

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. IPR2024-01165
U.S. Patent No. 10,958,840

PATENT OWNER'S PRELIMINARY RESPONSE

PUBLIC VERSION

PUBLIC VERSION**TABLE OF CONTENTS**

	<u>Page</u>
I. INTRODUCTION	1
II. OVERVIEW OF THE '840 PATENT	3
III. OVERVIEW OF CERTAIN CITED ART	6
B. Ground 1 Cited Art.....	6
1. Zhou (Ex. 1006).....	6
2. Cai (Ex. 1009).....	7
IV. LEVEL OF ORDINARY SKILL IN THE ART.....	9
V. CLAIM CONSTRUCTION	9
VI. GROUND 1: PETITIONER FAILS TO ESTABLISH THAT ZHOU AND CAI RENDER CLAIMS 1-21 OBVIOUS.....	10
A. Claims 1 and 16: Zhou Does Not Disclose Nor 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”	10
1. Zhou Lacks a Proactive Low-Light High-Pass Parameter	10
B. Claims 1 and 16: Zhou In View of Cai Does Not Render Obvious the Limitation “wherein the determination of the smoothed trajectory based on the look-ahead of the trajectory includes use of a temporal horizon of motion experienced by the image capture device, the temporal horizon enabling approximation of intentional motion of the image capture device while causing a delay in the determination of the smoothed trajectory”	14

PUBLIC VERSION

1. Cai Lacks a Temporal Horizon of Motion for
Intentional Motion Approximation..... 15

C. A POSITA Would Not Have Been Motivated to
Combine Zhou and Cai 17

1. No Clear Motivation to Combine Reactive
Systems for Proactive Stabilization..... 17

2. Technical Incompatibility and Lack of Benefit... 18

VII. GROUNDS 2 THROUGH 4 FAIL ON THE MERITS..... 19

VIII. PETITIONER FAILS TO PROVIDE A REASONABLE
EXPECTATION OF SUCCESS OR ADEQUATE
MOTIVATION TO COMBINE..... 20

IX. SECONDARY CONSIDERATIONS CONFIRM THE NON-
OBVIOUSNESS OF THE ‘840 PATENT..... 23

A. Commercial Success 24

B. Industry Praise and Recognition 26

C. Long-Felt but Unmet Need 27

D. Unexpected Results 28

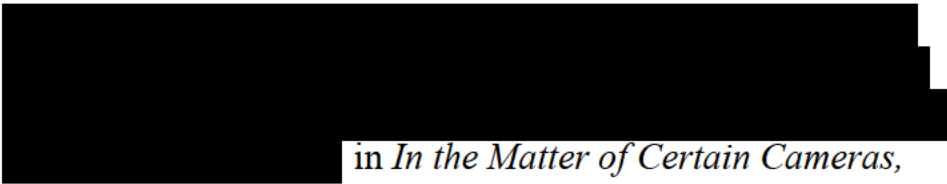
E. Copying by Competitors 29

X. CONCLUSION 31

PUBLIC VERSION**EXHIBIT LIST**

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

PUBLIC VERSION

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:

PUBLIC VERSION

- **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 Zhou and Cai references, fails to disclose or render obvious these proactive stabilization parameters. Zhou's system reacts to detected motion artifacts by adjusting a stabilization metric only after motion blur is observed in the frame, lacking the '840 Patent's preemptive low-light high-pass parameter that anticipates blur under low-light conditions before it occurs.

Cai, similarly, employs reactive low-pass filtering to smooth jitter, using a "sliding window" to review past and future frames, yet does not distinguish intentional from unintentional motion. In contrast, the '840 Patent's temporal horizon of motion allows for nuanced differentiation between erratic and consistent motion, enhancing stabilization precision by distinguishing intentional camera movement over a sequence of frames.

PUBLIC VERSION

These key distinctions, alongside the absence of any compelling motivation to combine Zhou and Cai's teachings to achieve the claimed 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, ¶¶35-39. 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 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.

Additionally, the '840 Patent introduces a temporal horizon of motion as a basis for distinguishing intentional camera movements from unintentional jitter. Ex. 2001, ¶38. By incorporating this temporal horizon, the system can analyze movement patterns across multiple frames, identifying consistent or planned motion over time as intentional. *Id.* This feature enables the stabilization system to apply adjustments based on whether the movement appears to be part of a purposeful trajectory or an unintended shake, allowing more nuanced stabilization that retains intended motion while filtering out irregularities. *Id.* The temporal horizon of motion thus enhances stabilization precision, especially in scenarios requiring distinction between different types of camera movements. *Id.*

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. *Id.*, ¶39.

