

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARASHI VISION (U.S.) LLC (D/B/A INSTA360),
Petitioner,

v.

GOPRO, INC.,
Patent Owner.

Case No. IPR2024-01164
U.S. Patent No. 10,958,840

PATENT OWNER'S PRELIMINARY RESPONSE

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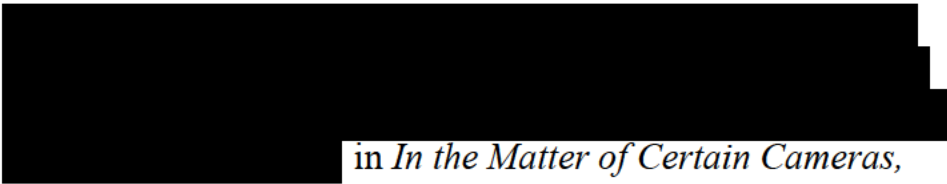
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No.	Exhibit
2001	Declaration of Hassan Foroosh, Ph.D.
2002	<i>Curriculum vitae</i> of Hassan Foroosh, Ph.D.
2003	“GoPro Celebrates Surpassing 50 Million Cameras Sold,” produced as GOPRO_00063291 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2004	 produced as GOPRO_00009580 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2005	“NHL, NHLPA Partner with GoPro To Deliver Hockey Fans Unique Perspectives Of The Game,” produced as GOPRO_00063270 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2006	Complaint, <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2007	E-mail from Alex S. Yap on October 9, 2024
2008	“GoPro Named Exclusive Action Camera of Red Bull Rampage, the World’s Biggest Freeride Mountain Bike Event,” produced as GOPRO_00063323 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2009	“GoPro and Adobe Collaborate to Bring Unique Content to Adobe Stock Users,” produced as GOPRO_00063341 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400

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2010	“73 rd Annual Technology & Engineering Emmys,” produced as GOPRO_00000009 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2011	“Believe the Hype: GoPro Showcases Award-Winning HERO7 Cameras at CES 2019,” produced as GOPRO_00063251 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2012	“GoPro Wins Second Emmy® Award for Groundbreaking Digital Imaging Technology,” produced as GOPRO_00063339 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2013	“J.P. Morgan – North America Equity Research (21 September 2018),” produced as GOPRO_00359592 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2014	“GoPro Hero 9 Black vs Hero 8 Black: 9 key differences you need to know,” produced as GOPRO_00010039 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2015	 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400
2016	 in <i>In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith</i> , Inv. No. 337-TA-1400

I. INTRODUCTION

Founded in 2002 in San Mateo, California, Patent Owner GoPro, Inc. (“Patent Owner” or “GoPro”) is a pioneer in developing cameras and digital imaging techniques, particularly for mountable and wearable use cases. As a company built on innovation, GoPro has received numerous patents protecting its technological improvements, including on video stabilization in diverse conditions and circumstances. GoPro has become a leader in the industry, receiving scores of industry praise from professionals and consumers alike. Petitioner is a recent entrant into this market that has found significant success by copying GoPro’s designs and innovations, including the patent at issue in this proceeding.

GoPro’s Emmy award-winning HyperSmooth video stabilization technology, protected by U.S. Patent No. 10,958,840 (the “’840 patent”), represents a breakthrough in video stabilization, accomplishing what no prior technology had, in part, by introducing finely tuned stabilization parameters, including weight-balance, low-light high-pass, and stickiness. These innovations enable HyperSmooth to dynamically adjust stabilization based on the specific needs of each shooting scenario, offering exceptional control over how yaw, pitch, and roll are stabilized. These proactive parameters include:

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- **Weight-balance parameter** – minimizes derivatives of rotational velocity and acceleration, enabling flexible adjustments for smoothness or responsiveness depending on motion dynamics.
- **Low-light high-pass parameter** – anticipates conditions likely to result in motion blur in low-light environments, proactively adjusting stabilization strength and direction to prevent the effect of blur before it manifests.
- **Stickiness parameter** – applies continuity from past motion, preserving smooth transitions even during rapid or erratic camera movements.

The prior art presented by Petitioner, including the Bell and Shi references, fails to disclose or render obvious these proactive stabilization parameters. While Bell discusses a general smoothing technique using a look-ahead buffer, the Petition concedes that Bell does not disclose the '840 Patent's stabilization parameters, including weight-balance, low-light high-pass, and stickiness. Similarly, Shi's coefficient for motion blur adjustment is far more general than the low-light high-pass parameter in GoPro's claims and lacks the targeted handling of low-light conditions that the '840 Patent uniquely addresses.

These key distinctions, alongside the absence of any compelling motivation to combine Bell and Shi's teachings to achieve the claimed

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inventions, demonstrate that Petitioner has failed to meet its burden of proving obviousness.

