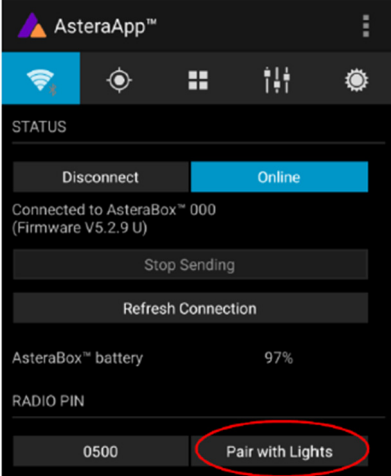
Id.

b. Claim Element 1a

receiving user input of at least one user input simulation parameter to customise a lighting effect;

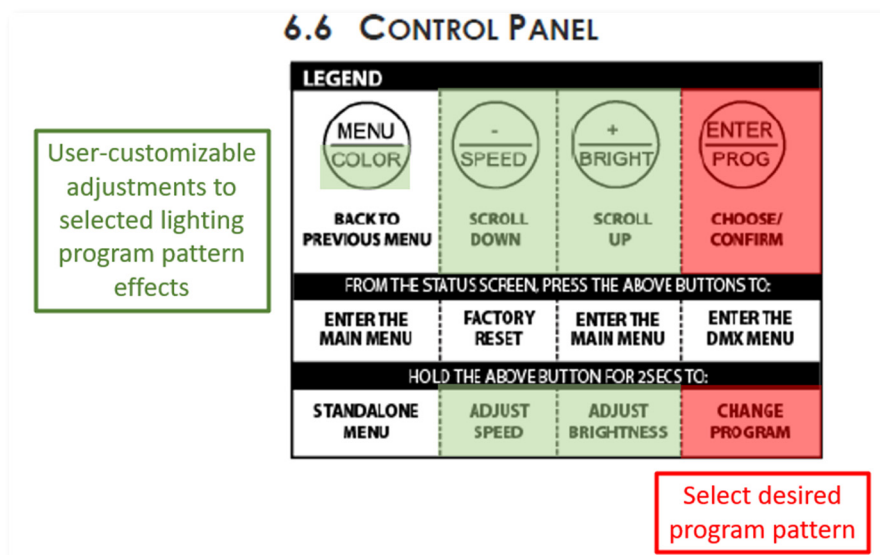
Astera teaches Claim Element 1a. EX1003, ¶¶268-273.

The AX10 receives user inputs through multiple user interfaces:

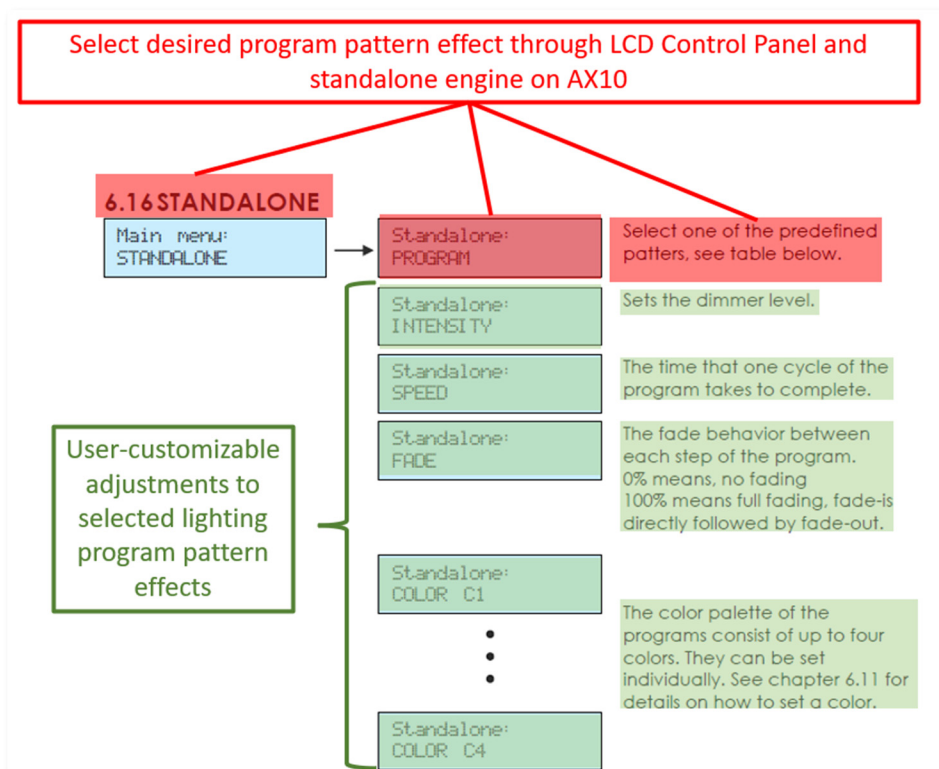
Control Panel on AX10 Light	Remote Control	App
		

EX1010, 9, 11, 23. Users can select desired effects and input parameters through interfaces on the Control Panel or AsteraApp. *Id.*, 8, 11, 13, 20, 24-29.

The Control Panel includes an LCD interface that “receives” user selections of a lighting program (*e.g.*, those listed on page 21) and parameters of: (i) intensity; (ii) speed of a cycle of the program; (iii) fade time between steps; and (iv) color selections. *Id.*, 20.



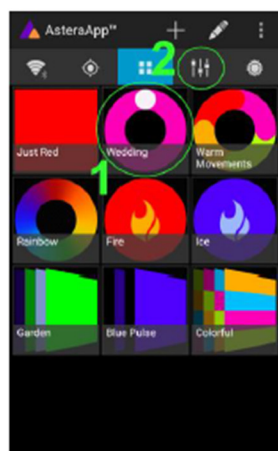
Id., 11 (annotated).



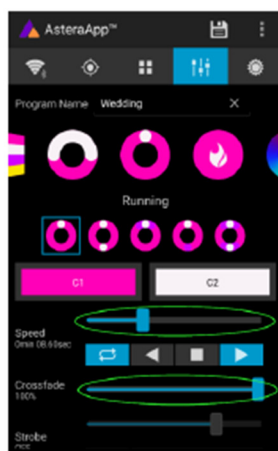
Id., 20 (annotated). These selections are received by the Control Panel, which then adjusts the effect accordingly. EX1003, ¶271; *see also supra* Claim Element 1p.

Similarly, with AsteraApp, programs of effects, such as “wedding,” may be selected and “highly customized.” EX1010, 27. In particular, different “effects” may be selected from a main screen, and the user can then “enter the editor” where the user is provided options to customize parameters of the effect. *Id.* Any user inputs of adjustments to the effect parameters are received by AsteraApp through the user interface. *Id.*

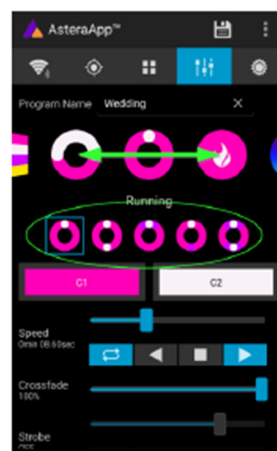
7.6 CHANGING THE EFFECT



On the AsteraApp™ main screen, press “Wedding” (1), then enter the editor (2).



Set “Crossfade” to 0% and “Speed” to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.



The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.

Id., 27.

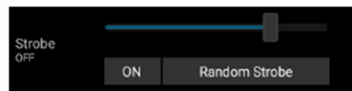
AN EFFECT CAN BE HIGHLY CUSTOMIZED:



The speed tells how long it will take for the effect to complete one cycle.



The crossfade tells if the light will fade from step to step. If it is set to 0% an immediate change is visible. If set to 100% the changes will be soft.



Stroboscope effect can be enabled and seamlessly adjusted in speed. Additionally, three random stroboscope options are available: slow, medium and fast.



Each effect can be adjusted in brightness as well.

Id.

In addition, Astera discloses that pre-defined effect patterns, such as “fire,” “fading colors,” and “rainbow,” may be selected, with the user then being able to adjust parameters of the effect that are received by AsteraApp. *Id.*, 28. For example, if a “fire” effect is selected as part of a program, the user can adjust at least the “background” and “flickering” colors, and if a “rainbow” effect is included, then the “speed” can be adjusted. *Id.* Finally, for all effects, Astera discloses a “master brightness” control that can adjust the brightness of any lights that would run an effect. *Id.*, 31.

c. Claim Element 1b

storing in memory said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated;

Astera discloses Claim Element 1b. EX1003, ¶¶274-280.