III. OVERVIEW OF CERTAIN CITED ART

The petition challenges the '840 Patent's claims 1 to 21 on four grounds. Ex. 2001, ¶¶40-41. Ground 1 asserts that the combination of Zhou and Cai renders the independent claims 1 and 16, along with certain dependent claims, obvious. Grounds 2 through 4 address the remaining dependent claims by asserting the combination of Zhou and Cai along with one other reference per ground. *Id.*

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

B. Ground 1 Cited Art

1. Zhou (Ex. 1006)

The Examiner issued the '840 Patent over Zhou. See Appl. No.: 16/713,798, List of References Cited by Examiner (Nov. 30, 2020); Ex. 2001, ¶¶42-44.

Zhou discloses a system aimed at smoothing camera motion during video capture by adjusting a “stabilization metric” in response to motion data derived from gyroscopes or accelerometers. Ex. 1006, Abstract, 3:47-4:19; Ex. 2001, ¶43. Zhou relies on motion data from gyroscopes or accelerometers, it discloses motion smoothing based on estimated motion blur of the current

PUBLIC VERSION

frame from adjacent frames in low-light conditions, and does not address rotational dynamics, such as yaw, pitch, or roll. Ex. 1006, 3:47-4:19; Ex. 2001, ¶43. The rotational aspects of camera movement are critical to the '840 Patent (Ex. 1001, 17:40-53, 21:17-58), but are not contemplated by Zhou. Ex. 2001, ¶43.

Zhou's stabilization strength metric, like Shi's motion blur coefficient,¹ is *reactive*, adjusting only after motion blur is detected and estimated in the frame, Ex. 1006, Abstract, 4:8-19, rather than proactively anticipating low-light conditions likely to result in blur, as in the '840 Patent. Ex. 2001, ¶44.

2. Cai (Ex. 1009)

Cai discloses a system for video stabilization that smooths a shaky camera trajectory by responding to detected jitter in recorded frames. Ex. 1009, Abstract; 2:17-19; Ex. 2001, ¶¶45-47. The system begins by applying a "low-pass filter" to separate high-frequency jitter from slower intentional

¹ Petitioner relies on Shi in its first-ranked petition for its disclosure of a coefficient to handle motion blur that has been detected and estimated (a reactive technique like Zhou, which was already before the Patent Office). Ex. 2001, ¶44, n.1.

PUBLIC VERSION

movements, generating an “estimated trajectory” that smooths out unwanted motion over successive frames. Ex. 1009, Abstract, 2:35-51; 4:4-6; Ex. 2001, ¶45. When jitter is detected in frames identified as “zero-motion frames,” Cai’s system then applies “frame warping” to remove the jitter from these frames. Ex. 1009, Abstract; Ex. 2001, ¶45.

To further address jitter artifacts, Cai’s system predicts future frames for planned trajectories, aiming to reduce jump artifacts caused by jitter “clamping.” Ex. 1009, 7:33-39; 9:64-10:3; Ex. 2001, ¶46. This is accomplished through a “sliding window” approach that considers several past and future frames to create a “smooth trajectory” between anchor points. Ex. 1009, 9:64-10:3; Ex. 2001, ¶46. Cai explains that trajectory planning may involve fitting a curve, such as a “Bezier curve” or “least squares fit,” to minimize abrupt transitions in the video. Ex. 1009, 8:33-43; Ex. 2001, ¶46. This sequence of steps responds to detected jitter and adjusts trajectories based on past and current frames, making it a reactive approach that stabilizes video only after unwanted motion is detected. Ex. 1009, 7:11-19; 7:35-8:10; Ex. 2001, ¶46.

In contrast to Cai’s reactive low-pass filtering, which responds only after detecting unwanted motion, the ’840 Patent’s parameters proactively

PUBLIC VERSION

anticipate and mitigate challenging conditions, enabling enhanced stabilization control across a wide-range of settings. Ex. 2001, ¶47.

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. 6.

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 6-7. Patent Owner agrees that no

PUBLIC VERSION

claim terms presently require construction to resolve any current dispute between the parties. Ex. 2001, ¶34.