Furthermore, the strength of GoPro's innovations is underscored by secondary considerations of non-obviousness, such as commercial success, industry recognition, the long-felt need for more precise stabilization technology and copying by competitors. The inclusion of parameters like weight-balance, low-light high pass, and stickiness, which were not previously available in the industry, have been essential to HyperSmooth's success and demonstrate why these claims should be upheld.

For all these reasons, as well as those further discussed below, Petitioner fails to meet its burden, and the Board should uphold the challenged claims.

II. OVERVIEW OF THE '840 PATENT

The '840 Patent, titled "Systems and Methods for Stabilizing Videos," discloses an advanced system designed to stabilize video content in diverse circumstances and conditions. Ex. 2001, ¶¶35-38. The system operates by analyzing position information including characterizing the rotational positions of the image capture device during the capture duration. *Id.*, ¶35. This position information allows the system to generate a "trajectory of the

image capture device during the capture duration,” which “reflect[s] the rotational positions of the image capture device at different moments within the capture duration.” Ex. 1001, 1:18-29; 30:18-23 (claim 1); 32:28-33 (claim 16); Ex. 2001, ¶35.

One of the key aspects of the '840 Patent is the use of specific parameters that influence how stabilization is achieved. Ex. 2001, ¶36; Ex. 1001, 21:17-25. These include the “weight-balance parameter” (Ex. 1001, 17:32-60, 21:17-58), “low-light high-pass parameter” (*id.*, 21:59-22:21), and “stickiness parameter” (*id.*, 22:22-41), which enable fine tuning of the stabilization process under diverse circumstances and conditions. *Id.*, 30:35-38 (claim 1), 32:44-48 (claim 16); Ex. 2001, ¶36.

The weight-balance parameter determines the degree to which the system minimizes rotational velocity or rotational acceleration and their tradeoff to achieve stabilization, allowing flexibility in the system's response to a wide variety to different types of motion. Ex. 1001, 17:32-60, 21:17-58; Ex. 2001, ¶37. The low-light high-pass parameter addresses the challenge of stabilizing videos captured in low-light environments by controlling the extent to which the system compensates for motion blur that occurs during frame exposure. Ex. 1001, 21:59-22:21; Ex. 2001, ¶37. The stickiness parameter

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ensures the smoothed trajectory retains some influence from past movements to provide continuity in rapid or erratic camera motions. Ex. 1001, 22:22-41; Ex. 2001, ¶37.

These innovations are integral to GoPro's HyperSmooth technology, which has played a significant role in the commercial success and industry recognition of GoPro's cameras. Ex. 2001, ¶38.

III. OVERVIEW OF CERTAIN CITED ART

The petition challenges the '840 Patent's claims 1 to 21 on seven grounds. Ex. 2001, ¶¶39-40. Ground 1 asserts that the combination of Bell and Shi renders the independent claims 1 and 16, along with certain dependent claims, obvious. Grounds 2 through 7 address the remaining dependent claims by asserting the combination of Bell and Shi, along with one or two other references. *Id.*

Below are short summaries of the primary references relied on for the independent claims.

B. Ground 1 Cited Art**1. Bell (Ex. 1006)**

Bell discloses a system for real-time video stabilization that relies on on-board motion sensing technology, such as gyroscopes, to measure the

movement of cell phones and mobile devices during recording casual video. Ex. 1006, Abstract, 1:15-29; 6:9-18; Ex. 2001, ¶¶41-42. A central feature of Bell's system is the creation of a "virtual camera" that simulates a smoothed camera trajectory to reduce unwanted shake. Ex. 1006, 8:51-56; Ex. 2001, ¶41. Bell explains that this virtual camera remains static when the motion of the physical camera is below a certain movement threshold, allowing the stabilization system to ignore insignificant movements. *Id.* The system uses angular velocity data from sensors to calculate and adjust the virtual camera's orientation, resulting in a smoother video output. *Id.* Specifically, Bell describes a method where "a crop polygon around scene content common to the first image frame and the second image frame is identified" and then "warped to remove motion distortions" using the measured movement data. *Id.*, Abstract. And Bell describes "us[ing] data from a look-ahead buffer to calculate a smoother path." Ex. 1006, 10:10-16; Ex. 2001, ¶41.