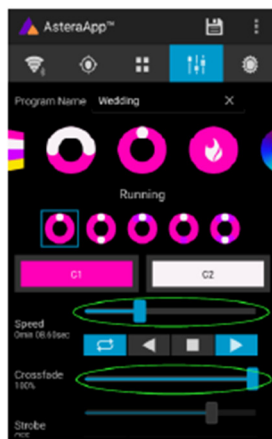
In Astera, the simulation parameter depends on the user-selected pre-programmed light effect (*e.g.*, fire, rainbow, chaser), as customized by any desired random strobing, speed, brightness, or color parameters. *See supra* Claim Element 1a. The speed, fade, color, stroboscope, and brightness selectable menu options are based on the user-selected effect and are presented as parameters for adjusting the particular selected effect. EX1010, 20-21,24-28. For example, when “rainbow” is selected a “speed” parameter can be generated, and when “fire” is selected parameters to generate the “random flicker” and set the background and flickering effect colors are generated. *Id.*, 28.

The effects and user adjustments made to them may also be “saved back to the main screen by pressing the save button.” EX1010, 27. Users may select an effect (like “fire” or “wedding”) and modify it by changing simulation parameters (like “colors,” “speed,” “stroboscope,” and “brightness”). *Id.*; *see also id.*, 25. When the user is done, she can click the disk icon in AsteraApp, saving the modified effect parameters. *Id.*, 27.

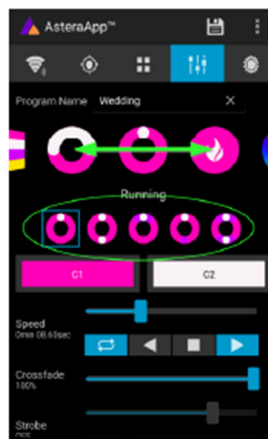
7.6 CHANGING THE EFFECT



On the AsteraApp™ main screen, press “Wedding” (1), then enter the editor (2).



Set “Crossfade” to 0% and “Speed” to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.



The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.

After the effect is adjusted, it may be saved back to the main screen by pressing the save button.

Id., 27 (annotated).

Once saved to the main screen, these stored effects (with their modified parameters) can later be recalled and played. *Id.*, 10, 24, 30; *see also infra* Claim Element 1c. Saving within AsteraApp (a program stored in memory) therefore saves to a “memory,” as saving within the main menu must save to a memory so that the saved effect can later be recalled and replayed. EX1003, ¶278.

Similarly, when operating the AX10 through the Control Panel on the lighting device, a POSITA would understand that any user selected effects and adjusted parameters are “saved” to a memory within the AX10. *Id.*, ¶279. From the Control

Panel, users can make Standalone mode selections of programs (*i.e.*, effects) and parameter adjustments. EX1010, 11, 14, 17, 20-21; *see also supra* Claim Element 1a. For example, a user can select a program, and then adjust and set an “intensity” parameter for the program. EX1010, 20. After setting the intensity, a user can also adjust “speed,” and then “fade” parameters of the same program. *Id.* Each of these parameter selections must be stored in memory; otherwise, a user would not be able to change one parameter and then make another selection to change a different parameter prior to finalizing the effect and outputting it from the light. EX1003, ¶279.

Further, the Control Panel provides an option for users to “reset” the settings of the device, including “resetting” the Standalone settings set for any particular user-customized effect and program. EX1010, 12, 22. That the Standalone settings, which include the selected effect and any adjusted parameters, *id.*, 12 (“reset all user settings to default”) 20-22, can be “reset” to default values indicates those parameters must be stored in memory on the device. EX1003, ¶280. That is, the user selected parameter settings are stored and saved until they are changed or reset to default. *Id.*

d. Claim Element 1c

recalling from said memory said at least one stored user input simulation parameter;

Astera discloses Claim Element 1c. EX1003, ¶¶281-286

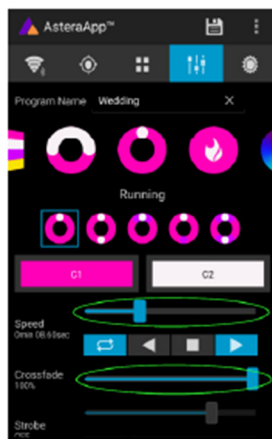
The stored user input parameters, *see supra* Claim Element 1b, are recalled from memory prior to, and during, the output of desired effects from the AX10. EX1003, ¶283.

In AsteraApp, stored effects (with their modified parameters) can be recalled, with lighting values calculated based on the recalled effect and parameters so the effect can be played later. EX1010, 24, 27, 30. For example, adjusted program effects such as “Wedding” may be “saved back to the main screen,” from which they can later be recalled, played, or further adjusted. *Id.*, 27. The saved programs of “effects” are represented by “tiles” on a main screen where they can be selected and recalled. *Id.*, 30.

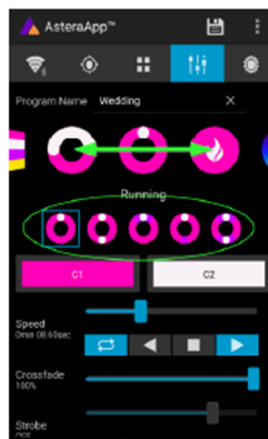
7.6 CHANGING THE EFFECT



On the AsteraApp™ main screen, press "Wedding" (1), then enter the editor (2).



Set "Crossfade" to 0% and "Speed" to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.



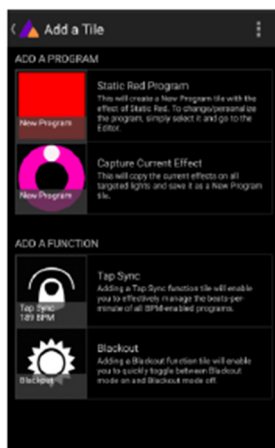
The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.

After the effect is adjusted, it may be saved back to the main screen by pressing the save button.

Id., 27.

7.9 THE MAIN SCREEN

Here each program is represented by a tile. Those tiles can be edited and freely positioned. Several pages of tiles are available.



To move or delete a tile, press the pen icon (2). A popup will show the available actions. To add a new program tile, press the "+" icon (1).

While adding a tile, either a default "Static Red" or the currently running program can be selected. Additionally, special function tiles are available.

Id., 30.

Again, the stored effects and adjusted parameters are saved to a memory, *see supra* Claim Element 1b, and when they are recalled, they are recalled from this same memory. EX1003, ¶285.

Similarly, in Standalone mode implemented through the Control Panel, saved user parameter settings are "recalled" for the AX10 to "replay" and "display" the customized effect programs with the lights. EX1010, 10, 17, 20-21; *see also id.*, 7 (indicating the AX10 may be "operating under a previous setting.").

e. Claim Element 1d

calculating, using an effect simulator, a time varying lighting value based on said recalled simulation parameter;

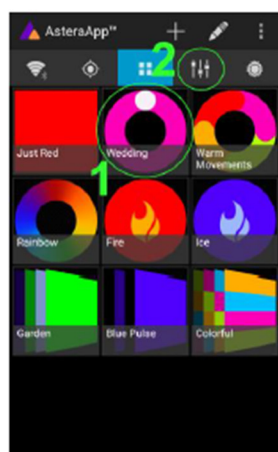
Astera discloses Claim Element 1d. EX1003, ¶¶287-292.

The Control Panel and AsteraApp include effect simulators to calculate time varying lighting values for generating special effects based on recalled simulation parameters. EX1010, 9-11, 13, 17, 21, 24.

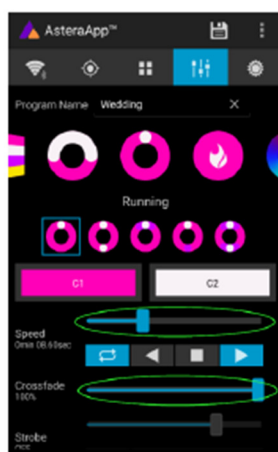
The Control Panel allows users to “select” from predefined effects, and then adjust parameters including intensity (to set a brightness level), speed (to change the time to complete one cycle), fade time, and color. *Id.*, 20. As noted above, these effects with adjusted parameters are stored and recalled from the AX10 (via the Control Panel) in order for the user to make selections and adjustments and play the desired effect. *See supra* Claim Elements 1b-1c. The Control Panel creates data characterizing the adjusted lighting effect based on the recalled effect settings, in the form of values and settings for the LEDs to “display these effects properly with [the] light.” EX1010, 12, 17, 20-21; *see also* EX1003, ¶290. The “standalone engine” then causes the LEDs to “display static colors or replay a number of predefined effect patterns with a customizable color palette.” EX1010, 24; *see also id.*, 10, 17. For effect patterns, the values vary with time to change the output of the LEDs, creating the effect. *Id.*, *see also* EX1003, ¶290.

Similarly, in AsteraApp, users can select from different lighting effects, such as “fire,” “chasers,” “rainbow” and “stroboscope.” EX1004, 23-24, 27-28; *see supra* Claim Element 1p. Selected effects can then “be highly customized,” to adjust parameters including: (i) “speed” of how long it will take to complete one cycle, (ii) “crossfade” between steps, (iii) random “stroboscope” speed, and (iv) “brightness.” *Id.*, 27. Users can also select and customize colors for effects “with a customizable color pallet,” and certain effects, like “fire effect,” allow a user to “adjust” the colors making up the effect. *Id.*, 24, 28.