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

A. Claims 1 and 16: Zhou Does Not Disclose Nor 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, ¶¶48-56.

1. Zhou Lacks a Proactive Low-Light High-Pass Parameter

The Examiner issued the '840 Patent over Zhou, recognizing that Zhou's reactive stabilization system lacks the proactive capabilities of the '840 Patent. Ex. 2001, ¶49.

Petitioner contends that Zhou's “stabilization strength parameter” is a “low-light high-pass parameter,” simply because it controls “the extent of motion blur compensation.” (Petition at 25-26). This is incorrect. Ex. 2001, ¶50.

Zhou discloses a system for video stabilization that adjusts a “stabilization metric” based on motion data from gyroscopes or

PUBLIC VERSION

accelerometers. Ex. 1006, Abstract, 3:47-4:19; Ex. 2001, ¶51. Zhou's system *reacts* to motion blur only *after it is detected* and estimated in a captured frame, making it a reactive system like Shi's motion blur coefficient (from Petitioner's first-ranked IPR petition), which also only responds to blur post-detection and post-estimation. Ex. 2001, ¶51. This purely reactive approach falls short of the proactive features in the '840 Patent, which anticipates challenging conditions before they manifest. *Id.*

Petitioner concedes that Zhou's motion blur compensation technique is reactive, when it explains that in Zhou "***if the amount of blur in the image is larger*** (typically found in darker images with longer integration times), smaller stabilization strengths may be employed." Pet. at 25; Ex. 2001, ¶52. Because the detection and estimation of larger blur may be associated with low light, Petitioner (and its expert) jump to the conclusion that Zhou's "stabilization strength parameter controls . . . the extent of motion blur compensation, and is a low-light high-pass parameter," (Pet. 25-26), thus, ignoring the fact that Zhou is teaching a reactive method that is fundamentally different from the '840 Patent's proactive method. Ex. 2001, ¶52. The ipse dixit of an expert, however, does not prove obviousness. *See In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) ("To satisfy its

PUBLIC VERSION

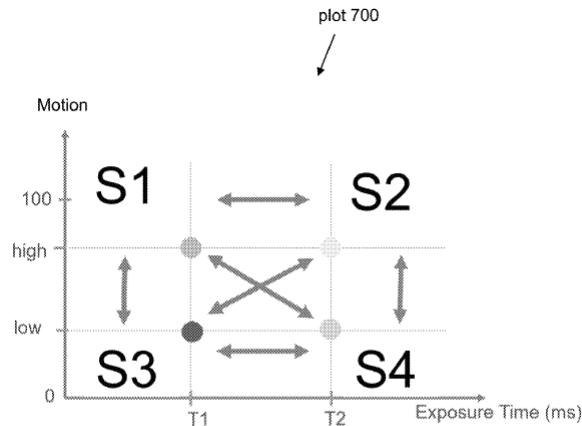
burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.”).

As recognized in *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), there must be a clear, articulated reasoning with a rational underpinning to support a conclusion of obviousness. Petitioner has failed to provide such reasoning, as Zhou's reactive system fundamentally differs from the proactive low-light high-pass parameter of the '840 Patent. Ex. 2001, ¶53.

In contrast to Zhou, the '840 Patent's low-light high-pass parameter proactively identifies low-light conditions likely to result in motion blur and adjusts stabilization strength (Ex. 1001, 19:15-26) and direction (Ex. 1001, 22:2-7) in advance to prevent the effect of blur before it manifests. Ex. 2001, ¶54. The proactive nature of the '840 Patent's low-light high-pass parameter is essential for effective stabilization under difficult lighting and rotational conditions, which Zhou does not address. Ex. 2001, ¶54. This parameter operates across a continuous range from 0 to 1, allowing for adaptive control based on exposure time and light conditions. Ex. 1001, 22:8-21; Ex. 2001, ¶54. Fig. 7 of the '840 Patent further illustrates how the system dynamically adjusts its smoothing strength based on environmental factors such as lighting

PUBLIC VERSION

and hence the exposure time, providing nuanced control over rotational dynamics. Ex. 1001, Fig. 7, 18:37-42; Ex. 2001, ¶54.