However, while Bell's system focuses on smoothing the virtual camera's trajectory based on physical parameters such as angular velocity, it does not disclose key features present in the '840 Patent. Ex. 2001, ¶42. Specifically, Bell does not disclose the use of parameters like the low-light high-pass parameter, which addresses the challenge of motion blur in low-

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light environments by controlling stabilization in such conditions, or the weight-balance parameter, which fine-tunes stabilization by considering both rotational velocity and rotational acceleration, or possibly higher order rotational derivatives. Ex. 1001, 17:40-53, 21:17-58; Ex. 2001, ¶42. Additionally, Bell does not describe a mechanism similar to the “stickiness parameter” found in the '840 Patent, which ensures that the virtual camera trajectory retains influence from past movements to ensure smoother transitions in rapid or erratic motion scenarios. Ex. 1001, 22:22-41; Ex. 2001, ¶42. These distinctions make Bell's system materially different from the system disclosed in the '840 Patent, particularly in its capacity to handle a wide variety of recording situations including low-lighting conditions and/or when both angular and linear velocities may change rapidly over time, i.e. in the presence of angular and linear accelerations, or even changing acceleration. Ex. 2001, ¶42. Bell teaches filtering discrete angular velocities for determining the smooth path of a virtual camera, but does not discuss or take into account angular acceleration or changing angular acceleration, and as for linear acceleration measurements using an accelerometer, it discourages its use even for estimating translational displacement. *Id.* In contrast, the '840 patent teaches minimizing a weighted balance objective function that trades

off between linear and angular velocities and acceleration and possibly other video parameters. Ex1001, 9: 29-41, 21: 26-43; Ex. 2001, ¶42.

2. Shi (Ex. 1007)

Shi focuses on trajectory estimation and correction to stabilize videos through a series of transformations that adjust the camera's position and rotation based on motion data. Ex. 2001, ¶¶43-45. The system applies a first transformation using optical image stabilization (OIS) data and then calculates a second transformation based on additional positional data collected after the capture of the frame. Ex. 1007, 3:52-4:11; Ex. 2001, ¶43. This second transformation refines the stabilization by incorporating further motion data captured post-frame, complementing the initial OIS-based transformation. Ex. 1007, Abstract; Ex. 2001, ¶43.

While Shi introduces a coefficient to adjust for motion blur by interpolating between the real and virtual camera positions based on detected and estimated blur (a *reactive approach* that responds to blur after it occurs), it does not disclose or suggest the low-light high-pass parameter of the '840 Patent. Ex. 2001, ¶44. The '840 Patent takes a *proactive approach*, dynamically adjusting smoothing in anticipation of motion blur caused by increased exposure times in low-light conditions. *Id.* Specifically, the low-

light high-pass parameter is triggered by detecting conditions—such as low-light environments—that are likely to result in motion blur, and it fine-tunes the stabilization to prevent the effect of blur before it manifests. *Id.*

Fig. 7 of the '840 Patent illustrates this proactive approach, where the amount of smoothing is adjusted based on factors such as exposure time, motion of the image capture device, and other conditions. Ex. 2001, ¶45. The system uses smoothing strengths (Ex. 1001, 22:2-7) and smoothing directions (Ex. 1001, 22:2-7) that are optimized according to the environment, with the application of constraints like the low-light high-pass parameter, which is tailored for scenarios where longer exposure times increase the likelihood of motion blur. Ex. 2001, ¶45. Shi, by contrast, makes *no mention of low-light conditions*, nor does it suggest any adaptation to account for such conditions, leaving its approach reactive rather than proactive. *Id.*

IV. LEVEL OF ORDINARY SKILL IN THE ART

Petitioners propose that the level of a POSITA at the time of the '840 patent “would have a bachelor’s degree in engineering or computer science, or equivalent field, and two years of experience working on image or video processing, or digital cameras” or “four years of experience working on image or video processing, or digital cameras.” Pet. 5.

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For purposes of this preliminary response, Patent Owner applies Petitioner's proposed level of skill. Ex. 2001, ¶¶17-21. Patent Owner's expert, Dr. Hassan Foroosh, was a POSITA under Petitioner's definition at the time of the '840 patent. *Id.*, ¶21.

V. CLAIM CONSTRUCTION

In an *inter partes* review, claim terms receive their plain and ordinary meaning in light of the specification of the patent in which they appear, following the same standard used in district court. 37 C.F.R. § 42.100(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). Petitioner states that no constructions are necessary. See Pet. at 5-6. Patent Owner agrees that no claim terms presently require construction to resolve any current dispute between the parties. Ex. 2001, ¶, 34.

VI. GROUND 1: PETITIONER FAILS TO ESTABLISH THAT BELL AND SHI RENDER CLAIMS 1-21 OBVIOUS

A. Claims 1 and 16: Bell in View of Shi Does Not Render Obvious the Limitation “determine a smoothed trajectory and one or more of a weight-balance parameter, a low-light high pass parameter, and/or a stickiness parameter”

Claims 1 and 16 require the stabilization system to “determine a smoothed trajectory and one or more of a weight-balance parameter, a low-light high pass parameter, and/or a stickiness parameter.” Ex. 2001, ¶¶46-60.