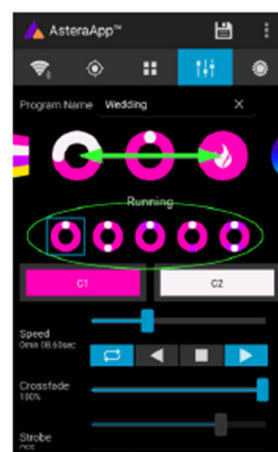
7.6 CHANGING THE EFFECT



On the AsteraApp™ main screen, press “Wedding” (1), then enter the editor (2).

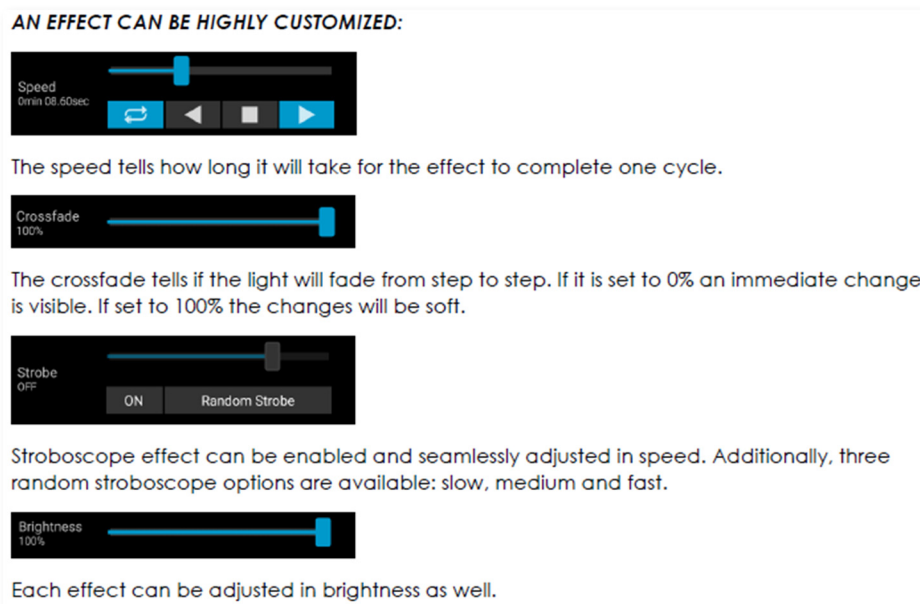


Set “Crossfade” to 0% and “Speed” to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.



The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.

Id., 27.



Id.

These selections may be saved and recalled for later use, such that the recalled parameters are used to calculate the time varying lighting value. EX1010, 10, 24, 30; *see also* EX1003, ¶292. For example, after recalling saved effects, AsteraApp calculates time varying lighting values, including brightness and color information, for these user-customized effects. EX1010, 23-29; *see also* EX1003 ¶292. AsteraApp can “send complex effects” to the lights and can be “used to adjust the lights remotely” by sending controls (which are lighting values). EX1010, 23; *see also* EX1003, ¶292. Thus, based on recalled user parameters, “effects can be created and can be sent to the light by the built in UHF receiver,” where the effects are “triggered” and replayed at each light. EX1010, 23.

f. Claim Element 1e

outputting to said lighting device said time varying lighting value thereby to simulate the lighting effect.

Astera discloses Claim Element 1e. EX1003, ¶¶293-297.

Both the Control Panel and AsteraApp output time-varying lighting values for the AX10 to “display these [selected] effects properly with [its] light.” EX1010, 21.

The Control Panel “Main Menu” allows users to select “STANDALONE” mode, where the Control Panel will “set the parameters of the standalone engine” in the AX10. *Id.*, 12, 17. In “STANDALONE,” the Control Panel allows users to select a desired effect program and adjust parameters of intensity, speed, fade, and color. *Id.*, 20-21; *see also supra* Claim Element 1a. When a user then wants the lights to play the effect, the “standalone engine” outputs the lighting values to the LEDs to cause them to “display static colors or replay a number of predefined effect patterns with a customizable color palette.” EX1010, 24; *see also id.*, 10, 17. For effect patterns, the output values vary with time to change the output of the LEDs, creating the effect. *Id.*; *see also* EX1003, ¶296.

With AsteraApp, users can select from different effects (*e.g.*, fire, chasers, rainbow) and customize them (*e.g.*, adjust speed, crossfade, stroboscope, brightness). *See supra* Claim Element 1a. When a user wants to play an effect, the calculated lighting values for that effect are output from AsteraApp to the AX10

lighting device. EX1010, 24. (“With the AsteraApp these effects can be created and be *sent to the light by the built in UHF receiver*,” where they are received by the standalone engine in the AX10.” (emphasis added)); *see also id.*, 10, 17. That is, AsteraApp outputs the lighting values representing the adjusted effect to the AX10 light. EX1003, ¶297. When the lighting values are received by the standalone engine, the AX10 “replays [the effect] autonomously until a new effect is received.” EX1010, 24.

3. Claims 12 and 19

For this Petition, there are no substantive differences between Claim 1 and Claims 12 and 19, and Astera anticipates and renders obvious claims 12 and 19 for the same reasons as Claim 1. *See supra* Claim 1; Ground 1, Claims 12 and 19; *see also* EX1003, ¶¶259-297, 345-384, 410-447.

With respect to Claim 12, Astera discloses that the method of Claim 1 is implemented on a system that includes the AX10 lighting device as controlled by either the Control Panel on the device itself in Standalone mode, or through connection with the AsteraApp. *See supra* Claim 1.

Moreover, as discussed in Claim 1, Astera expressly discloses the method can be performed by a “software program” as in claim 19. The Control Panel and AsteraApp are computer programs and perform their functions based on software code. EX1003, ¶414. AsteraApp is a mobile application, in the form of code, that is

downloaded and run on a mobile device. *Id.* The Control Panel is implemented through software-based programming in the AX10 itself. *Id.* The AX10 includes “firmware version 5.2.20.” EX1010, 2, 12, 22. A POSITA would understand that firmware is software programmed into a read-only memory, and that this firmware implements the programming and control of the AX10. EX1003, ¶414.

4. Claim 2

The method according to claim 1, wherein said user customizable simulation parameter is stored locally.

Astera anticipates or renders obvious Claim 2. EX1003, ¶¶298-301.

The user-selectable lighting effects, and user adjustments made to those effects, may be locally “saved back to the main screen by pressing the save button” within the app. EX1010, 27. Saving locally within AsteraApp saves the effect and parameters on a “local” memory on the device running the app. EX1003, ¶300.

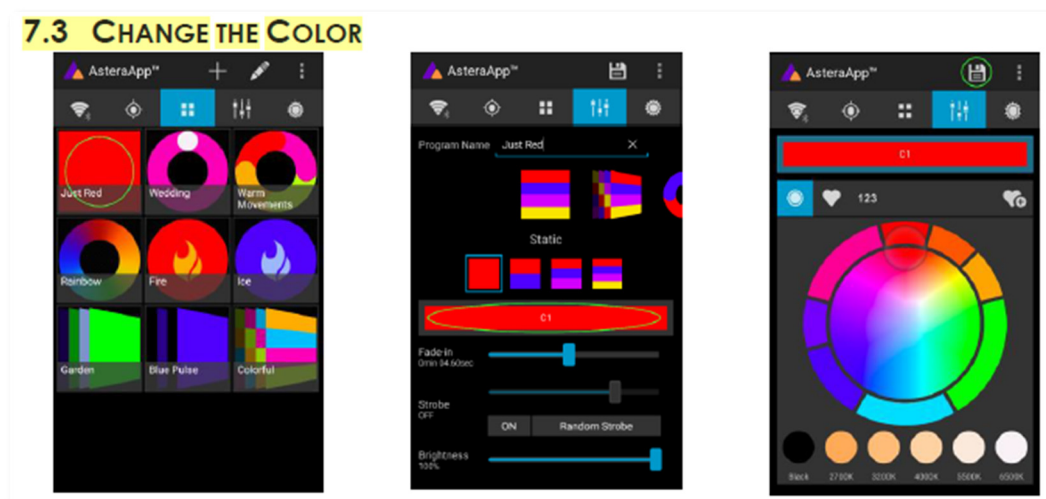
Similarly, when operating in “Standalone” and controlled by the local Control Panel, where “[t]he light can no longer be controlled by any wireless signal,” EX1010, 11, the user customized programs and parameters are saved locally in the AX10 itself. *See supra* Claim Elements 1b-1c. A POSITA would recognize that the standalone engine implementing “Standalone” mode would use a local memory in order to execute stored lighting commands. EX1003, ¶301.