**FIG. 7**

The low-light high-pass parameter and related parameters in the '840 Patent (including weight-balance and stickiness) enable an anticipatory adjustment system specifically designed to stabilize rotational motion under low lighting, where even slight rotational movements could otherwise amplify motion blur due to increased exposure times. Ex. 2001, ¶55. This anticipatory adjustment of stabilization strength differentiates the '840 Patent from Zhou's system, which does not anticipate or preemptively manage conditions that lead to blur, thus falling short of the unique low-light high-pass parameter disclosed in the '840 Patent. *Id.*

PUBLIC VERSION

The Petitioner's argument that Zhou discloses a low-light high-pass parameter misinterprets Zhou, as Zhou only reacts to motion blur once it is estimated in a frame. Ex. 1006, 13:32-37; Ex. 2001, ¶56. This fundamental distinction between a proactive, anticipatory approach and a post-blur-estimation reactive approach is why Zhou does not teach or suggest the '840 Patent's low-light high-pass parameter, as implicitly recognized by the Examiner during prosecution. Ex. 2001, ¶56; *see Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160-62 (Fed. Cir. 2021) (reversing obviousness decision in IPR where substantial evidence did not support finding that prior art taught all of the claim limitations).

B. Claims 1 and 16: Zhou In View of Cai Does Not Render Obvious the Limitation “wherein the determination of the smoothed trajectory based on the look-ahead of the trajectory includes use of a temporal horizon of motion experienced by the image capture device, the temporal horizon enabling approximation of intentional motion of the image capture device while causing a delay in the determination of the smoothed trajectory”

Claims 1 and 16 require: “the determination of the smoothed trajectory based on the look-ahead of the trajectory includes use of a temporal horizon of motion experienced by the image capture device, the temporal horizon enabling approximation of intentional motion of the image capture device

while causing a delay in the determination of the smoothed trajectory.” Ex. 2001, ¶¶57-63.

The Petition concedes that Zhou does not disclose this limitation and instead turns to Cai. Ex. 2001, ¶58. However, this reliance on Cai is flawed and invites error. *Id.*

1. Cai Lacks a Temporal Horizon of Motion for Intentional Motion Approximation

The '840 Patent claims require a “temporal horizon of motion” to identify intentional motion, enabling the system to distinguish between intentional and unintentional movements by analyzing motion across multiple frames. Ex. 2001, ¶59. This temporal horizon leverages frame-by-frame context to identify patterns of consistent motion as intentional, setting it apart from mere jitter smoothing. *Id.* A POSITA would understand that this temporal horizon involves assessing camera movement patterns over time to interpret the trajectory as either intentional or unintentional, a feature absent in Cai. *Id.*

The Petitioner, while suggesting it does not understand the meaning of the term, argues that Cai nevertheless discloses a temporal horizon of motion by pointing to Cai’s “sliding window” approach, which considers past and future frames to smooth trajectories. *Id.*, ¶60. However, Cai’s sliding window

PUBLIC VERSION

simply enables a form of low-pass filtering to reduce jitter and is not used for identifying intentional motion versus unintentional motion. *Id.* Specifically, Cai's system applies "frame warping" to remove detected jitter without distinguishing between intentional and unintentional movements. Ex. 1009, Abstract, 7:33-39, 9:64-10:3; Ex. 2001, ¶60. While Cai's smoothing reduces abrupt transitions, it lacks a mechanism to interpret motion context across frames as intentional or unintentional. Ex. 2001, ¶60.

Further, Cai's "sliding window" and "Bezier curve" techniques are used solely to minimize jumps between frames rather than to create a contextual motion model. Ex. 1009, 8:33-43; Ex. 2001, ¶61. While these methods fit a curve to align frame movements along a smooth path, they serve as reactive smoothing functions and lack the predictive ability required to distinguish between intentional and unintentional motions through a temporal horizon. Ex. 2001, ¶61. Cai's frame-by-frame adjustments do not achieve the '840 Patent's intentional motion identification, which requires an ongoing temporal analysis for effective differentiation between motion types. *Id.*

Therefore, Cai's low-pass filtering and smoothing techniques do not meet the intentional motion identification enabled by the '840 Patent's temporal horizon. *Id.*, ¶62. The Petition fails because Cai does not provide a

PUBLIC VERSION

method to interpret motion patterns as intentional or unintentional, as required by the claims. *Id.*

C. A POSITA Would Not Have Been Motivated to Combine Zhou and Cai

Even if Zhou and Cai's methods could be theoretically combined, no motivation exists in the prior art to do so in a way that would achieve the '840 Patent's proactive stabilization. Ex. 2001, ¶63-66.