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While Bell discloses a look-ahead buffer for calculating a smoother virtual camera path, the Petition concedes that Bell does not specify the parameters—such as a low-light high pass parameter—necessary for determining the smoothed trajectory as required by the challenged claims. *Id.*, ¶47. Instead, the Petition relies on Shi, claiming it discloses the low-light high-pass parameter. *Id.* This is incorrect and invites error. *Id.*

Shi's system, while *reactively* adjusting for motion blur when detected and estimated, does not disclose nor suggest the *proactive* low-light high-pass parameter of the '840 Patent. *Id.*, ¶48. In fact, Shi makes no mention of low-light conditions, much less the specific adjustments required to handle such conditions during stabilization. *Id.*

The '840 Patent's low-light high-pass parameter dynamically adjusts the smoothing strength in response to low-light conditions, balancing motion blur compensation and stabilization by accounting for the increased exposure times that often lead to motion blur. *Id.*, ¶49. This parameter operates along a well-defined range from 0 to 1, where 1 provides full motion blur compensation and 0 applies full smoothing without blur compensation. Ex. 1001, 22:8-21; Ex. 2001, ¶49. These values are determined based on the

capture conditions, including low-light and longer exposure times. Ex. 2001, ¶49. Shi does not disclose any environment-specific light-based controls. *Id.*

Furthermore, the Petition's motivation to combine Bell's video stabilization technique with Shi's motion blur compensation is based on conclusory statements, not articulated reasoning with a rational underpinning. *Id.*, ¶50. In *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), the Federal Circuit emphasized that "there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." Petitioner provides no such reasoning, relying solely on the presence of blur in Shi without addressing the significant differences between the proactive, light-condition-based control of the '840 Patent and Shi's reactive, frame-by-frame compensation method based on first estimating the motion blur in each frame. *Id.*, ¶50.

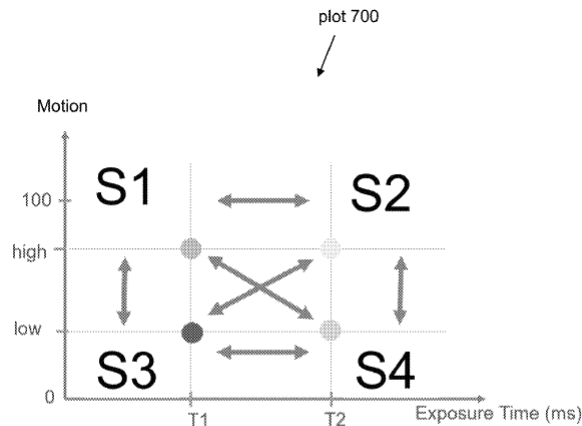
Additionally, modifying Bell with Shi's reactive approach would lead to a technically incompatible system. *Id.*, ¶51. Shi's blur compensation reacts only after blur is detected, while Bell's system relies on forward-looking stabilization. *Id.* The combination of these two would disrupt Bell's look-ahead mechanism, making it impractical for pre-emptively adjusting the trajectory. *Id.* Such a modification would not yield predictable results and

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would undermine the operation of Bell's system, rendering it inoperable for its intended purpose. *Id.*; see *Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999) (a reference teaches away when it leads to a result divergent from the path taken by the applicant or renders the device inoperable for its intended purpose).

Furthermore, the Petition's reliance on Shi to modify Bell's stabilization involves impermissible hindsight. Ex. 2001, ¶52. In *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007), the Supreme Court warned against "distortion caused by hindsight bias" and emphasized the need for a reasoned basis to combine prior art references. Here, the Petition engages in hindsight-driven reasoning by selectively incorporating Shi's reactive blur handling into Bell's system, without any real motivation or teaching in the prior art suggesting this combination. Ex. 2001, ¶52. This is precisely the type of hindsight bias the Supreme Court cautioned against.

The '840 Patent's proactive stabilization solution is illustrated in Fig. 7, where smoothing values and smoothing directions (Ex. 1001, 22:2-7) adjust according to factors like exposure time and motion of the image capture device, accounting for varying light conditions. Ex. 2001, ¶53.

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The '840 Patent explains, “[i]n some implementations, the exposure time of the image capture device may be automatically adjusted based on *light conditions*.” Ex. 1001, 19:15-18 (emphasis added); Ex. 2001, ¶54. “For instance, referring to FIG. 7, exposure time of less than T1 may be used in *high light* conditions, exposure time between T1 and T2 may be used in *mid light* conditions, and exposure time greater than T2 may be used in *low light* conditions. Higher exposure time may result in a greater amount of motion blur within the captured visual content.” Ex. 1001, 19:20-26 (emphasis added), Fig. 7; Ex. 2001, ¶54.