5. Claim 3

The method according to claim 1, wherein the simulation parameter comprises a colour or colour temperature.

Astera anticipates or renders obvious Claim 3. EX1003, ¶¶302-305.

In “Standalone,” users can choose “**color**” parameters to set a “color palette” of a selected program. EX1010, 20, 24. Similarly, in AsteraApp, users can set color parameters for lighting effects. *Id.*, 24, 27-28.



Id., 24 (annotated); *see also id.*, 25-27.

Astera also discloses that “**color temperature**” can be selected by choosing a static color from a list of predefined color options, including colors based on temperature. *Id.*, 14.

6.11.1 Predefined Colors			
Color	Red	Green	Blue
RED	255	0	0
ORANGE	255	107	0
YELLOW	255	160	18
GREEN	0	255	0
CYAN	0	255	224
BLUE	0	0	255
VIOLET	127	84	255
PINK	255	53	119
BLACK	0	0	0
2700K	255	166	70
3200K	255	178	89
4000K	255	193	115
5500K	255	211	150
6500K	255	219	167

Id. (annotated). Moreover, colors can be selected and edited to set “AsterRGB values” for a particular “color temperature.” *Id.*, 8.

6. Claim 4

The method according to claim 1, wherein the simulation parameter is related to at least one of: an effect frequency; an effect speed; a colour; a colour temperature; a trigger; a rate of increase of brightness; a rate of decrease of brightness; a rate of change of colour; a brightness; a local maximal (peak) brightness; a local minimal brightness; a brightness fluctuation period; and a colour fluctuation time period.

Astera anticipates or renders obvious Claim 4. EX1003, ¶¶306-312.

Users can select from various lighting effects from the Control Panel or AsteraApp. EX1010, 17, 20-21, 23-24, 27-28. Users may adjust the “color” of an effect, as well as select settings related to “color temperature.” *See supra* Claim 3.

Users can also adjust the “intensity,” or “brightness,” and “speed” parameters of each effect. EX1010., 20, 27. And, in the “Anti-Flicker” settings, a “frequency” parameter “can be freely adjusted.” *Id.*, 32. Accordingly, Astera expressly discloses parameters related to “frequency,” “a brightness,” “speed,” “color,” and “color temperature,” as these may be adjusted. EX1003, ¶308.

Moreover, Astera discloses simulation parameters related to a rate of increase or decrease of brightness, and the brightness fluctuation period, as the time for an effect to complete a cycle is adjusted through the speed parameter. EX1010, 17, 20, 27-28. Completing the same effect, such as a one, two, or three color fade, in a shorter time cycle changes how quickly brightness or color fluctuates to complete the effect. EX1003, ¶309.

In addition, “stroboscope” can be adjusted in speed, thereby changing the brightness fluctuation period of flashes in the effect. EX1010, 27. Further, rate of color change and color fluctuation period parameters can be adjusted in the “chaser effect” and “rainbow effect” that change colors, as the “speed” of both can be adjusted. *Id.*, 27-28. Changing the speed changes the rate of color change and color fluctuation period. EX1003, ¶310.

Astera also discloses parameters related to a “trigger,” as users can manually select when to start the effect by selecting “now” or setting a particular “later” time in “standby” settings. EX1010, 34. The “standby is intended to be used between

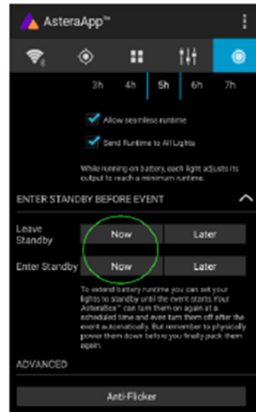
setup and event... [A]ll lights may be switched to standby mode and woken up later when the event starts.” *Id.*

7.14 ENTER AND LEAVE STANDBY

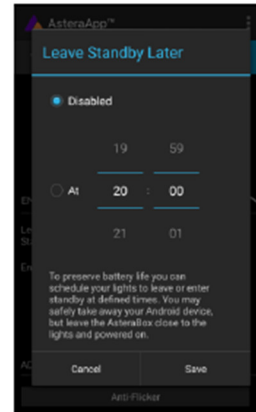
The standby is intended to be used between setup and event (see chapter 3.2.1 **Error! Reference source not found.**). After setup is completed, all lights may be switched to standby mode and woken up later when the event starts. This ensures that no battery runtime is wasted. This can be either done manually or automated.



Press the small arrow to open the standby menu.



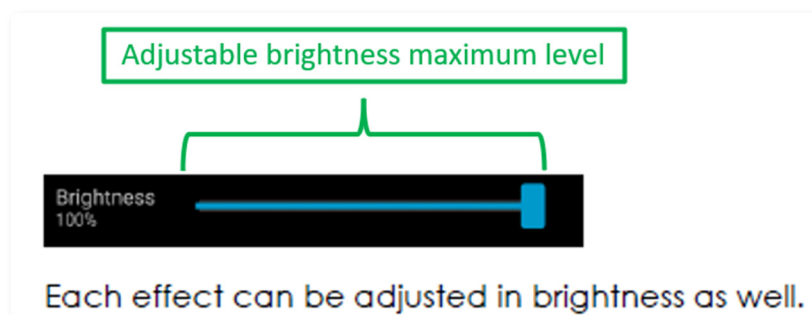
By pressing the “Now” buttons, standby can be switched on or off for all currently targeted lights.



Any of the “Later” buttons will require a time to be set. The standby will be scheduled to the specified time.

Id., 34.

Additionally, AsteraApp has a slider such that “[e]ach effect can be adjusted in brightness.” *Id.*, 27. Accordingly, the user-selected simulation parameter can be a maximum brightness, with the slider setting possible maximum brightness percentage.



Id., 27 (annotated). The Control Panel allows for the same brightness adjustment. *Id.*, 11. Because a “background” color can be set, this is related to a “minimum brightness” that is at least the background color brightness. *Id.*, 21, 27-28.

7. Claim 5

The method according to claim 1, wherein the lighting effect comprises a short time-period (e.g. stroboscopic) lighting effect with a user adjustable minimum pulse width.

Astera anticipates or renders obvious Claim 5. EX1003, ¶¶313-318.

Astera discloses both a “stroboscope” effect and the ability to create a short-time alteration between pulses of lights with a color fade or “chaser” effect, each customizable for minimum pulse width. EX1010, 27-28.

With respect to the “stroboscope effect,” this can be “enabled and seamlessly adjusted in speed.” *Id.*, 27. The stroboscopic effect is an effect of flashes with a short-time period between flashes. EX1003, ¶316.

AN EFFECT CAN BE HIGHLY CUSTOMIZED:



Stroboscope effect can be enabled and seamlessly adjusted in speed. Additionally, three random stroboscope options are available: slow, medium and fast.

EX1010, 27 (annotated). By enabling a user to adjust speed of the strobe, Astera allows users to adjust minimum pulse width. EX1003, ¶316. For example, a slower strobe would have a longer duration, and thus a longer pulse width, and adjustments to increase the speed of the strobe would result in the duration and thus pulse width becoming smaller. *Id.* Moreover, Astera provides that a user can select from “three random stroboscope options are available: slow, medium and fast.” EX1010, 27. By selecting between these speeds, a user again can adjust minimum pulse width, as a random slow stroboscope effect would have a greater pulse width than a random fast stroboscope effect that comprises more flashes. EX1003, ¶316.

Further, Astera describes that both the Control Panel and AsteraApp provide for control of “crossfade” between steps in an effect program, and “speed” of how “long it will take for the effect to complete one cycle.” EX1010, 17, 20, 27-28.



The speed tells how long it will take for the effect to complete one cycle.



The crossfade tells if the light will fade from step to step. If it is set to 0% an immediate change is visible. If set to 100% the changes will be soft.

Id., 27 (annotated).

Using this, a user may select a simple program of, for example, “one color fade,” creating a cycle which involves one color fading from maximum brightness to 0% brightness in one step, or a simple “chaser effect” of alternating between two colors. *Id.*, 17, 20, 27-28. By adjusting the speed of how long it takes the light to complete this cycle of fading down to 0% brightness, the user will adjust the pulse width of the light. EX1003, ¶318. Setting the speed to complete the effect cycle of fading down to 0% brightness in five seconds, for example, will create a longer duration pulse than setting a speed for the same effect to fade down to 0% brightness in one second. *Id.* Thus, by creating effects with a light pulse, and adjusting fade of the light and speed of the cycle in which the light fades, Astera teaches a user can create short-time period lighting effects with adjustable pulse width. EX1010, 17, 20, 27-28; *see also* EX1003, ¶318.