1. No Clear Motivation to Combine Reactive Systems for Proactive Stabilization

Both Zhou and Cai employ reactive stabilization techniques, adjusting only in response to detected motion artifacts rather than preemptively managing conditions that could lead to blur or unintended jitter. Ex. 2001, ¶64. The '840 Patent's invention moves beyond these frame-by-frame corrections by introducing parameters that anticipate and address conditions due to light and motion variability. *Id.* A POSITA would recognize that neither Zhou nor Cai offers any hint or suggestion of combining such reactive systems to create a proactive stabilization solution. *Id.* As emphasized by the Federal Circuit in *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1068 (Fed. Cir. 2018), obviousness requires that a skilled artisan would not only be

PUBLIC VERSION

able to combine the prior art but would have been motivated to do so. Here, no such motivation exists. Ex. 2001, ¶64.

2. Technical Incompatibility and Lack of Benefit

Zhou and Cai's reactive methods cannot achieve the proactive, dynamic stabilization capabilities of the '840 Patent, which includes advanced parameters to manage rotational dynamics (e.g., angular velocity, acceleration, and higher order derivatives), low-light motion blur, and intentional motion interpretation. Ex. 2001, ¶65. Combining these prior art methods would yield a hybrid system still limited to motion smoothing that takes a reactive approach to motion blur within narrow application settings disclosed by these prior art references, rather than the proactive anticipatory stabilization model claimed in the '840 Patent. *Id.* Moreover, Zhou and Cai do not address rotational dynamics, such as velocity and acceleration, or higher order derivatives, along yaw, pitch, and roll. *Id.* The rotational dynamics of camera movement are critical to the '894 Patent but are not contemplated by Zhou or Cai. *Id.* A POSITA would find no technical rationale to combine Zhou and Cai in a way that would render the '840 Patent claims obvious, as Zhou and Cai focus on motion smoothing that takes a reactive approach to motion blur within narrow application settings disclosed by these prior art references and

PUBLIC VERSION

lack the proactive environmental anticipation essential for the '840 Patent's unique stabilization solution. *Id.* Combining references is not obvious if the result would render the system inoperable for its intended purpose. *See Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999). Here, combining Zhou's reactive method with Cai's smoothing would not achieve the anticipatory, proactive system claimed in the '840 Patent and would instead create an ineffective hybrid. Ex. 2001, ¶65.

Therefore, the Petition fails to establish a motivation to combine Zhou and Cai in a way that would render the claims of the '840 Patent obvious. Ex. 2001, ¶66.

VII. GROUNDS 2 THROUGH 4 FAIL ON THE MERITS

Petitioner asserts that the combination of Zhou and Cai 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, along with the temporal horizon of motion requirements of the independent claims. *Id.*

PUBLIC VERSION**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 Zhou and Cai. Ex. 2001, ¶¶68-72. These deficiencies are fatal to the Petition, as both elements are indispensable in establishing obviousness.

A reasonable expectation of success is not established simply by identifying superficial similarities between references. A substantive, reasoned analysis is required to demonstrate why a person of ordinary skill in the art (POSITA) would expect the proposed combination to succeed. As the Federal Circuit has explained, “[a] finding by the Board that a patent challenger has demonstrated a motivation to combine references 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, “rejections 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.*

PUBLIC VERSION

v. Teleflex Inc., 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Petitioner's expert attempts to justify a reasonable expectation of success by pointing out the shared goal of stabilizing videos between Zhou and Cai (Ex. 1003, ¶¶ 127–133). Ex. 2001, ¶69. However, this superficial similarity does not address the significant technical differences between the two systems and is also conclusory. Ex. 2001, ¶69. Zhou focuses on smoothing video by analyzing motion data from gyroscopes and accelerometers, while Cai is concerned with smoothing jitters in zero motion or under intentional “low frequency” and “low speed” movement (e.g. “a sweep or a pan”) using scene movement analysis. Ex. 1009, 2:24-34, 6:4-17, 9:3-7; Ex. 2001, ¶69. The Petition fails to provide a reasoned explanation for why combining these fundamentally different approaches would yield a system capable of meeting the '840 Patent's claimed, including the “temporal horizon of motion” requirement for approximating intentional motion. Ex. 2001, ¶69.