In addition to proactive adjustments to exposure time, the '840 Patent uses smoothing values and smoothing directions (Ex. 1001, 22:2-7), a set of constraints, and optimization parameters to smooth the trajectory depending

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upon the recording conditions. Ex. 2001, ¶55. For example, “[i]n some implementations, a set of parameters... may control the generation of the smoothed trajectory” and may include the **low-light** high-pass parameter. Ex. 1001, 22:22-35; Ex. 2001, ¶55.

This low-light high-pass parameter is part of a sophisticated system designed to proactively modify smoothing based on environmental factors—unlike Shi’s reactive approach based on first estimating the motion blur. Ex. 2001, ¶56. Specifically, Fig. 7 demonstrates how the system adapts smoothing based on lighting conditions and hence exposure time, with different values used for short or long exposure times, depending on whether the environment is well-lit or in low light. *Id.*

In contrast, Shi’s discussion of a coefficient to handle motion blur is a reactive approach. *Id.*, ¶57. Shi’s system adjusts based on estimating the motion blur first in the captured frames, and interpolating between real and virtual camera positions based on the estimated blur. Ex. 1007, 17:59-66, 18:1-10; Ex. 2001, ¶57. This coefficient is applied generally to reduce the perception of unnatural motion blur, without addressing specific conditions like low-light environments. Ex. 2001, ¶57. Shi’s coefficient does not contemplate a dynamic, proactive response to anticipated blur caused by low-

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light conditions, nor does it offer a mechanism for adjusting smoothing based on such anticipation. *Id.*

By contrast, the low-light high-pass parameter in the '840 Patent is proactively triggered by detecting low-light conditions that would lead to increased exposure times and, consequently, greater potential for motion blur. *Id.*, ¶58. It optimizes stabilization by anticipating such conditions and adjusting stabilization to compensate for motion blur based on factors like lighting and exposure. *Id.* This nuanced control mechanism enables the system to balance the need for stabilization with the need to mask or compensate for motion blur. Ex. 1001, 18:37-42; Ex. 2001, ¶58. In particular, the '840 patent also teaches that when motion blur is anticipated by low light environment, its effect may be compensated by having the smoothed trajectory in stabilization follow the (observed) trajectory during the exposure periods under low light conditions. Ex. 1001, 22:2-7; Ex. 2001, ¶58. The '840 patent thus teaches also that the alignment of stabilized trajectory with the anticipated direction of motion blur (i.e. the observed trajectory) can avoid “poor visual impressions” known as “motion blur pulsation” in video stabilization. Ex. 1001, 22:2-7; Ex. 2001, ¶58. This teaching of using the anticipated direction of blur in addition to the anticipated

blur strength is not disclosed anywhere in Shi for video stabilization. Ex. 2001, ¶58.

Furthermore, Shi's coefficient operates in a binary fashion—adjusting only when motion blur exceeds a certain threshold. Ex. 1007, 18:34-37; Ex. 2001, ¶59. It lacks the granular control over smoothing strength and blur compensation that the low-light high-pass parameter in the '840 Patent provides. *Id.* In contrast, the '840 Patent's parameter offers dynamic adjustments, allowing for fine-tuning based on exposure time and other environmental factors, as explained in connection with Fig. 7. *Id.* This level of control is critical when stabilizing video in low-light scenarios, where the trade-off between blur compensation and maintaining stability is more pronounced. *Id.*

In summary, Shi's coefficient is a general-purpose, reactive blur compensation mechanism, whereas the low-light high-pass parameter in the '840 Patent is a proactive, finely-tuned control mechanism designed to anticipate and manage motion blur strength and its direction in low-light scenarios. *Id.*, ¶60. The '840 Patent goes beyond simply reacting to blur; it adjusts smoothing dynamically based on environmental inputs, ensuring optimal stabilization under varying conditions, particularly in low light. *Id.*

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The Petition argues that the combination of Bell and Shi would have been obvious because both are aimed at stabilizing videos and addressing issues like motion blur. *Id.*, ¶¶61-66. It suggests that a person skilled in the art would have been motivated to combine Shi's motion blur compensation technique with Bell's video stabilization technique. *Id.*, ¶61. But a POSITA would not have been motivated to combine Bell and Shi to create a stabilization system as claimed to “determine a smoothed trajectory of the housing based on a look-ahead of the trajectory and one or more of a weight-balance parameter, a low-light high-pass parameter, and/or a stickiness parameter.” *Id.*

Bell and the '840 patent are targeting fundamentally different applications and markets. *Id.*, ¶62. Bell clearly discloses that their target application is narrow and is for “cell phones and other mobile devices” for “recording casual video” (Ex. 1006, 1:15-29), whereas the '840 patent is not so limited and applies to casual as well as specialized video, e.g. bodycams in fast sports, or mobile agile platforms, etc. Ex. 2001, ¶62. That is why Bell does not incorporate accelerations (linear or angular) or higher order derivatives, whereas the '840 patent does, and teaches a weighted balanced