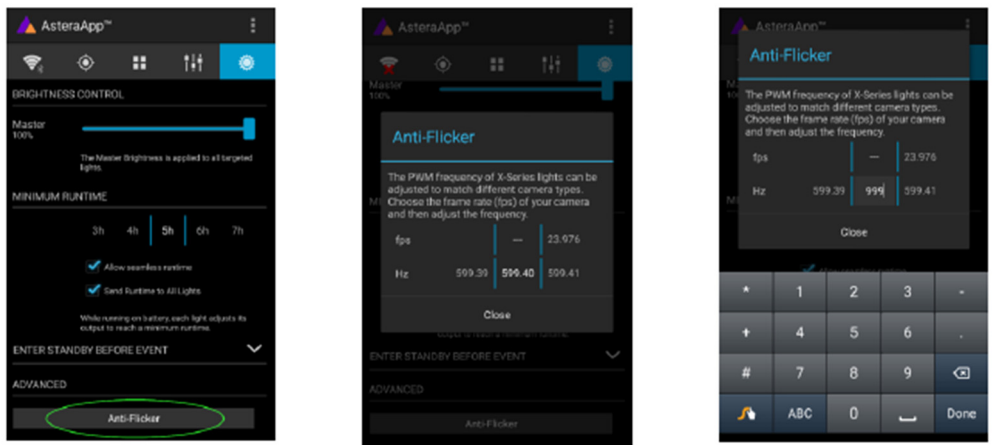
8. Claim 6

The method according to claim 1, wherein the user customisable simulation parameter comprises a parameter indicative of a group consisting of: a camera recording frequency; a camera shutter speed; and a camera frame rate.

Astera anticipates or renders obvious Claim 6. EX1003, ¶¶319-322.

Astera discloses compensating for “flicker” by calculating lighting values based on user input parameters indicative of at least camera frame rate. EX1010, 32. Specifically, users can select an “Anti-Flicker” option to compensate for unwanted “flicker” that would otherwise be produced if the PWM refresh frequency of the light did not fit the camera’s frame rate. *Id.*; see also EX1003, ¶321.

7.12 ANTI-FLICKER
The PWM refresh rate of this light is 599.4 Hz by default. This frequency can be freely adjusted between 200 Hz and 1205 Hz to fit different camera's frame rates.



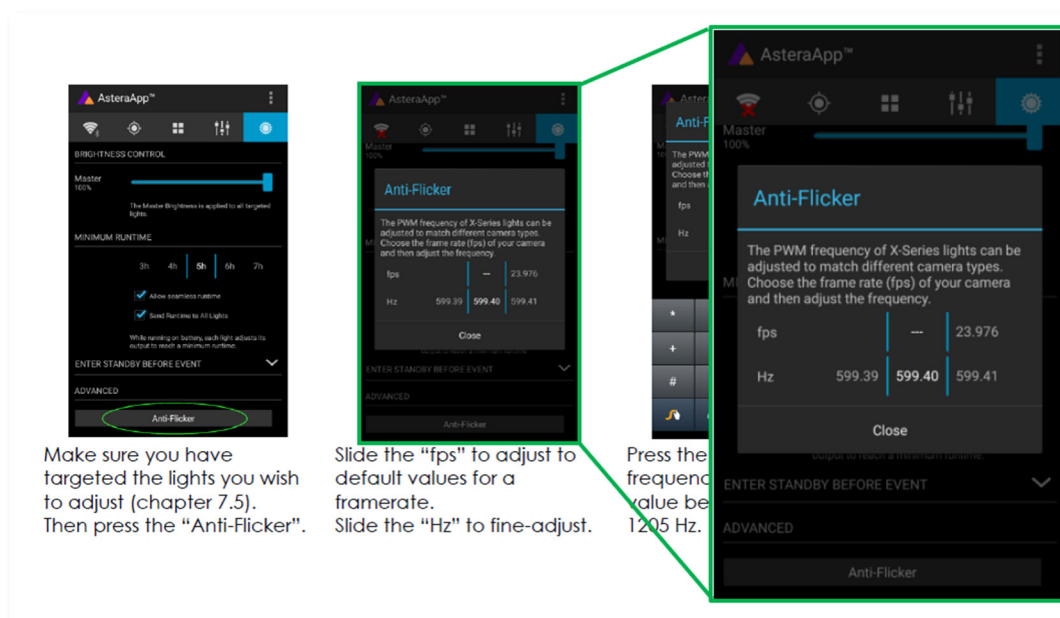
Make sure you have targeted the lights you wish to adjust (chapter 7.5). Then press the “Anti-Flicker”.

Slide the “fps” to adjust to default values for a framerate. Slide the “Hz” to fine-adjust.

Press the highlighted frequency to enter a custom value between 200 and 1205 Hz.

EX1010, 32 (annotated).

In the Anti-Flicker menu, users may input and adjust a value for the “frame rate (fps)” of a camera, with AsteraApp suggesting default PWM refresh values for that particular frame rate. *Id.*, 32. The Anti-Flicker menu also gives users the option to “slide the ‘Hz’ to fine-adjust,” allowing users to refine the PWM refresh frequency to compensate for the particular frame rate of the camera. *Id.*



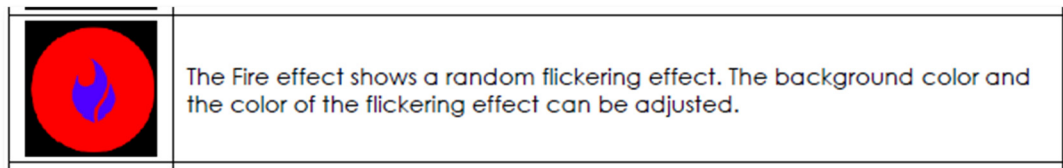
Id., 32 (annotated). Through the Anti-Flicker menu, “the [PWM refresh] frequency can be freely adjusted between 200 Hz and 1205 Hz to fit different camera’s frame rates.” *Id.*

9. Claim 7

The method according to claim 1, wherein the lighting effect is designed to mimic at least one of: fire; lightning; police car light; television; a neon flickering sign; a candle; muzzle (gunshot); welding; spark/short circuit; a scan (e.g. fingerprint scanner); paparazzi flashes; fireworks; flashes (strobe); a propeller; a (nuclear) explosion; and a wormhole.

Astera anticipates or renders obvious Claim 7. EX1003, ¶¶323-327.

The AX10 can produce many lighting effects, including a “fire effect” which mimics fire flickering:



EX1010, 28; *see also id.*, 21.

Moreover, a “stroboscope effect” (producing a strobe of flashes) can be added to selected effects:



Id., 27 (annotated); *see also id.*, 17.

Further, a POSITA would understand from Astera that the AX10 would produce other claimed effects (such as a candle, lightning, welding, sparking, paparazzi flashes, fireworks, a flickering neon sign, a scan, and a police light), based on the effects it offers and its ability to generate various colors, alternate between colors, and add strobing/flashing. *Id.*, 17, 21, 27-28; *see also* EX1003, ¶327. For example, flashing blue and red lights simulates police lights, and irregularly timed stroboscope flash effects create the impression of lightning, paparazzi flashes, welding, and spark/short circuit effects. *Id.*

10. Claim 8

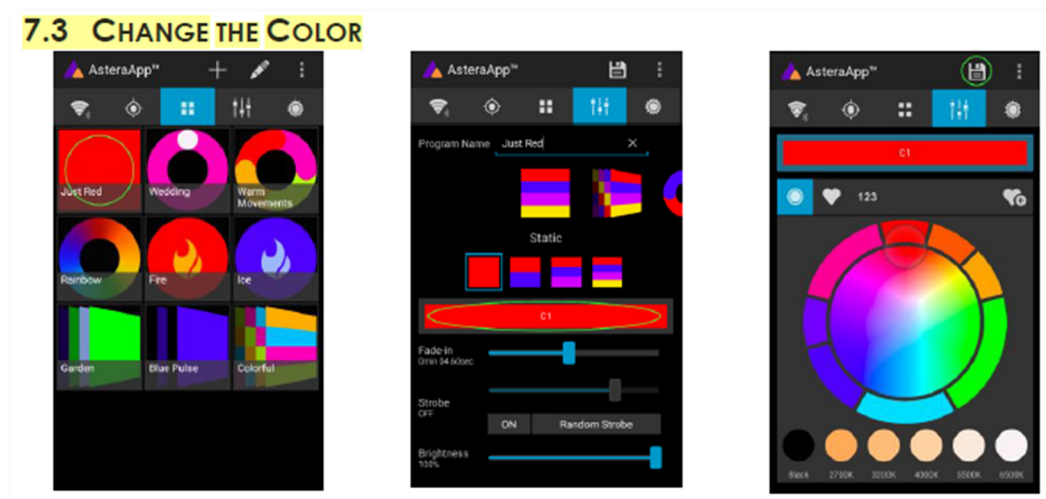
The method according to claim 1, wherein the lighting value comprises brightness and/or colour data.

Astera anticipates or renders obvious Claim 8. EX1003, ¶¶328-330.