Moreover, while Petitioner's expert contends that both Zhou and Cai use similar buffering systems (Ex. 1003, ¶132), the focus of the buffering in each reference differs completely. Ex. 2001, ¶70. Zhou uses buffering to

adjust stabilization strength to keep the current frame within its “overscan” (Ex. 1004, Abstract), while Cai uses it for **trajectory adjustment** and distinguishing jitter from zero-motion or low-speed movements. Ex. 1009, 4:39-44, 9:25-34. Ex. 2001, ¶70. Petitioner (and its expert) fail to articulate why a POSITA would expect that these buffering systems, which serve distinct purposes, could be combined successfully to approximate intentional motion, as required by the '840 Patent. Ex. 2001, ¶70.

Additionally, Petitioner's assertion that a POSITA would have been motivated to combine Zhou's motion-sensing based system (using motion sensors such as a gyroscope or an accelerometer) with Cai's scene-based smoothing system (using scene content information) lacks substantive support. Ex. 2001, ¶71. As the Supreme Court has emphasized, “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. at 418. Petitioner has not provided such reasoning. Instead, Petitioner relies on conclusory statements about the benefits of combining the two systems without addressing the specific technical challenges that would arise from such a combination, particularly with respect to the claimed temporal horizon of motion. Ex. 2001, ¶71.

Without a detailed explanation or evidence regarding why a POSITA would expect the proposed combination to succeed, Petitioner's case lacks the required articulation of a reasonable expectation of success. Ex. 2001, ¶72. 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 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, ¶¶73-83):

A. Commercial Success

GoPro's HyperSmooth technology, which practices the claimed inventions of the '840 Patent (Ex. 2001, ¶¶73-74, Ex. 2006 (Complaint), ¶22; Ex. 2016 [REDACTED]), has driven significant commercial success. Ex. 2001, ¶75. 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, ¶75. For example, the HERO7, which introduced HyperSmooth as a flagship feature, [REDACTED]

[REDACTED]

[REDACTED]

;
Ex. 2001, ¶75.

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, ¶76. 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 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, ¶76.

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, ¶77. 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, ¶78. 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

PUBLIC VERSION

Emmy is in recognition of the technology powering GoPro's industry-leading HyperSmooth video stabilization"); Ex. 2001, ¶78.

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, ¶79.

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, ¶80. 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-

PUBLIC VERSION

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, ¶81.

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, ¶¶80-81.

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

PUBLIC VERSION

HyperSmooth system over prior technologies. Ex. 2014 (“GoPro’s HyperSmooth image stabilization is the best we’ve seen on any action camera”); Ex. 2015, [REDACTED]; [REDACTED]; Ex. 2001, ¶82.

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.² Ex. 2001, ¶83, Ex. 2006 (Complaint).

² 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

IPR2024-01165

Patent Owner's Preliminary Response

PUBLIC VERSION

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.

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 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.

PUBLIC VERSION

2001, ¶¶73-83. 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.

Date: October 28, 2024

By: /s/ James Glass

James M. Glass (Reg. No. 46,729)
QUINN EMANUEL URQUHART &
SULLIVAN LLP

51 Madison Avenue, 22nd Floor
New York, NY 10010

Email: jimglass@quinnemanuel.com

Phone: 212-849-7142

Fax: 212-849-7100

Counsel for Patent Owner
GoPro, Inc.

PUBLIC VERSION

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 5,635 words and thus complies with the applicable word limit.

Date: October 28, 2024

By: /s/ James Glass

James M. Glass (Reg. No. 46,729)
QUINN EMANUEL URQUHART &
SULLIVAN LLP

51 Madison Avenue, 22nd Floor
New York, NY 10010

Email: jimglass@quinnemanuel.com

Phone: 212-849-7142

Fax: 212-849-7100

*Counsel for Patent Owner
GoPro, Inc.*

IPR2024-01165
Patent Owner's Preliminary Response

PUBLIC VERSION

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

Electronic Mail:

ayap@mofo.com
marjomand@mofo.com
jnguyen@mofo.com
mofo_insta360-IPRs@mofo.com
AYuan@mofo.com
SMao@mofo.com

Date: October 28, 2024

By: /s/ James Glass
James M. Glass (Reg. No. 46,729)
QUINN EMANUEL URQUHART &
SULLIVAN LLP
51 Madison Avenue, 22nd Floor
New York, NY 10010
Email: jimglass@quinnemanuel.com
Phone: 212-849-7142
Fax: 212-849-7100

Counsel for Patent Owner
GoPro, Inc.