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objective function depending on various input video characteristics (linear/angular velocity/acceleration or higher order derivatives), so a wide range of applications can be covered. *Id.*

Bell focuses on real-time video stabilization for cell phones and other mobile devices while recording casual video using a look-ahead buffer but does not address low-light conditions or motion blur. *Id.*, ¶63 Shi discusses handling blur, but primarily in the context of adjusting the virtual camera position based on frame blur detected and estimated after the fact. *Id.* There is no clear teaching or suggestion in the references that would motivate a skilled artisan to combine Bell's smoothing technique with Shi's *reactive*, blur-handling method to arrive at a system incorporating the *proactive low-light* high-pass parameter as defined in the '840 Patent. *Id.*

Furthermore, Petitioner's reliance on the alleged combination of Bell and Shi reflects improper hindsight reasoning. *Id.*, ¶64. The Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) cautioned against using hindsight to evaluate obviousness. Here, Petitioner fails to offer any reasoned motivation based on the prior art to combine Bell's look-ahead smoothing with Shi's reactive blur compensation. Ex. 2001, ¶64. A POSITA, without hindsight, would not have been motivated to combine two

fundamentally different systems—Bell's forward-looking approach and Shi's reactionary method. *Id.*; see also *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1068 (Fed. Cir. 2018) (finding that a POSITA must be motivated to make the combination, not merely able to do so).

Moreover, the combination of Shi's reactive blur detection and estimation with Bell's anticipatory stabilization would undermine Bell's look-ahead functionality. Ex. 2001, ¶65. Such a combination would lead to incompatible techniques, as Bell is focused on pre-emptively adjusting for future motion, while Shi reacts only after blur is detected. *Id.* Combining these systems would thus render Bell's system inoperable for its intended purpose, leading to technical incompatibility (*id.*), a key consideration for non-obviousness. See *Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999) (a reference teaches away when combining it with another would render it inoperable for its intended purpose). The Petition fails to address these fundamental differences, further weakening the rationale for combining these systems. Ex. 2001, ¶65.

In sum, Petitioner has not articulated a rationale supported by the evidence that would motivate a POSITA to combine Bell's and Shi's systems in a way that would result in the claimed invention. Ex. 2001, ¶66. Absent

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such motivation, the alleged combination fails to render the claims obvious.

Id.

VII. GROUNDS 2 THROUGH 7 FAIL ON THE MERITS

Petitioner asserts that the combination of Bell and Shi in combination with various other references render the remaining dependent claims of the '840 Patent obvious. Ex. 2001, ¶67. However, these combinations fail for the same reason as Ground 1, as all dependent claims require one or more of the low-light high pass, weight-balance and stickiness parameters of the independent claims. *Id.*

VIII. PETITIONER FAILS TO PROVIDE A REASONABLE EXPECTATION OF SUCCESS OR ADEQUATE MOTIVATION TO COMBINE

Petitioner fails to provide an adequate analysis regarding a reasonable expectation of success or the motivation to combine Bell and Shi. Ex. 2001, ¶¶68-70. These deficiencies are fatal to the Petition, as both elements are indispensable in establishing obviousness. *Id.*

A reasonable expectation of success is a core requirement for a finding of obviousness, and it cannot be established through mere conclusory statements. As the Federal Circuit has explained, “[a] finding by the Board that a patent challenger has demonstrated a motivation to combine references

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does not necessarily imply that the challenger has also met its burden of showing a reasonable expectation of success.” *Eli Lilly & Co. v. Teva Pharms. Int'l GmbH*, 8 F.4th 1331, 1344 (Fed. Cir. 2021). Moreover, the Federal Circuit has repeatedly emphasized that “[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

In this case, Petitioner has failed to meet this burden across each ground. For Ground 1, while Petitioner's expert attempts to explain a reasonable expectation of success by noting the shared video stabilization goals of Bell and Shi (Ex. 1003, ¶124), this analysis is both superficial and conclusory and fails to address the fact that Bell and Shi are both aimed at “casual video” stabilization for mobile devices (Ex. 1006, Intro) lacking the rigorous stabilization needed for more specialized applications. Ex. 2001, ¶69.

Bell's system, designed for casual video capture by cell phones and other mobile devices, does not address the complex rotational dynamics or proactive approach to low-light conditions by the '840 Patent. Ex. 2001, ¶70. And Shi does not remedy this deficiency. *Id.* Therefore, while Petitioner

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argues that a combination of these references would succeed, the focus on casual image capture and mobile devices in both references makes it unlikely that such a combination would lead to the claimed invention of the '840 Patent, which is designed for a wider range of applications, including more demanding applications (e.g., bodycams in sports or agile platforms with fast-changing motion characteristics). *Id.* Petitioner has not explained nor demonstrated why a POSITA would have expected success in extending Bell's and Shi's mobile-specific methods to the more specialized environments addressed by the '840 Patent. *Id.*

This lack of a meaningful explanation regarding a reasonable expectation of success undermines Petitioner's entire obviousness theory. Without any substantive analysis of why the proposed combinations would have a reasonable expectation of success, Petitioner's case rests solely on conclusory statements and fails to meet the necessary threshold for establishing obviousness across all grounds. *Id.* Therefore, the Petition should be denied on this basis.