Users can select from different lighting effects (*e.g.*, fire, chasers, rainbow) and then customize those effects (*e.g.*, adjust speed, color, crossfade, stroboscope, brightness). *See supra* Claim Element 1d. Again, based on these user-selected, customized effects, the AX10 system calculates time varying lighting values including brightness and color information to run the desired effects. EX1010, 17, 20-21, 23-29, 32; *see also* EX1003, ¶330.

For example, “fire” is a random flickering between a “background color and the color of the flickering effect,” both of which colors can be adjusted. EX1010,

17, 20-21, 23-29, 32. Moreover, users can adjust brightness and color for selected effects. *Id.*, 20, 24-28.



Id., 24 (annotated); *see also id.* (stating that effect patterns can be “played with a customizable color palette.”). When these effects are run, the brightness and color parameters are included in the lighting values sent to the LEDs so that they properly output the desired effect. EX1003, ¶330.



Each effect can be adjusted in brightness as well.

EX1010, 27 (annotated).

11. Claim 9

The method according to claim 1, further comprising converting at least one of brightness and colour data into a lighting signal and outputting the lighting signal to the lighting device.

Astera anticipates or renders obvious Claim 9. EX1003, ¶¶331-335.

Users can use the Control Panel or AsteraApp to select from different lighting effects (*e.g.*, fire, chasers, rainbow) and then customize those effects (*e.g.*, adjust speed, color, crossfade, stroboscope, brightness). *See supra* Claim Elements 1p-1d. Again, based on these user-selected, customized effects, the AX10 system calculates time varying lighting values including brightness and color information to run the desired effects. EX1010, 17, 20-21, 23-29, 32; *see also* EX1003, ¶333.

The Control Panel includes a “converter” in “Standalone” mode that converts³ the selected effects and parameters into values that are sent to the standalone engine that outputs signals to the LEDs. EX1010, 12, 17; *see also* EX1003, ¶334. In particular, the Control Panel offers “comprehensive control of the built in standalone engine,” which converts the brightness and color data into control signals that it

³ The '044 Patent generically describes how before lighting data is sent to the lighting device 102, to output light simulating the effect, it may be converted by a “converter,” which converts the data into a signal suitable for the particular light elements being controlled. EX1001, 8:27-39.

outputs to the LEDs to produce the light for the effect. EX1010, 17; *see also* EX1003, ¶334.

AsteraApp similarly includes a “converter” that converts data relating to user-selected brightness and color parameters for the lighting effects into signals that can be sent to the AX10. As noted above, the data values for color and brightness of an effect can be input in AsteraApp, which converts these values into signals representing the effect that can “be *sent to the light by the built in UHF receiver*,” where they are received by the standalone engine in the AX10 EX1010, 24, 27-28 (emphasis added); *see also id.*, 10, 17. That is, AsteraApp converts the brightness and color data for an effect into lighting values representing the effect created in AsteraApp, and outputs these lighting values to the AX10. EX1003, ¶335. When the lighting values are received by the standalone engine, the AX10 “replays [the effect] autonomously until a new effect is received.” EX1010, 24.

12. Claims 10, 16, 18

[10] The method according to claim 1, wherein the controlling is for a lighting system for videography, broadcast, cinematography, studio filming and/or location filming.

[16] The system according to claim 12, wherein the at least one lighting device comprises a lighting device for videography, broadcast, cinematography, studio filming and/or location filming.

[18] A lighting device according to claim 17, wherein the at least one lighting device is used for videography, broadcast, cinematography, studio filming and/or location filming.

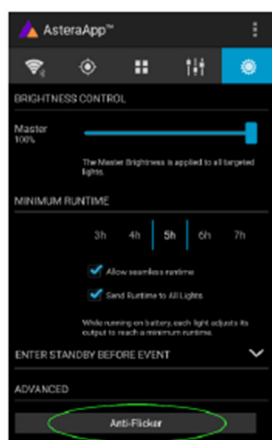
Astera anticipates or renders obvious Claims 10, 16, and 18. EX1003, ¶¶336-340, 398-402, 405-409.

The AX10 can produce many lighting effects (such as “fire,” “rainbow,” “stroboscope,” and “chase effects”). *See supra* Claim Element 1p. These effects can be used for “videography, broadcasting, cinematography, studio filming, and location filming.” EX1003, ¶¶338, 400, 407. As was well-known to a POSITA, Astera manufactures luminaires for film, TV, and theatrical use. EX1012, ¶2 (noting AX10 is one of Astera’s “production lighting products” and that it was shown at a “Prolight and Sound Exhibition”). Further, as was also well-known, the AX10 was designed and sold for such uses. *Id.*; EX1003, ¶¶338, 400, 407.

Moreover, Astera *expressly* teaches the AX10 produces effects captured by video cameras (used in videography, broadcasting, cinematography, and studio/location filming). EX1003, ¶¶339, 401, 408. The AX10 has an “Anti-Flicker” adjustment, so the light settings will “fit different *camera’s frame rates*.” EX1010, 32.

7.12 ANTI-FLICKER

The PWM refresh rate of this light is 599.4 Hz by default. This frequency can be freely adjusted between 200 Hz and 1205 Hz to fit different camera's frame rates.



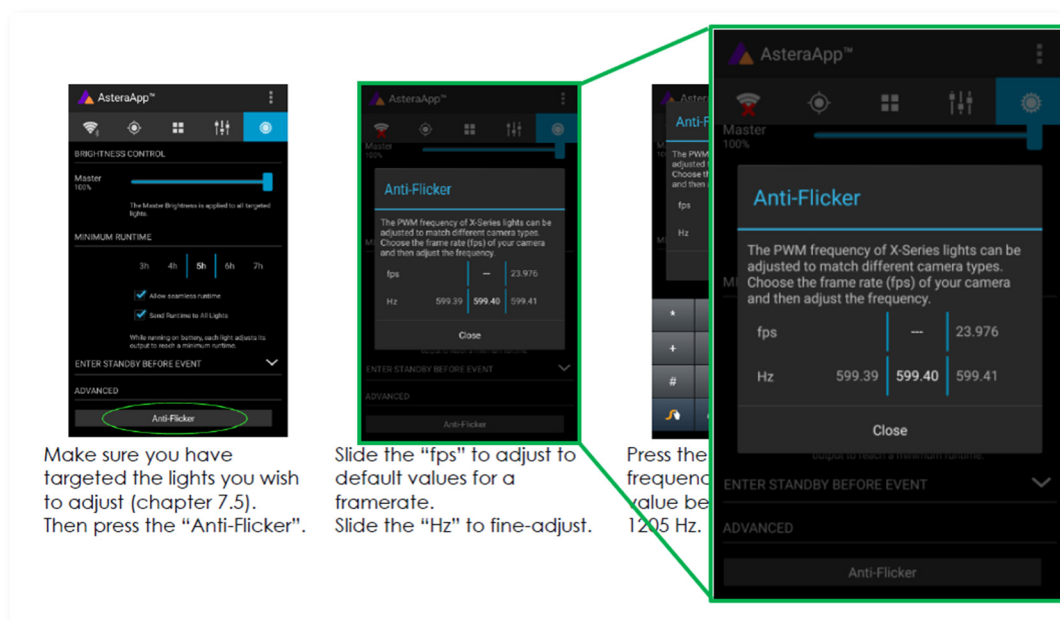
Make sure you have targeted the lights you wish to adjust (chapter 7.5). Then press the “Anti-Flicker”.



Slide the “fps” to adjust to default values for a framerate. Slide the “Hz” to fine-adjust.



Press the highlighted frequency to enter a custom value between 200 and 1205 Hz.



Id., 32 (annotated). Fitting lights to a camera's frame rates indicates the lighting effects are intended to be captured on video camera (as opposed to a still camera), as the "flicker" avoided is an unwanted artefact that would otherwise appear on captured video. EX1003, ¶¶339, 401, 408.

Further, a POSITA would understand references to DMX control in Astera, *see, e.g.*, EX1010, 9-10, indicate the AX10 was developed for TV, cinematography, and studio filming, as DMX is a common communication standard created by and for the entertainment lighting industry. EX1003, ¶¶340, 402, 409.

13. Claims 11 and 13

[11] The method according to claim 1, further comprising controlling at least one further lighting device.

[13] The system according to claim 12, wherein the system is adapted to control at least one further lighting device.

Astera anticipates or renders obvious Claims 11 and 13. EX1003, ¶¶341-344, 385-388.

The AX10 is comprised of nine “RGBAW” LEDs. EX1010, 7. The Control Panel and AsteraApp (e.g., controllers) control this plurality of nine LED “lighting devices.” *See supra* Claim Elements 1p-1e.

In addition, when AX10 lights are controlled by AsteraApp, the “[l]ights can be grouped into sets,” so that a user-created effect “can stretch over up to 32 lights.” EX1010, 10; *see also id.*, 23.

6.4 CONTROL BY THE ASTERAAPP™

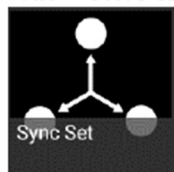
Your light has a built in standalone engine. It can display static colors or replay a number of predefined effect patterns with a customizable color palette.

With the AsteraApp™ these effects can be created and be sent to the light by the built in UHF receiver. The effects are just triggered and then each light replays it autonomously until it receives a new effect.

Lights can be grouped into sets. This way they can be controlled separately and also effects can stretch over up to 32 lights.

Id., 10 (annotated). For example, lights can be grouped together such that all lights in the same “Sync-Set” play the same effect simultaneously, based on control signals from AsteraApp:

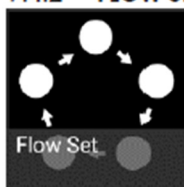
7.4.1 SYNC SET



All lights that are assigned to a Sync-Set can be controlled together. They will do exactly the same.

Id., 25. Alternatively, multiple lights can be given positions in a “Flow-Set” and “controlled together”:

7.4.2 FLOW SET



By using a Flow-Set, lights can also be controlled together. But additionally, they are assigned to positions inside the Flow-Set and so form a virtual light with several pixels. All effects, like a running light, are stretched over this virtual light.

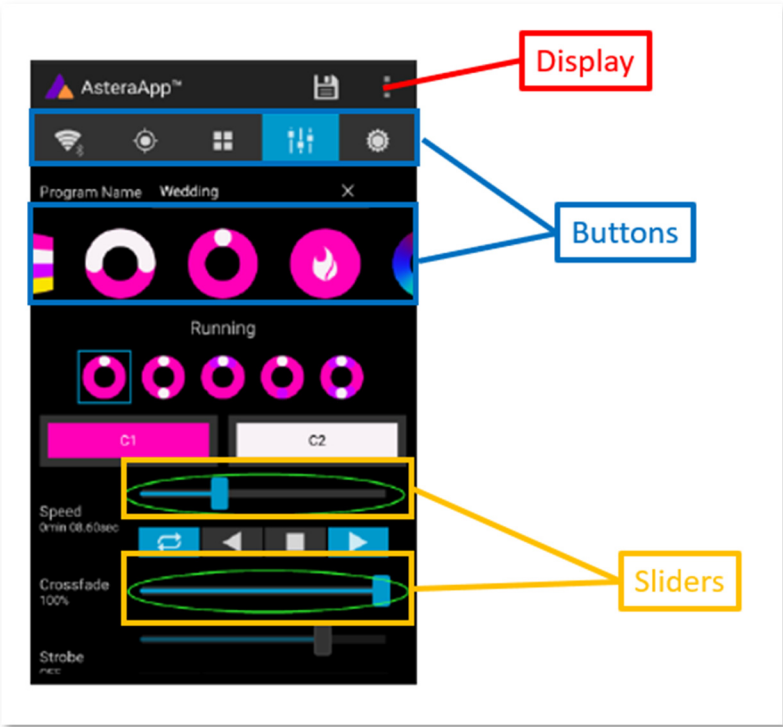
Id., 26.

14. Claim 14

The system according to claim 12, further comprising an input interface and wherein the input interface comprises at least one of: a wireless communication interface; a dial; a slider; a display and buttons.

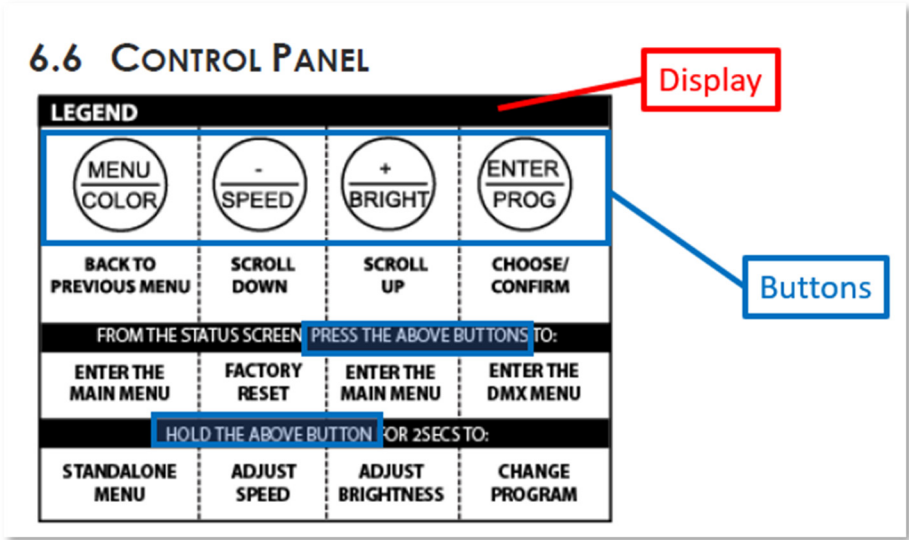
Astera anticipates or renders obvious Claim 14. EX1003, ¶¶389-392.

The AX10 has multiple user interfaces to receive inputs, including Control Panel and AsteraApp. *See supra* Claim Element 1a. AsteraApp comprises a wireless interface, EX1010, 24, as well a display, sliders, and buttons:



Id., 27 (annotated).

The Control Panel on the AX10 includes an interface having a display and buttons:



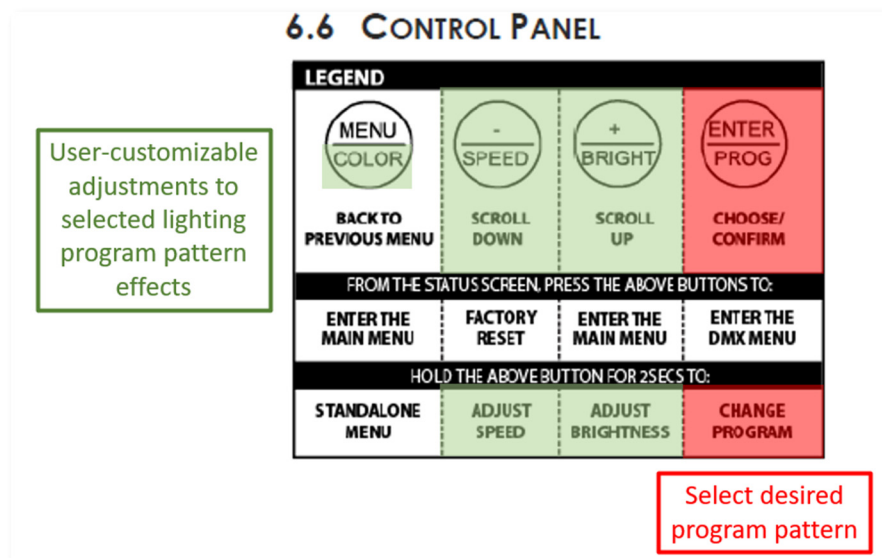
Id., 11 (annotated).

15. Claim 15

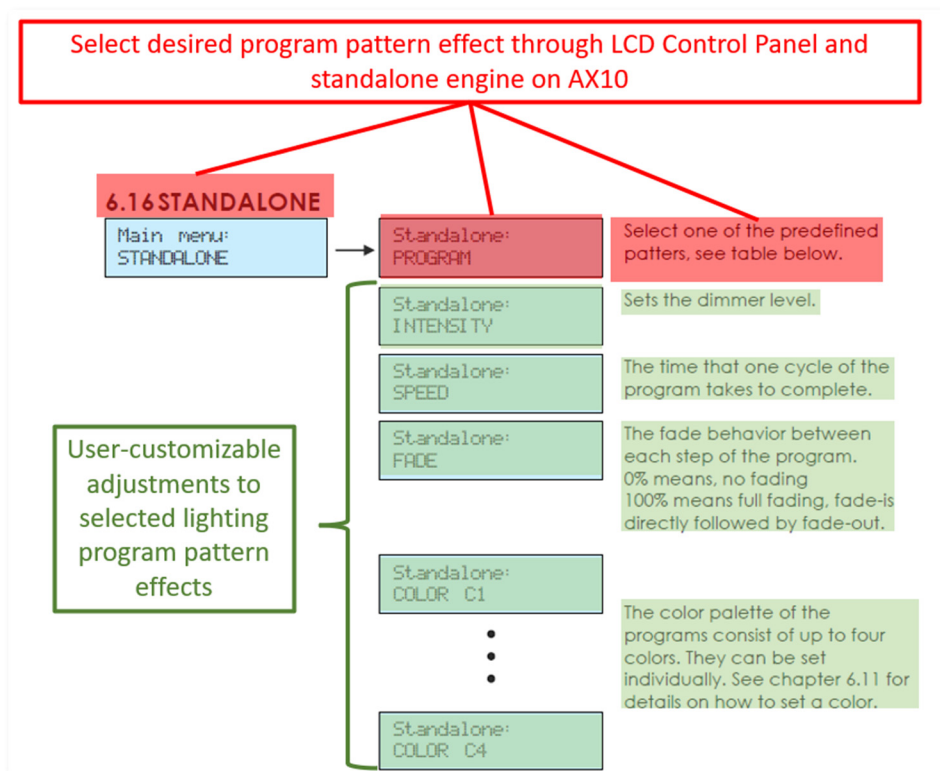
The system according to claim 12, wherein said at least one lighting device is integrated in a combined unit.