IX. SECONDARY CONSIDERATIONS CONFIRM THE NON-OBVIOUSNESS OF THE '840 PATENT

Secondary considerations, or "objective indicia," of non-obviousness are critical in the overall inquiry under 35 U.S.C. § 103. As the Federal Circuit

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has noted, these indicia can “often establish that an invention appearing to have been obvious in light of the prior art was not.” *See Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983); *Liqwd, Inc. v. L’Oreal USA, Inc.*, 941 F.3d 1133, 1136-37 (Fed. Cir. 2019). Objective indicia “‘may often be the most probative and cogent evidence’ of nonobviousness.” *Liqwd*, 941 F.3d at 1136. These considerations are crucial in preventing hindsight bias, which can distort the obviousness analysis. *See Bristol-Myers Squibb Co. v. Teva Pharms. USA, Inc.*, 752 F.3d 967, 977 (Fed. Cir. 2014). When a nexus exists between these secondary considerations and the claimed invention, this evidence can carry substantial weight. *See Rambus Inc. v. Rea*, 731 F.3d 1248, 1256 (Fed. Cir. 2013).

Moreover, as emphasized in *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007), secondary considerations play a pivotal role in avoiding the pitfalls of hindsight bias, which can improperly influence the determination of obviousness. Objective indicia offer concrete evidence that helps ground the analysis in real-world achievements and market realities, rather than retrospective rationalization of prior art.

In the case of GoPro’s ’840 Patent, the following secondary considerations strongly support non-obviousness (Ex. 2001, ¶¶71-81):

PUBLIC VERSION**A. Commercial Success**

GoPro's HyperSmooth technology, which practices the claimed inventions of the '840 Patent (Ex. 2001, ¶¶71-72; Ex. 2006 (Complaint), ¶22; Ex. 2016 [REDACTED]), has driven significant commercial success. Ex. 2001, ¶73. GoPro has sold over 50 million action cameras since 2009, with its HERO series cameras, featuring HyperSmooth stabilization, at the forefront of this success. *See* Ex. 2003 ("GoPro Celebrates Surpassing 50 Million Cameras Sold"); Ex. 2001, ¶73. For example, the HERO7, which introduced HyperSmooth as a flagship feature, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED];
Ex. 2001, ¶73.

GoPro's dominant position in the U.S. action camera market, holding a larger share than all competitors combined, further illustrates the commercial strength of its patented technologies. Ex. 2001, ¶74. GoPro's partnerships with leading brands like Red Bull, NHL, and Adobe reflect the substantial demand for and market confidence in GoPro's products, driven in large part by its stabilization technologies. *See* Ex. 2005 (NHL Senior VP of

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Programming and Production said, “[O]nly GoPro has the technology to help us and our media partners showcase the beauty and intensity of hockey in new and deeper ways.”); Ex. 2008 (GoPro “named the exclusive action camera of Red Bull” mountain bike competition; GoPro athletes will capture their runs wearing HERO11 featuring “GoPro’s Emmy Award-winning HyperSmooth video stabilization”); Ex. 2009 (Vice President of Adobe Stock said, “Adding GoPro’s unique footage to Adobe Stock gives our community access to a library of immersive ‘wow’ moments that will take their audience to new places and deliver an additional level of depth and perspective to their creations”); Ex. 2001, ¶74.

This success is closely linked to specific features of GoPro’s patented technologies, such as its innovative use of specific stabilization parameters, including the weight-balance parameter, low-light high-pass parameter, and stickiness parameter. Ex. 2001, ¶75. These parameters work together to ensure precise control over the stabilization process, allowing the system to adapt to various recording conditions, as described and claimed in the ’840 Patent. *Id.*

B. Industry Praise and Recognition

GoPro’s HyperSmooth technology has garnered widespread industry recognition. Ex. 2001, ¶76. It earned a CES Innovation Award in 2019 and a

Technology and Engineering Emmy in 2022, further confirming the value and non-obviousness of GoPro's patented stabilization methods. *See* Ex. 2010 ("73th Annual Technology & Engineering Emmys" . . . "In Camera Sensor and Software Stabilization – Awarded to GoPro and Socionext" . . . "The technology has created the ability for camera operators and producers to obtain stabilized action footage when a subject is rapidly moving easily and economically in unstable situation."); Ex. 2011 ("GoPro Showcases Award-Winning HERO7 Cameras at CES 2019"); Ex. 2012 ("GoPro Wins Second Emmy® Award for Groundbreaking Digital Imaging Technology"; "This Emmy is in recognition of the technology powering GoPro's industry-leading HyperSmooth video stabilization"); Ex. 2001, ¶76.

Third-party reviews consistently highlight HyperSmooth as a groundbreaking feature that sets GoPro apart from competitors, with praise for its ability to deliver stable, smooth video footage in challenging conditions. Ex. 2013 (analysts at JP Morgan stating GoPro's "gimbal like hypersmooth stabilization (developed in-house software and hardware)" was "a significant upgrade" when introduced and was the "key selling point" in the HERO7 camera); Ex. 2014 at 5 ("GoPro's HyperSmooth image stabilization is the best we've seen on any action camera"); Ex. 2001, ¶77.

PUBLIC VERSION**C. Long-Felt but Unmet Need**

Before the introduction of HyperSmooth, users of action cameras faced persistent challenges in capturing stable footage during high-vibration activities like mountain biking, hiking, or surfing. Ex. 2001, ¶78. Mechanical gimbals, while used for stabilization, were bulky, fragile, and unsuitable for dynamic environments of such applications. *Id.* This long-standing issue, now addressed by the digital stabilization system claimed in the '840 Patent, underscores the invention's non-obvious nature. *Id.* As the Federal Circuit has recognized, solving a long-felt but unmet need supports a finding of non-obviousness. *See Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]; Ex. 2001, ¶79.

The success of these advanced methods filled a long-felt gap in the market, further demonstrating the non-obviousness of the claimed inventions. Ex. 2001, ¶¶78-79.

D. Unexpected Results

GoPro's system consistently outperformed traditional stabilization techniques, which often failed to maintain stabilization under rapidly changing motion characteristics, showcasing the unexpected success of the HyperSmooth system over prior technologies. Ex. 2014 ("GoPro's HyperSmooth image stabilization is the best we've seen on any action camera"); [REDACTED]
[REDACTED]; Ex. 2001, ¶80.

These unexpected results further reinforce the non-obviousness of the '840 Patent. *Id.*

E. Copying by Competitors

Copying by competitors is a strong indicator of non-obviousness. *See Liqwd, Inc. v. L'Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019). In this case, Insta360, a direct competitor, is accused of copying GoPro's

HyperSmooth technology, further highlighting the innovative and valuable nature of the '840 Patent.¹ Ex. 2001, ¶81, Ex. 2006 (Complaint).

¹ Patent Owner understands that in the ITC litigation, Petitioner served an interrogatory response requesting Patent Owner's contentions regarding secondary considerations. On October 3, 2024, Lead Counsel for Patent Owner emailed Petitioner, asking that Petitioner produce any documents relevant to secondary indicia under Petitioner's self-executing obligation to produce any "relevant information that is inconsistent with" its obviousness grounds, including evidence of secondary considerations. 37 C.F.R. § 42.51(b)(1)(iii); Ex. 2007; *see Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 20 at 2-5 (PTAB Feb. 28, 2018) (finding that documents demonstrating copying and long-felt need must be produced as "routine discovery" because they are inconsistent with Petitioner's obviousness positions). Petitioner responded on October 9, 2024, that it was aware that Patent Owner had responded to the interrogatory by "cit[ing] to some Arashi documents in arguing secondary considerations of non-obviousness." Ex. 2007. However, Petitioner disagreed that it was obligated to produce those identified documents and has, at the time this

These secondary considerations—commercial success, industry praise, long-felt need, unexpected results, and copying by competitors—collectively confirm that the inventions claimed in the '840 Patent were not obvious. Ex. 2001, ¶¶71-81. GoPro's HyperSmooth technology has revolutionized the action camera market, driving consumer demand, earning industry recognition, and prompting competitors to replicate its success. *Id.* For these reasons, the Board should find that the claims of the '840 Patent are non-obvious and uphold their validity.

X. CONCLUSION

For the foregoing reasons, Patent Owner respectfully submits that the Board should uphold the challenged claims.

POPR has been filed, refused to produce those documents. *Id.* If Petitioner and Patent Owner are unable to come to agreement, Patent Owner will seek guidance from the Board. Patent Owner further may request that the Board grant authority to Patent Owner to file additional briefing once those documents are produced.

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CERTIFICATE OF LENGTH (37 C.F.R. §§ 42.24)

The undersigned hereby certifies that, according to the word-processing system used to prepare the foregoing document, this document has 5,859 words and thus complies with the applicable word limit.

Date: October 28, 2024

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CERTIFICATE OF SERVICE (37 C.F.R. §§ 42.6(E), 42.105(A))

The undersigned hereby certifies that the foregoing document was served in its entirety on October 28, 2024 upon the following parties via

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