Astera anticipates or renders obvious Claim 15. EX1003, ¶¶393-397.

The AX10 includes LED lights. EX1010, 7. The AX10 “can be controlled in several ways,” including a Control Panel user interface, memory, and standalone engine on the AX10 itself. *Id.*, 9, 20; *see also supra* Claim 1. More specifically, the AX10 “has a built in *standalone engine*. It can display static colors or replay a number of predefined effect patterns with a customizable color palette.” EX1010, 10 (emphasis added). Additionally, using the Control Panel, a user can “adjust speed,” “adjust brightness,” and select a new lighting effect program (“change program”), among other things:



Id., 11 (annotated).



Id., 20 (annotated). Thus, the AX10 LED lights, together with the Control Panel, memory, *see supra* Claim Elements 1b-1c, and standalone engine, are “integrated in a combined unit.”

Further, it would have been obvious to a POSITA to provide the AsteraApp interfaces and functionality, including selecting effect programs, editing parameters, and saving and recalling effects to a main screen directly on the Control Panel. EX1003, ¶396. A POSITA would have recognized that, as explained in Astera, the Control Panel and AsteraApp are two ways of controlling the same AX10 light. EX1010, 9. Astera expressly discloses a user can make many of the same selections and adjustments, such as selecting effects and modifying speed, intensity, and fade

of those effects. *Id.*, 11, 17, 20-21, 27-28. A POSITA would have recognized that providing the AsteraApp interfaces and functionality on the Control Panel of the AX10 itself would allow for expanded options and functionality through controls on the device itself, such as allowing saving and editing programs as icons on a main screen or making “Anti-Flicker” adjustments. EX1003, ¶396. Thus, modifying the Control Panel to include the interfaces and functionality of AsteraApp would have been trivial, simply including a different type of touch screen interface to make selections and save adjustments, in the same way the Control Panel LCD menu already allows certain selections and adjustments. *Id.* Such modification would yield a predictable result, as only the source of the instructions (coming from the Control Panel rather than a remote AsteraApp) would change; the content and result of those instructions as implemented by the standalone engine would not. *Id.*

A POSITA would have been motivated to add AsteraApp functionality to the interface on the AX10, given the need for ease of transport and to minimize need for additional equipment and controllers when filming. *Id.*, ¶397. Including AsteraApp functionality would allow a user operating the device with the Control Panel, rather than through a smartphone, to make necessary adjustments during operation without having to use additional controllers. *Id.* Moreover, adding AsteraApp features to the Control Panel would allow different users to operate the same light and make

necessary adjustments and selections, including recalling previously edited effect programs, without each separate user having to download and use AsteraApp. *Id.*

16. Claim 17

The system according to claim 12, wherein the at least one lighting device comprises at least one light emitting diode.

Astera anticipates or renders obvious Claim 17. EX1003, ¶¶403-404.

The AX10 includes “9 x 15W RGBAW Philips LEDs [*i.e.*, light emitting diodes].” EX1010, 7.

4 SPECIFICATION	
LED power:	135W
Illuminants:	9 x 15W RGBAW Philips LEDs
Luminous Flux*:	3,350lm (at White 4000K)
Emittance*:	10,350lx (at 2m; White 4000K)

Id. (annotated).

IX. CONCLUSION

Aputure respectfully requests that a Trial be instituted. Claims 1-19 should be cancelled.

Dated: September 16, 2024

Respectfully submitted,

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Industries Co., Ltd.*

APPENDIX A – CLAIM LISTING

U.S. Patent No. 10,845,044

Claim or Element #	Claim Language
<i>Claim 1</i>	
1p	A method for controlling a lighting device to produce a range of different user customisable lighting effects, the method comprising:
1a	receiving user input of at least one user input simulation parameter to customise a lighting effect;
1b	storing in memory said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated;
1c	recalling from said memory said at least one stored user input simulation parameter;
1d	calculating, using an effect simulator, a time varying lighting value based on said recalled simulation parameter; and
1e	outputting to said lighting device said time varying lighting value thereby to simulate the lighting effect.
<i>Claim 2</i>	

2	The method according to claim 1, wherein said user customisable simulation parameter is stored locally.
<i>Claim 3</i>	
3	The method according to claim 1, wherein the simulation parameter comprises a colour or colour temperature.
<i>Claim 4</i>	
4	The method according to claim 1, wherein the simulation parameter is related to at least one of: an effect frequency; an effect speed; a colour; a colour temperature; a trigger; a rate of increase of brightness; a rate of decrease of brightness; a rate of change of colour; a brightness; a local maximal (peak) brightness; a local minimal brightness; a brightness fluctuation period; and a colour fluctuation time period.
<i>Claim 5</i>	
5	The method according to claim 1, wherein the lighting effect comprises a short time-period (e.g. stroboscopic) lighting effect with a user adjustable minimum pulse width.
<i>Claim 6</i>	

6	The method according to claim 1, wherein the user customisable simulation parameter comprises a parameter indicative of a group consisting of: a camera recording frequency; a camera shutter speed; and a camera frame rate.
<i>Claim 7</i>	
7	The method according to claim 1, wherein the lighting effect is designed to mimic at least one of: fire; lightning; police car light; television; a neon flickering sign; a candle; muzzle (gunshot); welding; spark/short circuit; a scan (e.g. fingerprint scanner); paparazzi flashes; fireworks; flashes (strobe); a propeller; a (nuclear) explosion; and a wormhole.
<i>Claim 8</i>	
8	The method according to claim 1, wherein the lighting value comprises brightness and/or colour data.
<i>Claim 9</i>	
9	The method according to claim 1, further comprising converting at least one of brightness and colour data into a lighting signal and outputting the lighting signal to the lighting device.
<i>Claim 10</i>	

10	The method according to claim 1, wherein the controlling is for a lighting system for videography, broadcast, cinematography, studio filming and/or location filming.
<i>Claim 11</i>	
11	The method according to claim 1, further comprising controlling at least one further lighting device.
<i>Claim 12</i>	
12p	A system adapted to control at least one lighting device to produce a range of different user customisable lighting effects, the system comprising:
12a	an input interface adapted to receive user input of at least one user input simulation parameter to customise a lighting effect;
12b	a memory adapted to store said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated; and
12c	an effect simulator adapted to: recall from said memory said at least one stored user input simulation parameter; and

12d	calculate a time varying lighting value based on said recalled simulation parameter;
12e	wherein the effect simulator is adapted to output said calculated time varying lighting value to the at least one lighting device thereby to simulate a lighting effect.
Claim 13	
13	The system according to claim 12, wherein the system is adapted to control at least one further lighting device.
Claim 14	
14	The system according to claim 12, further comprising an input interface and wherein the input interface comprises at least one of: a wireless communication interface; a dial; a slider; a display and buttons.
Claim 15	
15	The system according to claim 12, wherein said at least one lighting device is integrated in a combined unit.
Claim 16	

16	The system according to claim 12, wherein the at least one lighting device comprises a lighting device for videography, broadcast, cinematography, studio filming and/or location filming.
Claim 17	
17	The system according to claim 12, wherein the at least one lighting device comprises at least one light emitting diode.
Claim 18	
18	A lighting device according to claim 17, wherein the at least one lighting device is used for videography, broadcast, cinematography, studio filming and/or location filming.
Claim 19	
19p	A computer program product comprising software code for controlling a lighting device to produce a range of different user customisable lighting effects the computer program product is adapted to perform, when executed, the steps of:
19a	receiving user input of at least one user input simulation parameter to customise a lighting effect;

19b	storing in memory said at least one user input simulation parameter, said at least one user input simulation parameter depending on the lighting effect being simulated;
19c	recalling from said memory said at least one stored user input simulation parameter;
19d	calculating, using an effect simulator, a time varying lighting value based on said recalled simulation parameter; and
19e	outputting to said lighting device said time varying lighting value thereby to simulate a lighting effect.

APPENDIX B

Certificate of Word Count

I certify that, in accordance with 37 C.F.R. § 42.24(d), the total word count for the forgoing Petition is 13,933. This is less than the permitted total under 37 C.F.R. 42.24(a)(1)(i).

/Donald R. McPhail/

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*Counsel for Aputure Imaging Industries Co.,
LTD.*

APPENDIX C

Certificate of Service

I certify that on September 16, 2024, a copy of this Petition for *Inter Partes Review* and supporting documents were served on Patent Owner via Federal Express at the following address:

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Plantation, FL 33317

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LTD.*